

Abstracts from the 2021 Annual Meeting of the Society of General Internal Medicine



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SCIENTIFIC ABSTRACT CAREER DEVELOPMENT

CAREER SPONSORSHIP IN ACTION: FACULTY KNOWLEDGE AND ACTIONS OF SPONSORSHIP AT A LARGE ACADEMIC HEALTH CENTER

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BACKGROUND: Women and underrepresented in medicine (URM) faculty members face inequities in promotion and representation in leadership. Sponsorship, wherein an influential person advocates for the advancement of an individual, may be a remedy. Few studies evaluate sponsorship in academic medicine, and none assess knowledge and behaviors of sponsorship across an institution. Our study fills this gap by surveying faculty in a large academic medical center about sponsorship.

METHODS: The Sponsorship Climate Survey (SCS) was created based on the literature and an iterative process with faculty experts. The SCS assessed familiarity with sponsorship; having had a sponsor; received acts of sponsorship; perceived inequities; and perceived career impact. The SCS had 31 questions with Likert, multiple-choice, or short answer formats. We distributed the survey electronically to eligible faculty (> 50% appointment in Dentistry, Medicine, Nursing, Pharmacy). Basic statistics were calculated using SPSS.

RESULTS: Respondents included 903 of 2900 (31.1%) faculty members, of whom 52.8% (n=477) were female and 10.5% (n=95) were URM. Their familiarity with and receipt of sponsorship are summarized in Table 1. 55.4% (n=398) felt that women receive less sponsorship than men and 46.4% (n=312) that URM faculty receive less than their peers. 64.2% reported being satisfied with the sponsorship they received and 59.8% that sponsorship had been important to their career success.

CONCLUSIONS: A majority of faculty respondents at a large academic medical center were familiar with the concept of sponsorship and reported receipt of sponsorship. Senior faculty were less likely to report either. Self-reported receipt of sponsorship was similar across genders and higher among URM versus non-URM faculty, yet half of the faculty perceived that women and URM faculty were less likely to receive sponsorship. While many were satisfied with the sponsorship they received, a substantial minority were not leaving room for improvement.

LEARNING OBJECTIVE #1: Describe faculty knowledge and experience of sponsorship within a large academic medical center.

LEARNING OBJECTIVE #2: Identify potential targets for improving future sponsorship efforts.

THE EXTENT AND PREDICTORS OF BURNOUT AMONG CLERICAL ASSISTANTS IN VA PRIMARY CARE.

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BACKGROUND: Patient centered medical homes (PCMHs) have expanded the role of clerical assistants (CAs), with recent studies describing increased task complexity and customer service responsibilities. Without adequate support and preparation for new roles, PC CAs may experience symptoms of burnout and higher turnover. Some studies have shown that CA turnover is associated with worse patient ratings of care. To our knowledge, no studies have examined burnout in PCMH CAs. Here we assess the level of burnout, and use the Job Demands-Resources Model to identify predictors of burnout among VA PCMH CAs.

METHODS: We analyzed cross sectional data from a 2018 VA national survey of primary care providers and staff (n for CAs=708, RR=12%) in 349 clinics. The outcome is experience of burnout (dichotomized, no/occasionally or definitely/completely). Predictors are CA's perceptions of the challenge/burden of 4 tasks: timely receipt of patient messages, scrubbing appointments (optimizing provider visit schedules), view alerts (notifications in electronic health record systems that document consult orders, results of tests, patient messages, etc.), and completing forms (e.g. disability). We included 2 measures of role "fit" (work well-matched to training; received education; training to function at top of scope of practice), 2 measures of work environment (skills and talents valued and utilized; rating of team interactions), and team instability (change in the past year) controlling for demographics and tenure. Odds ratios were estimated using logistic regression models.

RESULTS: Our analytical sample included 685/708 CAs; 40% reported experiencing burnout. CAs were more likely to experience burnout if they perceived greater reliance on them for fielding patient messages (OR=1.72), scrubbing appointments (OR=1.88), view alerts (OR=1.50), and forms (OR=1.71). We found no association between burnout and role "fit" or burnout and work environment. Longer tenure (OR=1.98) and team instability (OR=1.43) were associated with a higher likelihood of burnout.

CONCLUSIONS: CA burnout was higher among those perceiving greater reliance on them for customer service-related tasks, longer tenure, and team instability. We found no evidence that role "fit" or good teamwork was protective against burnout. Similar to studies of other PCMH roles (clinicians, nurses), staff instability was associated with higher burnout. Our results echo other studies' findings that identify components of CA work as "emotional labor" dealing with frustrated patients (e.g. messages, appointments, forms), and may contribute to burnout in PCMH CAs. CAs may need more support for customer service-related tasks. Further research exploring "emotional work" of CAs is merited given the evidence of CA turnover associated with worse patient ratings of care. Limitations of this study include low RR, lack of knowledge of CA training and potential bias due to unmeasured factors (e.g. number of PCMH teams CAs are assigned to, variation in scope of CA tasks).

LEARNING OBJECTIVE #1: 1

LEARNING OBJECTIVE #2: 6

Scientific Abstract - Clinical Informatics and Health Information Technology

A MACHINE LEARNING APPROACH TO CHRONIC OBSTRUCTIVE PULMONARY DISEASE EXACERBATION IDENTIFICATION AND READMISSION RISK QUANTIFICATION

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BACKGROUND: One quarter of patients discharged from hospital for chronic obstructive pulmonary disease (COPD) exacerbations are readmitted within 30 days. Early identification and treatment of patients with acute exacerbations of COPD improves outcomes. Yet, the presenting symptoms for COPD exacerbations, such as dyspnea and cough, and the radiographic infiltrates, are often non-specific and can signify multiple conditions; additionally, pre-existing diseases such as heart failure can trigger an exacerbation. This can make it difficult for the timely identification of all patients with COPD exacerbation and provide early COPD-specific care. Resource constraints limit who can receive intensive care management, therefore it is important to identify those at a high risk for readmission. The objective of the study was to create a machine learning model to identify patients admitted with acute exacerbations of COPD and stratify them according to their 30-day readmission risk.

METHODS: We used retrospective analysis of admissions to general internal medicine (GIM) from the University Health Network's Electronic Patient Record (EPR) to train a model to identify COPD exacerbations and predict their 30-day readmission risk. Potential predictors, from the EPR, included demographic, laboratory, and medication data variables. We evaluated the learning algorithms including logistic regression, random forest, and gradient boosting using metrics including recall, precision, and area under the curve (AUC) using averages from 5-fold cross-validation.

RESULTS: Of the 64,609 patients admitted to GIM between 2012 and 2018, 5% had experienced COPD exacerbations, and of those 20% were readmitted to hospital within 30 days. Identification of COPD model with gradient boosting after 5-fold cross-validation had an average accuracy of 97.4%, precision of 82%, recall of 68%, and an AUC of 0.978. Readmission risk with logistic regression after 5-fold cross-validation had an average accuracy of 85.2%, precision of 63.9%, recall of 11%, and an AUC of 0.676.

CONCLUSIONS: We demonstrate that the use of machine learning models for the identification of COPD exacerbations was accurate. Further work may be necessary to improve 30 day readmission risk prediction.

LEARNING OBJECTIVE #1: To improve medical care for patients hospitalized with COPD by more effectively identifying those experiencing an exacerbation and those who are more likely to be readmitted.

LEARNING OBJECTIVE #2: To explore the use of a machine learning model which could be implemented to improve the efficiency of hospitals caring for patients with COPD.

A NATURAL LANGUAGE PROCESSING SYSTEM TO EXTRACT COVID-19 SYMPTOMS FROM ELECTRONIC HEALTH RECORDS

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BACKGROUND: During the COVID-19 pandemic, electronic health records (EHRs) were used to populate registries supporting public health surveillance and research. Patient symptoms are important data elements for COVID-19 registries but are often missing in structured EHR data. We report the development and validation of a natural language processing (NLP) system to support extraction of COVID-19 symptoms from EHR notes.

METHODS: Our system builds on a generic-purpose clinical NLP system (cTAKES) that identifies medical terms and their Unified Medical Language System (UMLS) concepts from clinical text. To adapt cTAKES to the COVID-19 domain, we developed a dictionary of COVID-19 symptom terms to filter cTAKES-extracted terms. We used UMLS concepts to increase the system's recall of synonymous symptom terms and rules to improve negation detection. We adopted a novel open-protocol approach to create domain-expert-annotated

EHR notes (inpatient, outpatient, ED) to adapt and evaluate the system, starting from an initial annotation guide with 20 COVID-19 symptoms identified from the literature. We randomly selected 200 notes from encounters (March-October, 2020) where COVID-19 was suspected and tests were ordered. The notes (processed by NLP) were reviewed by 3 physicians (1 internist, 2 pulmonologists) for missed or wrongly identified terms. Each note was reviewed by 2 physicians independently, then discussed. Consensus was reached on all symptom terms and the annotation guide was updated. We used 50 notes to develop NLP (enriching the dictionary and improving negation detection) and 150 notes for evaluation. We report system performance at term level for the full notes and the narrative part of the notes, using standard NLP evaluation metrics precision (P), recall (R), and F1 (P: number of terms correctly identified by NLP/all terms identified by NLP; R: number of terms correctly identified by NLP/all terms identified by physicians; F1: 2PR/(P+R)).

RESULTS: 200 notes (82K words) were annotated. 19 new terms identified from review of the first 50 notes were added to the NLP dictionary. NLP's initial performance was strong (full notes: P=0.92, R=0.82, F1=0.87; narrative: P=0.96, R=0.82, F1=0.88) and improved further by enriching the dictionary with 25 new terms from the evaluation data (full notes: P=0.92, R=0.87, F1=0.89; narrative: P=0.96, R=0.86, F1=0.91). Error analysis showed that some multi-word terms (e.g., poor PO intake, abdominal cramping) were initially missed by cTAKES. Partial string match plus rule-based verification may further improve the recall.

CONCLUSIONS: Our NLP system can easily incorporate new information on COVID-19 symptoms. With further improvement, the system will be used to study symptom patterns for COVID-19 patients to support effective clinical diagnosis and management.

LEARNING OBJECTIVE #1: Apply NLP to support COVID-19 registry building and care

LEARNING OBJECTIVE #2: Learn a fast-adaptation, knowledge-driven NLP approach that allows easy incorporation of new information as our understanding of COVID-19 evolves

ASSOCIATION BETWEEN DEPRESSIVE SYMPTOMS AND TEXT MESSAGE SENTIMENT IN PATIENTS WITH TYPE 2 DIABETES RECEIVING HEALTH COACH SUPPORT

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BACKGROUND: Depressive symptoms, which commonly occur in people with type 2 diabetes (T2D), typically require active interpersonal screening questions to identify. Passive evaluation of text message communication may also be considered in detecting depressive symptoms. We hypothesized that lower text message sentiment would be associated with greater burden of depressive symptoms in patients with T2D.

METHODS: We analyzed text messages from middle-aged participants with T2D in an mHealth study who received health coach support over one year. Three health coaches interacted with 59 African American/Latinx English-speaking participants about diabetes self-management, including social needs. Communications typically involved coordination of appointments, lifestyle behaviors (diet and physical activity), glucose monitoring efforts, and medication use. We assigned text message participant response words as "positive" (+1) or "negative" (-1) based on the National Research Council of Canada Emotion (NRC) Lexicon (tidytext package in R version 4.0.1) and summed sentiment word scores for each participant. Misspelled and non-English words were excluded. To determine depressive symptoms, we administered the Patient Health Questionnaire (PHQ-9) at 0-, 6-, and 12-months and calculated their mean scores over time (dichotomized with mean scores ≥ 10 as moderate/severe depressive symptoms, and <10 as mild or none). We applied Wilcoxon rank sum testing to compare sentiment scores of these two dichotomized groups in R.

RESULTS: Of the 59 participants, there were 13 men and 46 women (median age of 54, interquartile range [IQR]=11). The PHQ-9 scores ranged from 0 to 22.5 (median 5, IQR=8.5). Based on the PHQ-9 scores, 40 participants had mild/no symptoms and 19 participants had moderate to severe depressive

symptoms. There were 459 text messages analyzed with an overall sentiment score range of 1-55 and median of 6.0 (IQR=6.5). For those with moderate/severe depressive symptoms, the median number of messages was 6 (IQR=5.5), and for those with mild/no symptoms was 7 (IQR=7, p=0.14). There were 363 unique text message words coded. The sentiment median for moderate/severe depressive symptoms was 3 (IQR=4), which was less than those with mild/no symptoms (6, IQR=7.3, p-value=0.03). Additionally, we created a “word cloud” to visualize the most common words from participants (with word size proportional to frequency). The most frequent positive words were “good” (n=615), “hope” (n=180), and “happy” (n=168); the most frequent negative words were “late” (n=46), “problem” (n=42), and “bad” (n=40).

CONCLUSIONS: There was an association between text message sentiment and depressive symptoms in patients with T2D receiving health coach support. We identified several challenges with this approach, including misspelling and presence of non-English words, limited number of participants, and multiple meanings with different words (e.g., sugars).

LEARNING OBJECTIVE #1: Medical Knowledge

LEARNING OBJECTIVE #2: Interpersonal and Communication Skills

ASSOCIATION BETWEEN PATIENT CHARACTERISTICS AND PATTERNS IN REMOTE SHARING OF SELF BLOOD PRESSURE MONITORING

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BACKGROUND: Hypertension management has relied on in-office blood pressures, yet self-blood pressure (BP) monitoring outside the office is increasingly recommended. Previous studies found that 43.2% of adults with hypertension perform self-BP monitoring. However, hypertension management requires not only measurement, but timely sharing of data with clinicians to guide treatment. Remote sharing would allow timelier treatment. Our objective was to describe the factors associated with remote sharing of self-BP monitoring.

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Characteristic	Unadjusted, n (weighted %)		pvalue	Adjusted		
	Did Not Share Remotely (24 614)	Shared Remotely (3 792)		OR	95% CI	p-value
Age			<.001			
Age 18 to 24	103 (1.0)	27 (2.9)		—	—	
Age 25 to 34	453 (4.1)	87 (5.3)		0.45	0.18, 1.13	0.090
Age 35 to 44	1,119 (8.4)	223 (11)		0.34	0.14, 0.83	0.018
Age 45 to 54	2,693 (17)	512 (18)		0.30	0.12, 0.72	0.007
Age 55 to 64	5,566 (25)	895 (25)		0.28	0.11, 0.68	0.005
Age 65 or older	14,080 (44)	2,048 (37)		0.22	0.09, 0.53	< 0.001
Race/Ethnicity			0.4			
White, Non-Hispanic	18,835 (63)	2,864 (64)		—	—	
Asian, Non-Hispanic	140 (1.4)	34 (1.9)		1.32	0.73, 2.41	0.4
Black, Non-Hispanic	3,197 (19)	519 (20)		0.98	0.78, 1.23	0.8
Hispanic	1,433 (14)	204 (12)		0.88	0.62, 1.25	0.5
Other	1,009 (2.6)	171 (2.6)		0.97	0.67, 1.41	0.9
Education			.041			
Graduated from College or Technical	7,770 (21)	1,326 (25)		—	—	
Attended College or Technical School	7,180 (31)	1,134 (32)		0.84	0.69, 1.02	0.081
Graduated High School	7,415 (31)	1,012 (30)		0.85	0.69, 1.05	0.13
Did not graduate High School	2,176 (17)	307 (13)		0.68	0.51, 0.92	0.011
Health Status			.061			
Excellent	1,679 (6.1)	280 (8.4)		—	—	
Very Good	6,319 (24)	1,028 (25)		0.76	0.55, 1.07	0.12
Good	8,742 (36)	1,245 (36)		0.80	0.56, 1.13	0.2
Fair	5,341 (25)	811 (23)		0.69	0.48, 1.00	0.048
Poor	2,476 (10)	421 (10)		0.80	0.54, 1.19	0.3
Insurance			0.7			
Insured	23,428 (92)	3,566 (92)		—	—	
Uninsured	1,119 (8.0)	218 (7.6)		1.08	0.77, 1.52	0.7
Location			0.15			
Urban	19,293 (90)	3,060 (91)		—	—	
Rural	5,321 (10)	732 (8.8)		0.91	0.73, 1.12	0.4
Personal Doctor			0.4			
No	1,349 (8.0)	230 (7.0)		—	—	
Yes	23,190 (92)	3,549 (93)		1.20	0.85, 1.68	0.3
Time since last visit			0.4			
<2 years	24,044 (98)	3,698 (98)		—	—	
>2 years/never	465 (2)	77 (1.8)		0.72	0.40, 1.29	0.3
Cost limited care			0.6			
No	22,306 (86)	3,402 (87)		—	—	
Yes	2,266 (14)	381 (17)		0.86	0.65, 1.13	0.3
History of stroke			0.3			
No	22,074 (90)	3,386 (89)		—	—	
Yes	2,266 (14)	381 (13)		1.33	1.04, 1.72	0.026
History of diabetes			0.2			
No	17,823 (71)	2,789 (74)		—	—	
Yes	6,749 (29)	999 (26)		0.99	0.82, 1.20	>0.9
History of CKD			>0.9			
No	22,245 (91)	3,389 (90)		—	—	
Yes	2,217 (9.5)	380 (9.6)		1.10	0.83, 1.45	0.5

METHODS: We performed a retrospective study using the Behavioral Risk Factor Surveillance System survey 2019, which asked about self-BP monitoring (in 21 states). Our cohort included patients with hypertension who shared their self-BP monitoring. Our primary outcome was the method of sharing self-BP monitoring, comparing remote methods (i.e., phone, email, portal) to in-person. We performed logistic regression to determine the association between our primary outcome and patient characteristics. We used survey-supplied weights to produce population estimates.

RESULTS: Our sample included 28,406 patients with hypertension who reported sharing their self-BP monitoring, representing a population estimate of 12.2 million people. Only 14.3% of patients reported sharing their self-BP monitoring remotely. Patients who did not share their readings remotely were older and less likely to be high school graduates (Table).

CONCLUSIONS: We found that a minority of patients shared their BP readings remotely. Supporting patients with less education will be essential in promoting remote sharing. Further, expanding remote sharing can be supported by telehealth tools and patient portals. A focus on promoting remote self-BP monitoring is needed to realize its benefits.

LEARNING OBJECTIVE #1: Participants will understand the role of remote blood pressure monitoring as part of care.

LEARNING OBJECTIVE #2: Participants will understand of the role education in promoting remote self blood pressure sharing.

AUTOMATING INDIVIDUALIZED PATIENT NOTIFICATION OF DRUG RECALLS: COMPLEX CHALLENGES

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BACKGROUND: Consumer-level drug recalls have increased in frequency and require action by individual patients. Patients may be informed of recalls by the manufacturer, their pharmacy, word-of-mouth or the media, rather than FDA's public-facing outlets. Prescribers are not notified of drug recalls for individual patients. The process may lead patients to stop taking their medications. We aimed to leverage the FDA's Healthy Citizen prototype platform to programmatically identify patients affected by relevant drug recalls through the electronic health record (EHR) and determine feasibility and acceptability of proactively communicating drug recall information through the MyChart patient portal.

METHODS: We developed and evaluated an electronic notification system in the Primary Care and Cardiology practices at a large urban, academic medical center. The notification system was composed of two parts: 1) Compare new consumer-level drug recalls with medication prescriptions in EPIC EHR and 2) Connect the MyChart patient portal with the FDA-managed Healthy Citizen prototype platform to launch a SMART-on-FHIR software module (widget) displaying details of a recall. We created and tested the system in Epic's ACE6 development environment. Using structured interviews, we assessed qualitative feedback on the system and MyChart messaging from a convenience sample of 9 patients. Interview recordings were transcribed and separately analyzed by two investigators (RP, MG) for common themes, with verification by SC and IS.

RESULTS: Program Description Our system scanned the FDA's Healthy Citizen Application Programming Interface (API) nightly to detect new recalls, identified patients with the recalled medications in their EHR medication list, and sent them a MyChart message with a link to the FDA widget displaying customized information.

Program Evaluation The system was functional but notifications could not be accurately targeted as prescription records in the EHR could not be traced to specific lot numbers dispensed to patients. Major themes included: a) patients appreciated recall notifications through MyChart because they trust the clinic; b) displaying simplified widget content directly in the message would improve user interaction; c) patients would likely contact their clinicians despite being directed to the pharmacy. **CONCLUSIONS:** The lack of a complete electronic audit trail from prescription to dispensed medication resulted in unacceptably high false positive notifications that precluded clinical deployment of this system. To improve the process, EHRs

should include full dispensing information, widget content should be re-designed for consumers, and lot numbers should be included on consumer prescription labels. Addressing these limitations would enable accurate automated notification of medication recalls.

LEARNING OBJECTIVE #1: Improve patient care by designing a system to electronically detect and notify patients of consumer-level drug recalls.

LEARNING OBJECTIVE #2: Evaluate a proactive, systems-level solution for drug recall notification.

CLINICAL EFFECTS OF AN ELECTRONIC HEALTH RECORD BASED INTEGRATED SMOKING CESSATION INTERVENTION DURING INPATIENT ADMISSIONS

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BACKGROUND: Tobacco use is one of the primary causes of morbidity and mortality in the US. Hospital admissions can be pivotal for smoking cessation intervention. Hard-stops, clinical decision-making prompts in electronic health records (EHR) that force action, have been shown to change clinical behavior. This

study assesses the effects of an EHR hard-stop enforcing nicotine replacement therapy (NRT) prescription at hospital admission and discharge in a large integrated health system.

METHODS: This was a retrospective cohort study of adult (>=18) smokers hospitalized in Kaiser Permanente Northern California hospitals between September 2013 and 2017. It evaluated two newly implemented EHR hard-stops that force NRT order sets on admission (February 2015) and discharge (September 2015). Interrupted time series analyses (ITS) were used to assess change in NRT orders at admission and discharge corresponding with the implementation of each hard-stop. ITS was also used to assess change in patient self-reported quit attempts at 30 days post discharge. Pre-post analyses using chi-square tests were used to quantify the magnitude of change seen.

RESULTS: 41,805 patient encounters were included for 29,245 unique patients. The patient population had significant cardiovascular comorbidities. Despite a general upward trend over time, ITS analyses showed acute increases in NRT orders on admission after rollout of the admission smoking cessation order set (pre-post 29.9% to 78%, p<0.0001) and in discharge NRT orders after rollout of the discharge smoking cessation order set (pre-post 12.9% to 45.7%, p<0.0001). (Figure 1) There was a small but significant increase in quit attempts following the hard-stop implementation from 24.6% to 31.0% (pre-post p<0.0001).

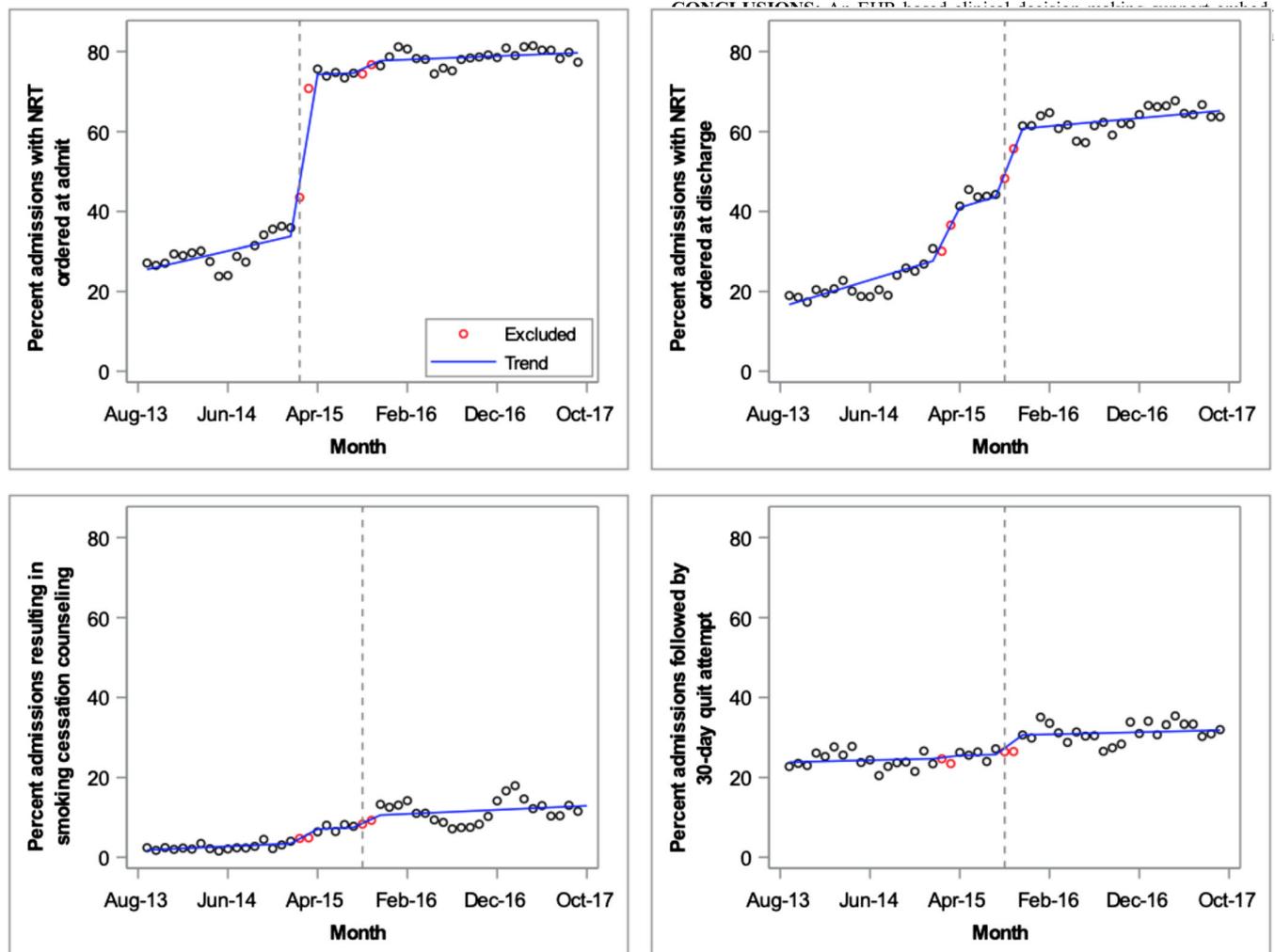


Figure 1. Percentage of admissions with select outcomes, including interrupted time series linear model trend line. Dotted line indicates primary intervention date for each outcome

increase in NRT prescriptions and subsequent improvement in patient quit rates.

LEARNING OBJECTIVE #1: An EHR based intervention can change clinical behavior on a wide scale to improve smoking cessation.

LEARNING OBJECTIVE #2: Interrupted time series analyses can be utilized to study large scale interventions.

COMPARISON OF ELECTRONIC MEDICAL RECORDS WITH SELF-REPORT IN MEASURING CANCER SCREENING

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BACKGROUND: Efficient measurement of receipt of cancer screening has been attempted with electronic health records (EHRs), but EHRs are commonly associated with a single health care setting. However, health information exchange (HIE) includes EHR data from multiple health care systems and settings, thereby providing a more population-based measurement approach. In this study, we compared statewide Indiana HIE data to survey self-report of cancer screening.

METHODS: A statewide survey was conducted among individual residents in Indiana who were seen at an ambulatory/inpatient Indiana University Health clinical setting in the past year. Out of 970 patients who completed the survey, 711 patients provided HIPAA authorization (73.3%) providing access to their electronic health information. Types of cancer screening tests measured were colorectal cancer (colonoscopy and fecal immunochemical test (FIT)), cervical cancer (human papilloma virus (HPV) and Pap test), and breast cancer (mammogram). For each screening test, we measured both receipt of the screening (yes/no) and time since last screening to evaluate the proportion of agreement/disagreement between measures from survey self-report and HIE. Concordance of HIE data with the survey self-report was calculated using Cohen/Conger's Kappa (κ) and Gwet's agreement coefficient.

RESULTS: Percent agreement of HIE and self-report of screening receipt ranged from 59%-81%, the Kappa coefficient ranged from 0.17-0.26 and the Gwet's coefficient ranged from 0.24-0.76. For time since receipt of the last screening test, the Kappa coefficient ranged from 0.13-0.39 and the Gwet's coefficient ranged from 0.38-0.86. In comparing the proportion of all patients where HIE data indicated screening (but self-report did not) versus self-report indicated screening (but HIE did not), the following patterns emerged: colonoscopy (7% HIE alone vs. 34% self-report alone), FIT test (15% vs. 4%), HPV test (24% vs. 12%), Pap test (10% vs. 27%), mammography (8% vs. 20%). HIE data provided relatively more additional information about FIT and HPV tests, both laboratory tests, and less additional information about colonoscopy, Pap test, or mammography, all procedures.

CONCLUSIONS: The information value using different data sources, about receipt of cancer screening, varied by the type of cancer screening. Studies that use a single data-source should consider the type of cancer screening test to choose the best data collection method. HIE and self-report both provided unique information in measuring cancer screening, and the most robust measurement approach entails collecting screening information from both HIE and patient self-report.

LEARNING OBJECTIVE #1: Understand relative strengths, limitations of electronic medical record data and patient self-report to assess cancer screening among primary care population.

LEARNING OBJECTIVE #2: In designing learning health systems, consider the complementary nature of EMR self-report and patient interviews to obtain the most complete clinical picture of a patient's screening history.

CONDITIONAL SURVIVAL ADDS VALUE TO PATIENT DECISION MAKING

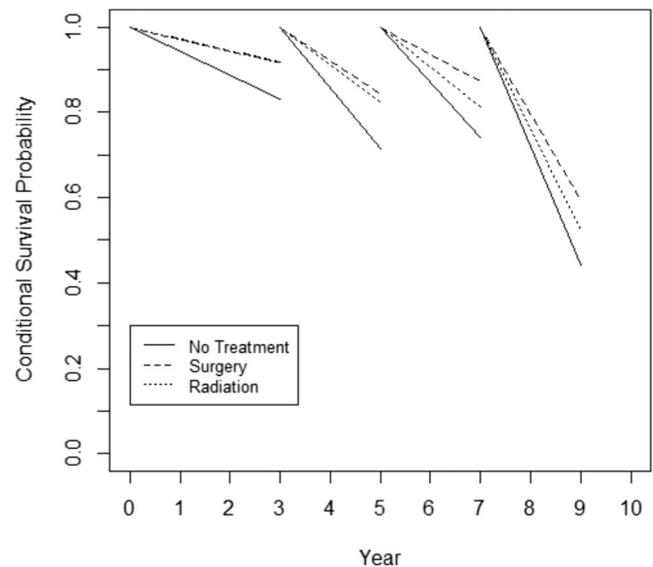
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BACKGROUND: Many patients are told their predicted cumulative probability of a clinical outcome (e.g., survival) from diagnosis to the end of a time interval, Y years, but the effect of the disease and its treatment on survival changes over time. When patients have lived X years after diagnosis, the conditional probability is from time X to the end of time Y. It excludes patients who died during the preceding X years. Conditional predictions can be calculated for any disease, prognostic factors, treatments, time intervals, and outcome. As an example, we predict the probability of a man with prostate cancer surviving each of 4 time intervals over 9 years.

METHODS: Logistic regression conditional survival models were trained on SEER prostate cancer data for years 2004 – 2009, 9 year follow-up, 202,211 patients. Independent variables: age, PSA, TNM, Gleason score, treatment. Patients with more than one treatment were removed. Separate models for the four time intervals; 0 to 3, 3 to 5, 5 to 7, and 7 to 9 years. The population for each model was the patients alive at the start of each time interval (1.0 probability of survival), the predicted outcome was the treatment-related conditional survival at the end of each of the four intervals.

RESULTS: For an 80-year-old man with PSA 20, T2, N1, M0, Gleason 8 prostate cancer, his probability of survival for the intervals was: no treatment 0.83, 0.71, 0.74, and 0.44, respectively; surgery, 0.92, 0.84, 0.87, and 0.59, respectively; and radiation, 0.92, 0.82, 0.81, 0.52, respectively (Figure).



CONCLUSIONS: Across all time intervals surgery and radiation were superior to no treatment. Initially, there was no survival difference between surgery and radiation but, as patients survived the early intervals, the treatments diverged in their survival benefit. Conditional survival adds value to patients when they are planning both their treatment and the rest of their lives.

LEARNING OBJECTIVE #1: Understand conditional probability predictions.

LEARNING OBJECTIVE #2: Understand how conditional probability improves patient decision making.

DEVELOPING A BEHAVIORAL SUPPORT TEXTING PROTOCOL FOR HYPERTENSION INCORPORATING STORIES FROM AFRICAN AMERICAN VETERANS

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BACKGROUND: Peer narratives (storytelling) engage listeners through personally relevant content and have been shown to promote lifestyle change and effective self-management among patients with hypertension. Incorporating key quotations from these stories into follow-up text messages (mHealth) is a novel way to ‘continue the conversation,’ providing reinforcement of health behaviors within patients’ daily lives.

METHODS: We developed a multi-step process, transforming five video recorded Veteran stories into 160-character texts and integrated these into a comprehensive 6-month texting protocol. We began with iterative review of story transcripts to identify salient vernacular features and key self-manage-

ment concepts emphasized by each storyteller. We worked with a Veteran consultant who guided ‘narrative text message’ development in substantive ways, as we sought to craft culturally sensitive content for texts. Supplementary educational and 2-way interactive assessment text messages were also developed, informed by Veteran input on timing and integration.

RESULTS: Within the Veterans Health Administration (VHA) texting system (‘ANNIE’), we programmed 6-month text-messaging protocols that included cycles of three text message types: narrative messages, non-narrative educational messages, and two-way interactive messages assessing self-efficacy and behaviors related to hypertension self-management. Each of the five protocols corresponded to a single Veteran storyteller, allowing Veterans to choose the story that most resonated with their own life experience.

CONCLUSIONS: We crafted a culturally sensitive text-messaging protocol using narrative themes referenced in Veteran stories, aimed at supporting effective hypertension self-management. Leveraging mHealth provides additional tools to continue conversations and cues for behavior change.

LEARNING OBJECTIVE #1: (Patient Care): In our previous work, we developed and tested videos in which African American Veterans shared stories of challenges and success strategies related to their hypertension self-management. We now describe the process by which we developed a text-messaging protocol (intended for at-home use after viewing online videos) that incorporated the voices of these Veterans as a means of supporting and sustaining lifestyle change and self-management.

LEARNING OBJECTIVE #2: (Systems Based Practice): We describe our use of the nationally available VA texting system as a platform upon which we built a long-term texting support intervention for hypertension.



Storyteller Patricia

- 63-year-old from Chicago, Army
- Blood pressure wasn’t controlled because side effects kept her from taking her medication. Her friend went on dialysis and then convinced Pat to take her meds.
- Reads labels for sodium in her food and keeps a journal on her sodium and blood pressure.
- She lines medication bottles up on her dresser, and she says she doesn’t miss even one day.

DEVELOPING A DIGITAL USER-CENTERED COMMUNITY RESOURCE MAPPING TOOL FOR SAFETY-NET PATIENTS IN SAN FRANCISCO

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BACKGROUND: Healthcare systems are increasingly investing in efforts to address Social Determinants of Health (SDoH) to improve patient outcomes, but gaps exist in linking clinical and community-based health resources. We used human-centered design to a) explore the types of community-based health

type a digital tool linking community members to resources in their neighborhoods.

METHODS: We recruited and interviewed primary care patients and community leaders living or working in underserved neighborhoods in the SF Bay Area. We analyzed transcripts from in-depth participant interviews and neighborhood tours, as well as detailed field notes from the interviews and prototype usability testing to determine participants’ top health activation content priorities. We synthesized findings and determined potential prototype directions to meet user needs, values, and preferences, drawing upon a multi-disciplinary design team of health services researchers alongside internal and external digital health developers and designers.

RESULTS: Most patient participants (n=6/10) identified as Black, two-thirds identified as female, the average age was 62, and most earned less than \$20,000 annually. Community leader participants (n=20) primarily worked in non-profit organizations providing services ranging from social service navigation, wellness programs, to health education/promotion. In our first phase of discovery, we found that participants wanted interventions/solutions that

addressed core topics in everyday life, such as food insecurity, psychosocial needs, spirituality, and sense of belonging. In addition, interviews identified a need to design specifically for community-based organizations as they help individuals manage medical and SDoH needs, and to strengthen ties between these community-based organizations and healthcare settings. Our next phase includes prototyping a digital solution to assist community-based organizations with both screening for patient interest/needs related to health programs and resources, as well as customized communication channels to follow up with clients about the resources that best meet their needs and preferences.

CONCLUSIONS: The user centered design process is well suited for focusing digital health research on high-priority end user needs. While our findings are preliminary, our work indicates that engaging broader community stakeholders to address SDoH is critical, rather than focusing on electronic health record SDoH screening and referral only. Future builds of digital products focused on the community could be a bridge to a truly multi-faceted approach to simultaneously address patients' social and medical needs.

LEARNING OBJECTIVE #1:

Identify how safety net patients and community-based organizations prioritize health resources within their neighborhoods.

LEARNING OBJECTIVE #2: Understand how the human centered design process can be implemented to further public health goals.

DEVELOPMENT OF A CLINICAL INFORMATICS TOOL USING EMPIRIC SEGMENTATION TO SUPPORT CARE PLANS FOR COMPLEX, HIGH-RISK PRIMARY CARE PATIENTS.

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BACKGROUND: Patients at high-risk for hospitalization and poor health outcomes often have complex care needs that are challenging for primary care providers (PCPs) to manage. Current panel management tools can identify patients, but do not guide providers towards effective interventions. Recent trials of one-size-fits-all interventions for high-risk patients have not improved outcomes. Models that segment high-risk patients into subgroups may help guide more tailored care. We developed an informatics tool to display data-driven groups of high-risk primary care patients and identify tailored clinical care gaps for care planning in the Veterans Health Administration (VHA).

METHODS: Based on validated models describing six groups of diagnosis patterns among Veterans with $\geq 10\%$ hospitalization risk in 1 year, we developed an algorithm to assign patients in PCPs' panels to a group and an informatics tool for displaying groups. The tool also displays suggested steps to improve clinical care for patients, a group's common utilization patterns, and task tracking features. Using human-centered design principles, we obtained two rounds of feedback on a prototype of the tool from target users (2 PCPs, 12 nurse care managers) at two VHA primary care sites via semi-structured interviews, updating the prototype between rounds. Data were analyzed using content analysis in four user experience domains: usefulness, desirability, credibility, and usability.

RESULTS: Most users described the tool as useful for PCPs (more than nurses), especially for panel management and monitoring care needs; desirable, particularly for proactive identification of needs and in-depth understanding of patient groupings; credible due to valid, established data sources, with future credibility dependent on frequency of group and care step updates. Users gave actionable feedback on improving graphical display and terminology to improve usability. After updating a paper prototype according to this feedback, the tool was programmed into a nationally available, web-based platform linked to the electronic health record. This version will be field-tested with a third round of users in early 2021 before VHA-wide release.

CONCLUSIONS: We developed an integrated clinical informatics tool to sort and display high-risk, complex patients in a PCP's panel into data-derived, comorbidity-based groups along with corresponding group utilization patterns and recommended care steps. Target users reported the tool appeared useful for proactive clinical care, and provided feedback that improved desirability, credibility and usability through iterative refinement. Next steps are to evaluate tool use within an integrated platform and assess impacts on patient care quality and outcomes in pragmatic settings.

LEARNING OBJECTIVE #1: To describe the development of a clinical informatics tool displaying data-driven comorbidity groups and care steps to improve systems-based practice and care for high-risk patients.

LEARNING OBJECTIVE #2: Not provided by author.

DIFFERENCES IN TOTAL AND AFTER-HOURS ELECTRONIC HEALTH RECORD TIME ACROSS AMBULATORY SPECIALTIES

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BACKGROUND: While electronic health records (EHRs) are associated with positive effects such as improved healthcare outcomes and reduced errors, they have also increasingly filled clinicians' days and had negative effects on satisfaction and wellbeing. In this cross-sectional study, we measured total and after-hours time spent on the EHR by specialty and the distribution of activities on which clinicians spend their EHR time.

METHODS: The sample included 351 United States-based ambulatory healthcare organizations who used the EHR vendor Epic Systems between January and August 2019. The sample included all clinicians with scheduled outpatient appointments, including physicians and advance practice practitioners. To characterize specialty variation in EHR usage, we categorized the specialties present at each organization as surgical, primary care, or medical specialties.

We measured total daily time actively using the EHR and time spent after-hours per clinician. Active EHR time was categorized into "Clinical Review," "Notes," "In-Basket," "Messages," and "Orders." We additionally measured the average number of in-basket messages received per clinician per day. We compared these metrics across surgical vs. medical vs. primary care specialties. Finally, we performed multivariable linear regression to examine associations between total and after-hours EHR time and specialty type adjusting for observable health system characteristics.

RESULTS: Mean total active daily EHR time was 45.6 vs. 85.7 vs. 115.0 minutes for surgical vs. medical vs. primary care specialties, respectively. Mean after-hours time on the EHR was 16.0 vs. 26.2 vs. 29.8 minutes, respectively. Differences in total and after-hours time spent on the EHR between groups persisted on multivariable linear regression controlling for organizational characteristics. Clinicians spent the most time on notes, with surgical specialties spending 22.0 minutes per day, versus 40.8 minutes for medical specialties and 51.5 minutes for primary care specialties. Clinical review and orders represented the next two biggest areas of time expenditure. Team and system messages were the predominant message sources. As compared to surgical colleagues, primary care clinicians received more than twice as many team-derived messages, five times as many patient messages, and fifteen times as many prescription messages each day.

CONCLUSIONS: We identified significant cross-specialty differences in daily EHR time, with clinicians in primary care and medical specialties spending significantly more time on the EHR than those in surgical specialties. There were additionally inter-specialty differences in time spent on notes and in-basket messages, as well as message sources. Further investigation should characterize the reasons underlying these differences and identify interventions that reduce the EHR burden.

LEARNING OBJECTIVE #1: Characterize differences across ambulatory specialties in time spent on the EHR.

LEARNING OBJECTIVE #2: Describe the distribution of activities on which clinicians spend their EHR time

ELECTRONICALLY PROVIDING VOTER INFORMATION DURING A PANDEMIC: A NOVEL APPROACH TO PATIENT VOTER RESOURCE EDUCATION DURING THE COVID-19 ERA

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BACKGROUND: During the COVID-19 pandemic, in-person voting in the general election had significant potential to spread the virus. In NC, absentee voting was expanded to all registered voters and online voter registration platforms were created to reduce foot traffic at voter registration sites. We aimed to bring awareness to these initiatives, determine the most effective mechanism for messaging this information to patients, and assess perceived helpfulness of voter resources provided to patients of general internal medicine clinics.

METHODS: An online survey was designed to provide awareness of safe, healthy voting options during the pandemic and assess participants' preferred voting method and perception of resource helpfulness. Specific candidate views or preferences were never provided nor obtained. A total of 14,842 patients in 1 faculty and 2 resident clinics received the survey via the electronic health record patient portal. Patients were messaged if they attended one of the clinics in the past year. Patients who attended any of the clinics in-person could also access the survey by scanning a QR code on prominently placed posters. Electronic links embedded within the survey directed patients to non-partisan voting resources to register to vote or request an absentee ballot online. Branching logic directed patients to specific information based on their voter registration status and/or preferred method of voting.

RESULTS: 740 (4.99%) surveys were completed. Only one survey was completed via the QR code. Of those who commented on the helpfulness of the information (512), 87% found the voting information helpful. Although only 18.8% of participants were initially interested in voter information, 63% of patients who rated the helpfulness of the information found the resources to be "extremely" or "very" helpful. Black patients were twice as likely to be interested in voter resources while comorbidities did not affect interest. Furthermore, participants who were interested in voter information were 3.4 times more likely to find it helpful ($p < 0.00001$) and to report planning to vote absentee (65% vs 46%; $p < 0.00053$). 50% of all respondents planned to vote absentee.

CONCLUSIONS: In this study, voter information resources were circulated and accessed more effectively through a patient portal than through QR codes placed prominently in clinics. Most respondents felt that the resources provided were helpful. Patients who voiced interest in the resources were significantly more likely to vote absentee during the pandemic. Race affected interest while comorbidities did not. Our findings show that healthcare providers/systems can effectively disseminate safe, non-partisan voter information to patients through electronic patient portals with overall good patient satisfaction.

LEARNING OBJECTIVE #1: Electronic patient portals are a reliable way to disseminate information regarding safe voter practices.

LEARNING OBJECTIVE #2: Nonpartisan voting information, when provided in the interest of public health, was found helpful by patients.

EVALUATION OF THE EFFECTS OF THE COVID-19 PANDEMIC ON ELECTRONIC CONSULTATION USE IN PRIMARY CARE

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BACKGROUND: Little is known about electronic consultation (e-consult) utilization during the COVID-19 pandemic when health systems rapidly implemented and scaled telehealth alternatives to in-person care. It is also unknown if e-consult utilization during the pandemic replaced or merely deferred the need for a specialty appointment. We evaluated if primary care physicians' (PCP) e-consult utilization and specialists' recommendations for specialty appointments changed after the transition to telemedicine during the COVID-19 pandemic.

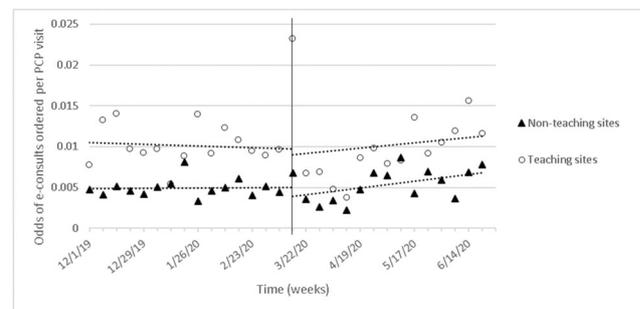
METHODS: This cohort study used an interrupted time series analysis of e-consult utilization in a large, urban academic health care system between December 1, 2019 and June 27, 2020; the post-telemedicine time period began March 15, 2020. The primary outcome measure was the odds of an e-consult ordered during a PCP appointment; the secondary outcome measure was the odds of a specialist recommending a specialty appointment in an e-consult.

RESULTS: During 193,263 PCP appointments, 1,318 e-consults were placed to internal medicine sub-specialties. Compared to the pre-telemedicine time period, the odds of a PCP ordering an e-consult increased (OR 1.04, 95% CI [1.02,1.07]) and the odds of specialists recommending specialty appointments increased (OR 1.11, 95% CI [1.06,1.15]).

CONCLUSIONS: E-consult use increased following the transition to telemedicine in the context of the COVID-19 pandemic, suggesting that PCPs consider the e-consult a valuable tool for patient care when there is limited availability of specialty appointments. However, recommendations for specialty appointments following an e-consult also increased, suggesting that the e-consult may not replace the need for a specialty appointment. Further research should be conducted to explore PCPs' and specialists' perceptions of the utility of the e-consult to streamline the outpatient specialty referral system and ultimately improve patient care.

LEARNING OBJECTIVE #1: Understand how PCPs used e-consults to communicate with specialists when there were limited specialty appointments during the COVID-19 pandemic.

LEARNING OBJECTIVE #2: Understand that while e-consults cannot entirely replace specialty appointments, they may serve as a mechanism to facilitate appointments when traditional mechanisms for appointment requests are disrupted.



FEASIBILITY, ACCEPTABILITY, AND IMPACT OF A WEB-BASED PREDIABETES TREATMENT DECISION AID IN WOMEN WITH A HISTORY OF GESTATIONAL DIABETES

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BACKGROUND: Women with gestational diabetes mellitus (GDM) are at increased risk for developing type 2 diabetes after pregnancy. Both intensive lifestyle changes and/or metformin therapy are effective in reducing risk, but women are often unaware of their risk and treatment options. Decision aids (DA) can engage patients in treatment decisions, and while they have been frequently utilized in clinic encounters, less is known about their use with telehealth visits. We evaluated the feasibility and acceptability of a web-based DA for diabetes prevention and assessed impact on decisional conflict.

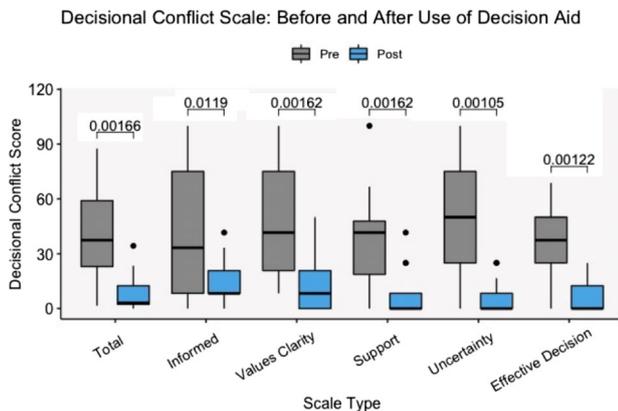
METHODS: We developed a custom, interactive, web-based DA that assessed lifestyle preferences and presented information about diabetes risk and prevention options (e.g., metformin, intensive lifestyle intervention) using the Ottawa Decision Support Framework. A convenience sample of women with a self-reported history of GDM was recruited by phone and electronically consented. Participants reviewed the DA website with a health provider via phone or video conference (Zoom PHI, Dexterity Dialer). Using self-reported and available electronic health record measures, individualized 3-year risk for diabetes was calculated from a Diabetes Prevention Program model and presented with infographics. We evaluated DA acceptability and change (pre- and post-) in decisional conflict (Wilcoxon rank sum test). Statistical analysis was conducted with R version 4.0.3.

RESULTS: Of the 16 women consented, 15 women (median age 43 [IQR 38.5, 57]; 6 Hispanic, 4 White, 3 Asian, 2 African American) completed the DA pilot (12 via video conference, 3 via phone audio). One woman did not attend her study appointment. Participants found the length of the DA to be “just right” (n=13) or “too short” (n=2); and the amount of information presented to be “just right” (n=13) or “too little” (n=2). Decisional conflict was reduced across all scales (see figure)

CONCLUSIONS: Early findings suggest remote implementation of this web-based DA is feasible and acceptable, and reduces decisional conflict in prediabetes treatment for women with GDM

LEARNING OBJECTIVE #1: Learn how a web-based DA can support decision-making regarding prediabetes treatment options.

LEARNING OBJECTIVE #2: Understand the feasibility, acceptability, and impact of the DA when delivered via web-based format.



IDENTIFYING FEATURES OF SUCCESSFUL MOBILE HEALTH INTERVENTIONS FOR HYPERTENSION SELF-MANAGEMENT IN POPULATIONS WITH DIGITAL BARRIERS: A QUALITATIVE COMPARATIVE ANALYSIS

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BACKGROUND: Most mobile health (mHealth) strategies for blood pressure (BP) self-management use multimodal approaches, but it is unknown which intervention components most impact BP control, especially in diverse groups. We aimed to identify mHealth intervention components effective at improving BP outcomes in populations with barriers accessing digital health.

METHODS: Using 25 studies from a systematic review on mHealth for BP self-management in older (mean age ≥65), limited educational attainment (≥60% ≤high school completion), or minority patients (<50% non-Hispanic White), we used qualitative comparative analysis (QCA) to identify effective mHealth implementation features. QCA is an analytic approach that uses Boolean logic to mathematically identify combinations of pre-specified features associated with an outcome of interest (improved BP for this study). We studied seven features: tech platform (text message vs app); higher risk for digital access barriers (>1 of age, education, or minority inclusion criteria met);

and five intervention strategies (technology training [TT]; human interaction [HI]; home BP monitoring with feedback [BPMF]; higher frequency use of the mHealth tool [Freq]; and medication adherence support [MA]). Using fsQCA v3.0 (Univ. of CA), we conducted three analyses: (1) the five intervention strategies; (2) all seven variables; (3) subgroup analysis in studies that met inclusion based on age, education, or race/ethnicity inclusion criteria. For each analysis, we report the features that were sufficient for improved BP (i.e., BP improved when that combination was present).

RESULTS: In the first analysis, two combinations (table) resulted in BP control: BPMF or (TT + Freq). In analysis two, among groups with >1 risk factor, TT was required for success. Three intervention features improved BP outcomes in each subgroup analysis: use of app, TT, or BPMF. MA and human interaction were not important in any analyses.

CONCLUSIONS: BPMF is a component of effective BP mHealth interventions. Among groups at risk for digital barriers, technology training is an important lever for success. Future research should continue identifying features crucial to successful mHealth intervention, especially in health disparity populations.

LEARNING OBJECTIVE #1: Identify mobile health strategies that improve blood pressure control

LEARNING OBJECTIVE #2: Recognize value of assessing digital health tools in diverse patients

Table. Study features associated with improved blood pressure

Intervention Feature	Analysis 1: five intervention strategies		Analysis 2: all seven features
	Solution 1	Solution 2	Solution
TT		✓	✓
HI			
BPMF	✓		
Freq		✓	
MA			
Mobile App			
>1 Risk Factor			✓

ID PLUS CARE: “NUDGING” PATIENTS TOWARDS GUIDELINE-CONCORDANT DIABETES CARE.

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BACKGROUND: Electronic Health Records enable monitoring of patient data to identify gaps in recommended diabetes care and self-management. Patient engagement interventions, utilizing informatics and behavioral economics theory, can “nudge” patients towards recommended services. The goals of the ID PLUS Care (Identifying Diabetes Patients and Linking with Underutilized Support to improve Care) program are to: (1) identify patients with gaps in recommended diabetes care, (2) proactively engage and support these patients using the 5 As (Ask, Assess, Advise, Agree, Assist) approach, and (3) monitor patients longitudinally to identify new patients and evaluate impact of outreach.

METHODS: ID PLUS Care uses the following informatics tools: (1) an Epic EHR reporting workbench report to identify patients with gaps in recommended diabetes care and self-management; including missed appointments, overdue labs and screening tests, positive smoking status and lack of diabetes self-management training, (2) a REDCap outreach protocol to assess barriers to care and nudge patients to uptake recommended services, and (3) a Tableau dashboard to monitor patient outcomes longitudinally. To assess feasibility, the ID PLUS Care program was piloted among patients enrolled in UMass Medicare Accountable Care Organization. The number of patients reached, barriers to care identified and recommended services facilitated were collected.

RESULTS: 213 patients were identified on the reporting workbench report and screened for outreach at three primary care clinics. After a maximum of

three phone outreach attempts, 131 patients (61.5%) were reached with 108 agreeing (82.4%) and 23 declining (17.6%) to speak with the outreach specialist. Barriers to recommended diabetes self-care reported by patients (n=84) included challenges with diet (n=28), medication (n=12), transportation (n=4), finances (n=3), and other challenges including co-morbidities, language and appointment scheduling (n=41). Support provided by outreach specialists included assistance rescheduling appointments, ordering labs, referring to diabetes-self-management training and provision of diabetes-related educational information.

CONCLUSIONS: Pilot results demonstrate feasibility ID PLUS Care to identify patients with gaps in recommended diabetes care and self-management, assess barriers of care and promote recommended diabetes care services. Preliminary lessons learned include the need to verify EHR report with manual chart review and patient verification, and to tailor outreach protocols to meet the needs of partnering clinics. Next steps include incorporating patient and care management team input into the program and extending outreach with patient portal messaging and evaluating impact of the program with a randomized cluster design.

LEARNING OBJECTIVE #1: Using Electronic Health Records to identify patients with gaps in recommended diabetes care and self-management.

LEARNING OBJECTIVE #2: Conducting proactive outreach to address patient barriers and nudge patients towards recommended services.

NATIONWIDE USE OF TELEHEALTH AMONG COMMERCIALY INSURED INDIVIDUALS 2007-2017

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BACKGROUND: While the potential benefits of telehealth have been long recognized, uptake had been gradual prior to COVID-19. Though expanded telehealth is likely to persist during and after the pandemic, a knowledge gap remains about the characteristics of patients who have historically received telehealth services – insight that would help policy and practice leaders implement telehealth alongside other health care reforms.

METHODS: We analyzed 2007-2017 data from Truven® MarketScan, a national database of over 40 million individuals with commercial employer-sponsored insurance. We assessed telehealth services using the GT modifier to a series of Current Procedural Terminology codes: 99201-99205 (new patient visits), 99211-99215 (return patient visits), and 99241-99245 (consultant visits). We evaluated demographic data, the number of telehealth visits annually, site of service, and insurance type. We categorized insurance type as (1) consumer driven health plans (CDHP) and high deductible health plans (HDHP); (2) health maintenance organization (HMO), point of service (POS), and POS with capitation plans; and (3) preferred provider organization (PPO), exclusive provider organization (EPO), and comprehensive plans.

RESULTS: Our sample consisted of 47,911 patients receiving 80,360 telehealth visits from 2007-2017 (averaging 1.7 visits per patient), most of which (86%) occurred in the outpatient setting. Mean patient age was 38 years, and most were female (57%) and insured through PPO, EPO, or comprehensive plans (66%). Fewer patients were insured through CDHP or HDHP (21%), and HMO or POS (12%) plans. Telehealth use increased from 321 patients and 859 total visits in 2007 to 14,031 patients and 22,927 total visits in 2017. Across our study period, there were decreases in both the mean number of visits per patient (from 2.7 to 1.6; p=0.29) and mean patient age (from 39.5 years to 34.7 years, p<0.001). Telehealth visits occurred predominantly in the outpatient setting, however total percentage of visits in outpatient setting decreased over time (from 99% to 81% between 2007-2017). Telehealth use increased across patients with all insurance types, with the most pronounced trend among patients covered under CDHP or HDHP plans (from 7 to 3,455 patients between 2007 and 2017).

CONCLUSIONS: Telehealth visits increased over 11 years and occurred most often in the outpatient setting, with a trend toward younger individuals and those with high deductible insurance plans. These findings pose implications for efforts to improve access and outcomes using telehealth during and beyond COVID-19, particularly given the pandemic's impact on employer-sponsored insurance coverage, as well as policymaker interest in insurance reform.

LEARNING OBJECTIVE #1: Describe long-term national trends in utilization of telehealth services among commercially insured patients

LEARNING OBJECTIVE #2: Describe characteristics of patients who used telehealth services and the potential post-pandemic policy and practice implications

NOT SPEAKING THE SAME LANGUAGE- LOWER PATIENT PORTAL USE FOR LIMITED ENGLISH PROFICIENT PATIENTS IN THE LOS ANGELES SAFETY NET

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BACKGROUND: As safety net health systems increasingly rely on patient portals to promote access, there is a need to understand digital health in these vulnerable settings, especially among Limited English Proficient (LEP) patients. We examined portal registration and use across English proficiency, in a safety net portal during its first four years.

METHODS: We examined portal enrollment and use across English language proficiency for 2015-2019 in the Los Angeles safety net. We categorized portal users into “active” versus “passive” users. An “active” portal user was defined as one who accessed the medication refill request function, requested an appointment and/or sent a message via the free-text secure messaging function, at least once during the study period. Using multivariate logistic regression models, we examined the association between language (English vs. LEP) and active use of the patient portal, adjusting for patient age group, gender, marital status, race/ethnicity, nativity, and portal enrollment year.

RESULTS: Of 425,000 patients assigned to primary care as of March 2019, 55,190 (13%) unique portal enrollments were found: 22% LEP, 60% female, 43% Latino, 7% Black, mean age 40 years. Among 54,981 portal users who logged into the portal at least once in the last year of the study period, LEP users had lower adjusted odds of using an “active” portal function vs. English-speakers (AOR 0.75; p<0.001).

CONCLUSIONS: While portal registration and use have significantly increased over the first four years in the Los Angeles safety net, at 13% overall, it still lags behind neighboring Los Angeles health systems, where close to 70% of the primary care population are portal users. This discrepancy is particularly notable among LEP patients, who comprise almost 50% of the LA safety net population, but only 2.8% of empaneled patients with a portal registration. LEP patients accessed active portal functions at lower rates than English-speaking patients in the safety net. These active portal functions have been demonstrated to require intentional patient involvement—serving as a surrogate for a higher/more meaningful level of engagement with the patient portal. Health system leaders in these settings will need to prioritize design and usability with vendors, especially for LEP patients, to promote more meaningful use in this population. Without the integration of meaningful and robust digital tools, the risk is high for worsening health disparities for LEP populations in these already vulnerable safety net communities.

LEARNING OBJECTIVE #1: To understand digital health implementation via the patient portal, in the Los Angeles safety net—the safety net of a large area of southern California: caring for a majority proportion of Medicaid, low-income, low literacy, immigrant, and about 50% LEP patients, among other vulnerable populations.

LEARNING OBJECTIVE #2: To learn about digital health disparities across English language proficiency for patient portal enrollment and use.

OBESITY CLASSIFICATION FROM FACIAL IMAGES USING DEEP LEARNING

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BACKGROUND: Telehealth has increasing importance with the COVID19 pandemic and in improving rural access to healthcare. The ability to obtain patients' vital signs through telehealth video feeds will improve our quality of care. In this clinical reanalysis of our prior bench study, we have investigated deep learning-based convolutional neural networks (CNNs) to classify whether a person is obese or not obese based on facial images. Further modifications, 'fine-tuning', to these CNNs can improve the accuracy of these models. Fine-tuning of public CNNs is the first step to developing CNNs to be used in real-world situations.

METHODS: The four CNNs (VGG16, ResNet50, DenseNet121, and MobileNetV2) used in this study were pre-trained on three, public datasets (ImageNet, VGGFace, and VGGFace2). Using the above CNNs, we extracted deep features from the FIW-BMI and VisualBMI datasets annotated with BMI information. The deep features from 8298 images in the FIW-BMI dataset along with BMI values were then used to train a Support Vector Classification (SVC) classifier. The trained SVC model was tested on 4206 different images from the VisualBMI dataset for validation.

RESULTS: Public CNNs trained on the ImageNet dataset obtained an initial accuracy of 64% to 72%. Higher accuracy of 84% to 86% was obtained by CNNs trained on the VGGFace dataset. 86% accuracy was obtained by using feature concatenation of the above CNNs with the models fine-tuned on FIW-BMI along with the SVC. ResNet50 trained on the VGGFace2 dataset obtained the highest accuracy of 91% when features from the original image datasets were used. A further modification resulted in 92% accuracy when features from ResNet-50 were fused from the original image with the image horizontally flipped. These fused features were used to train and test SVC on FIW-BMI and VisualBMI datasets, respectively. The fused image modifications resulted in a model with sensitivity, specificity, and precision of 0.90, 0.94, and 0.95, respectively. The mean absolute error (MAE) of this model in predicting BMI is 3.16 and the area under the curve (AUC) is 0.97.

CONCLUSIONS: Obesity can be classified from facial images using deep learning models with accuracy. SVC models trained on deep features from previously trained CNNs performed better than models trained on only the ImageNet dataset. ResNet50 (pre-trained on VGGFace2) obtained the highest accuracy of 92% by: fusing features from the fine-tuned model and original models and combining features from the original image and horizontally flipped image. This study pilots future work in using SVC models to determine specific BMI, weight, and daily weight changes of patients from facial images. This can be clinically useful in remote vitals monitoring as well as disease states where fluid status is a marker of disease, such as in patients with heart failure or cirrhosis.

LEARNING OBJECTIVE #1: Learn the basics of an emerging platform for patient care.

LEARNING OBJECTIVE #2: Learn a new mode for practice-based improvement.

PREVALENCE AND PREDICTORS OF MOBILE HEALTH APPLICATIONS OWNERSHIP AMONG ADULTS WITH RHEUMATIC AND MUSCULOSKELETAL DISEASES IN THE UNITED STATES

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BACKGROUND: Interventions using mobile health applications have shown promise in promoting healthy lifestyle behavior change and improving health outcomes among individuals with rheumatic and musculoskeletal disorders

(RMDs). However, little is known about the prevalence and predictors of mobile health application ownership among individuals with RMDs in the United States. Here, we explored the prevalence and factors associated with ownership of mobile health applications among adults with RMDs in the United States.

METHODS: Data was drawn from cycles 1 (2017) and 2 (2018) of the 5th edition of the Health Information National Trends Survey (HINTS 5). Descriptive statistics was used to investigate the sociodemographic characteristics and the prevalence of mobile health apps ownership among individuals with RMDs. Using multivariable logistic regression, we assessed predisposing (age, gender, race, and marital status), enabling (education, employment, income, regular provider, health insurance, and rural/urban location of residence), and need factors (general health, confidence in their ability to take care of health, body mass index, and number of comorbidities) associated with mobile health application ownership among individuals with RMDs.

RESULTS: We identified 1,490 (weighted estimate of 81,998,408) individuals who self-reported having been diagnosed with RMDs. Of these, 61.9% were females (912), 71.3% were whites (891), 40.2% had two or more medical comorbidities (700), 40.3% were employed (490) and 35.9% (700) were aged 65 or more. Prevalence of mobile health apps ownership was 40.5% (588). Multivariable logistic regression showed that among those with RMDs, females ($p = 0.003$) and individuals with annual income $> \$75,000$ ($p = 0.004$) were more likely to own mobile health apps.

CONCLUSIONS: Our results indicate that in a nationally representative sample, there was a relatively high prevalence of mobile health applications ownership. These findings suggest that individuals with RMDs are not digitally naïve and can be approached through mobile health apps. Clinicians and patients would need to be engaged in the technology design process to effectively incorporate these new tools into clinical care. Socio-economic status and gender differences were identified as predictors of mobile health apps ownership and should also be considered when developing mobile interventions for individuals with RMDs.

LEARNING OBJECTIVE #1: To Improve communication and effective information exchange between patients and their providers by adequate incorporation of these mobile health devices in health care delivery.

LEARNING OBJECTIVE #2: Increasing knowledge of use of electronic health devices and the application of this knowledge to patient care.

RESULTS OF THE 'ROLE OF ELECTRONIC COMMUNICATION TO ENHANCE PATIENT TRUST' STUDY - FIFTY QUANTITATIVE INTERVIEWS DURING THE COVID19 PANDEMIC

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BACKGROUND: Electronic Medical Record (EMR) adoption by physicians in the US is now the norm. Most EMRs are bi-directional with a patient interface. The COVID19 pandemic has resulted in a large increase in EMR portal adoption by patients. While many studies exist in how patient engagement and trust are established in face to face interactions between patients and their healthcare team, little is known about these critical factors in EMR portal communication.

METHODS: Using qualitative grounded theory methodology, between 2.1.2020 and 12.30.2020, we conducted semi-structured 45-minute interviews with a purposive sample of patients ($n = 50$), and in some instances their caregivers ($n = 6$), at an internal medicine clinic in Colorado. Interviews were audio-recorded and transcribed and then analyzed in ATLAS.ti software using constant comparison. Codes were developed inductively and applied by two team members. Coding discrepancies were resolved via consensus. Core themes were identified based upon concepts and patterns within and across the coded data.

RESULTS: The EMR communication platform is now perceived as an invaluable component of a patients' healthcare. Patient trust remains very high in this patient group toward their healthcare team.

EMR portal communication themes that enhances trust:

- Timeliness and reliability of response to messages.

- Easy to understand language of medical results.
- Ease of use of technology.
- Easy accessibility to urgent video visits.
- Length of time spent on video visit.
- Caregivers and younger demographic groups feel a great sense of benefit from the EHR communication app. Themes that erode trust:
 - Uncertainty as to what medical care can effectively be delivered over messaging or video visits.
 - Lack of effective technology help when needed.
 - Patient being given a serious medical diagnosis, such as cancer, over EHR messaging portal.
 - Lack of follow up as expected (no answer to messages, not getting back to a patient as indicated).
 - Technology problems on the clinician side during a video visit. Unexpected themes:
 - Small portion of EHR app functionality used by most physicians and patients.
 - Patients' perception of portal messaging as a 'time saver' for physicians.
 - So essential that increased concern for those without access.

CONCLUSIONS: The EHR portal provides a highly valued communication tool to enhance trust and engagement when used optimally for patients. There are large gaps in patient and clinician knowledge/use of the functionality of this EHR app, as well as what types of medical concerns are applicable for patient messaging and/or video visits.

LEARNING OBJECTIVE #1: Patient Care: Inform learners as to the unique aspects of various demographic groups experience of the EMR portal communication through the 2020 COVID19 pandemic.

LEARNING OBJECTIVE #2: Interpersonal and Communication Skills - Inform learners as to what we have learned from this qualitative study in EHR portal communication, messaging, functionality and video visits, especially as it relates to patient engagement and patient trust.

TELEHEALTH IN US HOSPITALS: STATE-LEVEL REIMBURSEMENT POLICIES DO NOT INFLUENCE ADOPTION

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BACKGROUND: Coronavirus 2019 disrupted the provision of care, catapulting telehealth to the forefront. Looking beyond the pandemic, it will be critical to identify characteristics that were associated with telehealth adoption prior to the pandemic as key levers to driving broader national implementation.

METHODS: We used the 2018 American Hospital Association's Annual Survey to measure adoption of telehealth at each hospital based on 5 categories: consultation and office visits, eICU, stroke care, psychiatric and addiction treatment, and other. We looked for associations between telehealth adoption and hospital characteristics, including teaching status, affiliation with a larger system, rural vs urban, use of electronic documentation, hospital size, and ownership status. We also examined state telehealth policies, including reimbursement for remote patient monitoring (RPM), reimbursement for store and forward (S&F) technology, reimbursement for interactive communication between patient and provider, commercial parity, Medicaid parity, and location-based parity. To identify predictors, we examined bivariate associations, selected variables that were significantly associated with telehealth adoption ($p < 0.05$), and then performed multivariable logistic regression with those variables.

RESULTS: We analyzed 2923 hospitals. Hospitals had a mean bed size of 186 (95% CI, 178-194). Nearly all (97%) hospitals used electronic clinical documentation systems, 70% were affiliated with a major health system, 65% were non-profit, 69% were in a metropolitan area, and 54% were non-teaching. Most (73%; 2142 out of 2923) hospitals adopted at least one telehealth capability in 2018.

In bivariate analyses, all hospital characteristics were significantly different between hospitals that had and had not adopted telehealth. Legislative characteristics were only significantly different for RPM (42% vs 52%, $p < 0.0001$), S&F (59% vs 76%, $p = 0.004$), and location-based parity (78% vs 85%,

$p < 0.0001$). In multivariable analyses, the adjusted odds of adopting telehealth increased for nonprofit hospitals (vs government; aOR 1.8 [95% CI, 1.4-2.3]), major teaching hospitals (vs nonteaching hospitals; aOR 2.4 [95% CI, 1.3-4.3]), micropolitan hospitals (vs metropolitan; aOR 1.5 [95% CI, 1.1-2.0]). In contrast, hospitals had lower odds of adopting telehealth if they lacked electronic clinical documentation (aOR 0.4 [95% CI, 0.3-0.8]), were unaffiliated (aOR 0.5 [95% CI, 0.4-0.6]), or were investor-owned (vs government; aOR 0.4 [95% CI, 0.3-0.5]). None of the statewide policies were associated with adoption of telehealth.

CONCLUSIONS: In a national sample of US hospitals in 2018, we found that hospital characteristics, but not state telehealth policies, were associated with telehealth adoption. It is likely that new policy levers are necessary to facilitate telehealth in hospital systems.

LEARNING OBJECTIVE #1: Describe hospital characteristics that are associated with telehealth adoption

LEARNING OBJECTIVE #2: Describe state policies that are associated with telehealth adoption

TELEPSYCHIATRY FOR ASSESSING AND MANAGING TARDIVE DYSKINESIA: EXPERT INSIGHTS FROM A CROSS-DISCIPLINARY VIRTUAL TREATMENT PANEL

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BACKGROUND: The use of virtual medical visits in psychiatry (telepsychiatry) is increasing and will likely continue beyond current societal circumstances. The diagnosis and assessment of tardive dyskinesia (TD), a persistent and potentially disabling movement disorder associated with dopamine receptor blocking agents (e.g., antipsychotics), is difficult in-person and even more challenging in virtual settings.

METHODS: Insights were solicited from a panel of 6 neurologists, 3 psychiatrists, and 3 psychiatric nurse practitioners. In July 2020, these experts participated in individual semi-structured interviews about how TD is diagnosed and treated in real-world settings. In November 2020, a virtual roundtable was conducted to consolidate findings from the individual interviews.

RESULTS: The panel agreed that telepsychiatry offers benefits and opportunities to both patients (easier access, reduced time/cost) and clinicians (fewer missed appointments, ease of soliciting partner/caregiver feedback on symptoms and quality of life, ability to assess patients in their own environments). The panel also agreed, however, that virtual visits cannot completely replace in-person visits. Given the challenges of differentiating TD from other drug-induced movement disorders, most new patients may initially require an in-person evaluation. For follow-up, all patients should have an in-office visit at least once a year if possible. The panel agreed that video is preferable and often necessary; telephone visits alone may not be sufficient. Key challenges for telepsychiatry include technology issues (inadequate technology), time constraints (more time needed for virtual assessments), absence of a standardized approach, and difficulty observing the patient's whole body for a comprehensive assessment of TD movements. For pre-appointment preparation, suggested best practices include ensuring that patients have adequate access/equipment and educating them on how to set up their environments and videos for optimal assessment. During the appointment, medical history and clinical review could be conducted similarly to in-person visits. For overall assessment of movements, patients can be instructed to walk around with someone else holding a smart phone or computer with camera. For more specific assessments, clinicians can demonstrate the type of movement that they would like the patient to try in a semi-structured but consistent manner. If movements are unclear, a follow-up in-person visit may be required.

CONCLUSIONS: Telepsychiatry allows clinicians to ask patients and caregivers about bothersome movements and how these movements affect functional ability and quality of life. Telepsychiatry also presents an opportunity to educate both patients and caregivers about TD, including FDA-approved treatment options (e.g., valbenazine).

LEARNING OBJECTIVE #1: Understand the potential benefits and limitations of telepsychiatry in patients with TD

LEARNING OBJECTIVE #2: Describe possible best practices for virtual assessment and follow-up of patients with TD

UNDERSTANDING THE PUBLIC DISCUSSIONS REGARDING THE COVID-19 VACCINES IN THE US ON TWITTER

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BACKGROUND: Coronavirus 2019 (COVID-19) has caused a global pandemic. Prediction models have estimated that more than half a million Americans will die of COVID-19 by April 2021. In December 2020, two COVID-19 vaccines were approved as an Emergency Use Authorization by the Food and Drug Administration (FDA). Questions remain to what extent these vaccines will be accepted by the public. This is important as rapid distribution and uptake of the vaccine is critical for successful community immunity. Therefore, we evaluated the public discussions regarding the Covid-19 vaccines in the US, on Twitter.

METHODS: To better understand discussions related to the Covid-19 vaccine on Twitter, we concurrently assessed the geospatial and temporal distributions of Tweets in the US. We obtained public Twitter discussions and other metadata from March 15 to December 13, 2020. Data Collection was performed using an Advanced Twitter Scraping tool called Twint (MIT License on GitHub). Data was collected using a Keyword-based search (keywords used: "covid vaccine", "coronavirus vaccine", "Moderna vaccine", "BioNTech vaccine", and "Pfizer vaccine"). We additionally used Natural Language Processing (NLP) to find themes in Twitter discussions.

RESULTS: A total of 15,857 Tweets relating to the COVID-19 vaccine were analyzed, which included 8,307 unique users. The highest number of Tweets were recorded in the months of November (n=4,477, 28.2%) and December (n=3,259, 20.6%), which corresponds to the months in which announcements about vaccine trial completion and FDA review for both (Pfizer and Moderna) vaccines were made. The following states had the highest number of Tweets on the topic: New Jersey (n=2,839, 17.9%), Washington DC (n=1,811, 11.4%) and Maryland (n=1,806 11.4%). The most common hashtags associated with the Tweets include #covid19, #coronavirus, and #covidvaccine. Additional analysis on a subset of Tweets (n=12298) and Users (n=8037) using NLP showed that the Top 100 Tweets with the most engagement (likes, retweets, and replies) had discussions relating to Dr. Anthony Fauci and President Donald Trump. Rallies and President Donald Trump were among the major topics of discussion for the general public in the overall Tweets.

CONCLUSIONS: This study indicates that there has been a surge in the discussions relating to the Covid-19 vaccines in recent months. These Tweets are geospatially-clustered, and the discussions frequently involve national leaders. Analysis of Twitter discussions can potentiate understanding of the public perception of the COVID-19 vaccines and assist in achieving acceptance of the vaccines.

LEARNING OBJECTIVE #1: To evaluate public discussions regarding the Covid-19 vaccines in the US, using the social media platform Twitter.

LEARNING OBJECTIVE #2: To demonstrate the use of natural language processing to analyze public discussions on a social media platform.

USABILITY, INCLUSIVITY, AND CONTENT EVALUATION OF COVID-19 CONTACT TRACING APPS IN THE UNITED STATES

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BACKGROUND: To facilitate contact tracing for exposure to the novel coronavirus (COVID-19), some states introduced mobile applications (apps) or notification systems to augment their contact tracing efforts. These apps track interactions using smartphones and notify individuals if they have been exposed to COVID-19. We evaluated the usability of mobile contact tracing, especially for individuals with limited digital literacy.

METHODS: We created a usability framework derived from the literature and expert insight focused on inclusivity and content—together encompassing “usability”. We searched the Apple Store, Google Play, literature, and news media using search terms of “covid-19,” “coronavirus,” and “contact tracing” to find contact tracing apps in the United States (U.S.) and evaluated them with our framework. We coded 17 categories, with coders matching 100% on 14 categories. Table 1 shows sample usability features.

RESULTS: Of 26 contact tracing apps in the U.S., government-affiliated entities created 19/26 (73%) of the apps. Notably, Apple and Google jointly created Exposure Notification Express, which they embedded in the operating systems and we coded as a separate app. Most apps (20/26, 77%) were available on both iPhone and Android, yet 18/26 (69%) were above 9th grade readability and 17/26 (65%) were available only in English. While almost all apps (85%) did not require users to input contact information to sign up and explained how their alert system worked, few apps included audio/video tools, illustrated instructions, or inclusive illustrations with different genders, skin tones, or physical abilities depicted. Although less than half of apps provided links to find physical testing locations, 16/26 (62%) linked to a local or state health department website within 3 clicks. None provided links to social support services or resources for quarantining.

CONCLUSIONS: Contact tracing apps must be usable and accessible to the populations they aim to serve. Our findings present concrete features for app developers to consider in app design (for contact tracing and beyond). Further, app developers should integrate standards for accessibility of digital health to reach diverse end users, such as those put forth by the Agency for Healthcare Research and Quality and the Healthcare Information and Management Systems Society.

LEARNING OBJECTIVE #1: Patient care

LEARNING OBJECTIVE #2: Systems-based practice

Scientific Abstract - Clinical Practice

ADDRESSING PROBLEM-RELATED DISTRESS AMONG CANCER SURVIVORS DURING COVID-19: FINDINGS FROM THE JOHNS HOPKINS PRIMARY CARE FOR CANCER SURVIVORS CLINIC

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BACKGROUND: As cancer survivors live longer, there has been increased demand on primary care to address survivors’ numerous healthcare and psychosocial needs, which have been further exacerbated by the COVID-19 pandemic. We established the Johns Hopkins Primary Care for Cancer Survivors (PCCS) Clinic in 2015 to provide comprehensive care to cancer survivors and address survivors’ unique problems. To inform survivorship priorities in primary care during COVID-19, we aim to: 1) describe and compare sources of distress among recent and long-term survivors in the PCCS clinic and 2) assess survivors’ need for support services.

METHODS: From August-December 2020, survivors seen by PCCS providers completed a validated distress survey with 48 problems (1-5 scale) grouped into 4 distress domains: physical, practical, functional, and emotional. Patients indicated how the healthcare team could address each problem (nothing, written information, or direct assistance). We defined clinically significant distress as a rating of ≥ 3 (moderate to severe) on at least one problem in the survey, and domain-specific distress as a rating of ≥ 3 on at least one problem in a particular domain. Recent survivors were < 5 years from diagnosis and long-term survivors were ≥ 5 years from diagnosis. We used descriptive statistics to analyze sources of distress and Chi-square or Fisher’s exact tests to assess associations among survivorship duration, clinically significant and domain-specific distress, and need for support services.

RESULTS: We approached 69 patients and 55 completed the survey (80% response rate), including 25 (45%) recent and 30 (55%) long-term survivors. Clinically significant distress was present in 78% of survivors. The most common sources of distress were sleep (33%), fatigue (22%), physical appearance (18%), and worry about the future (18%). Recent survivors were statistically significantly more likely to report clinically significant distress (96%) compared to long-term survivors (63%) ($p < 0.05$). There were no statistically significant differences in recent vs. long-term survivors in the frequency of physical (72% vs. 50%, $p = 0.1$), practical (40% vs. 40%, $p = 1.0$), functional (48% vs. 40%, $p = 0.6$), or emotional (56% vs. 37%, $p = 0.15$) distress. In the total sample, 24% requested written information and 38% asked for direct assistance. Recent survivors were statistically significantly more likely to request any form of support (64%), either written information or direct assistance, compared to long-term survivors (33%) ($p < 0.05$).

CONCLUSIONS: A majority of cancer survivors seen in the PCCS clinic during COVID-19 reported distress, with decreasing but still clinically meaningful distress in longer-term survivors. Models of survivorship based in primary care, such as the PCCS clinic, may enable primary care providers to more effectively support survivors through the challenges posed by the pandemic.

LEARNING OBJECTIVE #1: Identify contributors to distress among cancer survivors.

LEARNING OBJECTIVE #2: Recognize survivors' need for support in primary care.

ANOTHER ARROW IN THE QUIVER OF CARE: PCP PERSPECTIVES ON USE OF TELEMEDICINE FOR ADULTS AGED 65 AND OLDER

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BACKGROUND: As a result of the novel coronavirus pandemic, use of telemedicine has increased. We aimed to learn from primary care physicians (PCPs) their thoughts on implementing telemedicine in the care of adults ≥ 65 years.

METHODS: Since September 2020, we have emailed all PCPs affiliated with one large health system in Boston that includes 1 academic internal medicine practice, 1 academic geriatrics practice, and 7 community primary care groups each consisting of multiple practices to complete a web-based survey about their experiences providing telemedicine to adults ≥ 65 years. In addition to quantitative questions, the survey includes open-ended questions that ask participants to share their thoughts on using telemedicine with adults ≥ 65 , specific challenges and/or useful experiences, recommendations for improvement, and on continued use after the pandemic. For this study, we conducted a thematic analysis to identify themes in participants' comments to open-ended questions. Codes emerged from the text and the research team met to organize codes to reflect major themes. Disagreement about the meaning of themes or codes was resolved by consensus.

RESULTS: Overall, 163/383 (42%) PCPs responded to the survey; of these, 91 (56%) provided answers to open-ended survey questions. Of these 91, 60% were female, 83% were non-Hispanic white, 80% were community-based, and 72% had been in practice ≥ 20 years. We identified 3 major themes in PCPs' comments related to telemedicine for older adults including: 1) Optimizing the telemedicine visit; 2) Integration of telemedicine with the provision of primary care; and 3) Variation in PCPs' attitudes towards telemedicine. To optimize telemedicine for older adults, PCPs recommend patients be prepared for the visit by becoming familiar with the telemedicine platform, that an effective platform be utilized, home medical equipment be used before the visit (e.g., blood pressure cuff), schedule with a caregiver if needed, expectations be set, and administrative support be available. To integrate telemedicine into primary care, PCPs recommended targeting telemedicine for certain problem or visit types, enabling video access, and reducing administrative burdens on PCPs. As for PCP attitudes, some PCPs felt that telemedicine enhanced the doctor-patient relationship, improved the patient experience, and allowed for a more relaxed visit with improved show rates: "it creates immediate access and

sudden intimacy with our patients." Others felt that telemedicine visits were incomplete without a physical exam, were less rewarding, and could be frustrating: "the technical issues took over the visit."

CONCLUSIONS: PCPs saw a role for telemedicine in older adults care, but its use may need to be targeted for certain types of visits and more support is needed to ensure a successful telemedicine visit with older adults.

LEARNING OBJECTIVE #1: Identify factors influencing the utility of telemedicine for adults ≥ 65 and older

LEARNING OBJECTIVE #2: Learn ways to improve telemedicine

ANTI-MELANOMA DIFFERENTIATION ASSOCIATED GENE 5 (MDA5) DERMATOMYOSITIS: CLINICAL FEATURES AND OUTCOMES IN A PRE-DOMINANTLY AFRICAN-AMERICAN CASE SERIES

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BACKGROUND: Clinically amyopathic dermatomyositis (CADM) is recognized as a distinct subgroup of dermatomyositis (DM) with the typical cutaneous manifestations of classic DM, but without muscle involvement. Several studies have demonstrated that rapidly progressive interstitial lung disease (RP-ILD) with a poor prognosis occurs in patients with CADM. Recently, certain autoantibodies (anti-melanoma differentiation-associated protein 5 or anti-MDA5) have been associated with an increased risk of RP-ILD in CADM patients. Previous studies exploring this association have been performed in largely Asian or Caucasian populations. This study describes the clinical findings and outcomes of a pre-dominantly Black cohort of CADM patients with anti-MDA5 associated interstitial lung disease (ILD).

METHODS: This retrospective study characterized the clinical characteristics, HRCT findings, laboratory test results, presence of additional myositis autoantibodies (MAAs), and treatment outcomes of MDA5 positive patients in two subgroups: Black and non-Black patients.

RESULTS: Among 17 patients with CADM and anti-MDA5 autoantibodies identified between 2013 and 2020, 15 (88%) developed ILD with 6 patients (40%) having the rapidly progressive variant. Out of the predominantly Black cohort (11 of 17 patients), 6 (55%) patients had at least one additional MAA. Within the Black cohort, 5 patients were positive for ANA, 1 for anti-CCP, 3 for anti-SSA, 5 for anti-Ro52, and 1 for anti-synthetase antibodies. Black patients exhibited a higher prevalence of MAAs when compared to the non-Black cohort. All 6 patients with RP-ILD presented in the Black sub-group. Average ferritin levels, CPK, aldolase, ferritin, FVC, and TLC did not differ significantly between Black and non-Black patients, but the majority of patients with anti-MDA5 antibody alone (4 of 5) developed ILD but not RP-ILD. Three out of four patients who died developed RP-ILD and all four had additional MAAs.

CONCLUSIONS: Black patients with anti-MDA5 positive DM exhibited many of the key phenotypic findings in other MDA5 positive DM populations. However, in our cohort, there was a higher incidence of RP-ILD and mortality among Black patients compared to non-Black patients. We noted that Black patients with CADM and anti-MDA5 often had co-existent MAAs and this was associated with a poorer prognosis and incidence of RP-ILD than their non-black counterparts. This suggests that coexistent MAAs may be a marker for less favorable prognoses in Black patients with CADM and anti-MDA5. This study provides novel insights into the clinical findings and outcomes of Black patients with dermatomyositis. Further study of dermatomyositis in vulnerable populations is needed.

LEARNING OBJECTIVE #1: Demonstrate that patients with anti-MDA5 associated DM who have co-existing myositis associated antibodies (MAAs) may have a worse prognosis than patients with no additional MAAs.

LEARNING OBJECTIVE #2: Recognize that studies describing clinical manifestations of disease may not have adequate representation of Black patients.

A QUALITATIVE EXPLORATION OF PRIMARY CARE PHYSICIANS' PERCEIVED CHALLENGES AND STRATEGIES FOR DIABETES PREVENTION

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BACKGROUND: Primary care physicians (PCPs) play an essential role in diabetes prevention by screening, diagnosing and managing prediabetes. Our objective was to understand PCP perspectives on patient- and provider-specific challenges and strategies to address these barriers to inform a clinic-based intervention to improve diabetes prevention.

METHODS: We conducted a qualitative study using in-depth semi-structured interviews. From May- October 2020, we recruited PCPs from primary care practices affiliated with one academic system in the mid-Atlantic region. We used a standardized interview guide focused on barriers, facilitators and potential intervention components for diabetes prevention. We also obtained demographic information. Interviews were audio-taped and auto-transcribed using the Zoom video platform. Transcripts were cleaned and double-coded by two reviewers (E.T. and K.M.) using the framework analytic approach. The codebook was generated based on the core questions from the interview guide and later refined by the reviewers through a consensus process. The two reviewers compared their coding from each interview to confirm the coding was applied consistently. We organized the data using MAXQDA 2020.

RESULTS: We conducted interviews of 11 PCPs (73% female, 45% white, aged 35-67 years, 2-25 years in practice) from 9 community-based primary care clinics. Providers suggested five themes around patient barriers to diabetes prevention, including lack of: 1) nutrition knowledge, resources and affordability, 2) exercise time, accessibility and affordability, 3) social and family support, 4) motivation and ability to maintain behavior change, and 5) follow up with PCP. Among provider barriers, we identified three themes: 1) PCP apathy about prediabetes, 2) lack of time to address diabetes prevention, and 3) lack of close follow up with patients. PCPs proposed the following solutions for improving diabetes prevention: 1) exercise resources and tips, 2) arranging regular follow-up appointments with PCP or check-in with nurse, 3) positive reinforcement for behavior change, and 4) increased accessibility and insurance coverage of nutrition visits.

CONCLUSIONS: In our qualitative study, we identified several important patient- and provider- specific barriers to engaging in diabetes prevention efforts. These factors and their proposed solutions will be considered in designing and implementing a clinic-based intervention to improve diabetes prevention. Although not mentioned by the providers interviewed, Diabetes Prevention Programs, which are yearlong evidence-based intensive lifestyle programs, effectively address many of the barriers identified here, including need for resources, knowledge, positive reinforcement and frequent follow-up, and are becoming more widely available across the U.S.

LEARNING OBJECTIVE #1: Increase medical knowledge about challenges and strategies for diabetes prevention.

LEARNING OBJECTIVE #2: Introduce Diabetes Prevention Programs as a resource that clinicians can offer patients to prevent diabetes.

CAN PCT VALUE PREDICT OUTCOME IN COVID 19 PATIENTS?

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BACKGROUND: The purpose of this study is to demonstrate the variation in outcomes among SARS- CoV2 positive patients based on procalcitonin (PCT) level at one community teaching hospital. It has been noted in the literature that PCT rises in response to systemic inflammation and may be utilized as a biomarker for infection of bacterial origin. However, PCT level may also be elevated in cytokine storm, which can occur during high-risk viral infections. In this study we attempt to assess whether PCT level >0.25 can prognosticate severe disease.

METHODS: A retrospective analysis of patients whose PCT levels and positive for SARS-CoV2 were obtained between April 26th - April 29th of 2020. For preliminary data we analyzed 27 patients, 14 with PCT level <0.25 and 13 with PCT level >0.25. Patients were assessed for baseline characteristics including sex, age, and comorbidities. Outcomes measured were in-hospital mortality rate, 30-day mortality rate, total hospital length of stay (LOS), requirements for ICU transfer, and the need for mechanical ventilation.

RESULTS: Among 27 records, 14 (52%) patients had PCT level <0.25 and 13 (48%) had PCT level >0.25. Among 14 patients with PCT level <0.25 8 (57%) were female and 6 (43%) were male, in 13 patients with PCT level >0.25 5 (38%) were female and 8 (62%) were male. Average age in patients with PCT level <0.25 was 59 years, in patients with PCT level >0.25 61 years.

Average number/percentage of comorbid conditions in patients with PCT level <0.25 were: DM 6 (43%), BMI>30 7 (50%), CHF 3 (21%), CKD 1 (7%), COPD/Asthma 4 (29%) vs in patients with PCT level >0.25 were: DM 5 (38%), BMI>30 3 (25%), CHF 3 (23%), CKD 7 (54%), COPD/Asthma 2 (15%), cancer 2 (15%).

Among patients with PCT level <0.25 in hospital mortality rate was 1 (7%), 30-day mortality rate was 1 (7%), average total hospital LOS was 8 days, rate of ICU transfer was 1 (7%), rate for invasive ventilation was 1 (7%). Among patients with PCT level >0.25 in hospital mortality rate was 1 (8%), 30-day mortality rate was 1 (8%), average total hospital LOS was 14 days, rate for need for ICU transfer was 5 (38%), rate for invasive ventilation was 4 (31%).

CONCLUSIONS: There was no significant difference between in-hospital mortality rate, 30-day mortality rate, total hospital LOS, ICU care requirement, need for invasive ventilation and PCT level. However, average LOS was 14 days in >0.25 PCT group vs 8 days in the <0.25 group, ICU admission rate was increased 38% vs 7% and rate for invasive ventilation 31% vs 7% respectively. Although there was no significance to support these findings, we observed a definite trend that if investigated in large sample size can provide helpful clinical information.

LEARNING OBJECTIVE #1: This preliminary study suggests that high PCT level correlated with longer LOS, need for ICU care and invasive ventilation in SARS-CoV2 positive patients and therefore was associated with severe disease.

LEARNING OBJECTIVE #2: PCT level in Covid-19 disease could be utilized as a marker for predicting development of severe disease.

CLINICAL FEATURES ASSOCIATED WITH ANTEMORTEM SUSPICION OF FATAL PE

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BACKGROUND: Autopsy studies have consistently shown that pulmonary embolism (PE) is one of the most common causes of inpatient death that is not considered by clinicians antemortem. Improving detection of PE may therefore substantially reduce preventable inpatient deaths. The only existing study assessing the clinical features of patients with autopsy-confirmed, fatal PE without antemortem suspicion of the diagnosis studied a cohort from the early 1990s. Two key changes to the diagnostic approach to PE have subsequently occurred: the adoption of computerized tomography pulmonary angiogram as the preferred imaging modality for diagnosis, and the development of PE clinical prediction tools such as the Wells' Score. This study aims to examine the clinical features of autopsy-confirmed, fatal PE at single medical center in the modern era.

METHODS: All cases of inpatient death from 1999-2018 with an autopsy examination at an academically-affiliated Veterans Affairs hospital were reviewed for evidence of fatal PE. A fatal PE was defined using criteria from prior studies. The pulmonary embolus had to involve at least 3 subsegmental pulmonary arteries and be listed as the cause of death on the autopsy report. Patients who were on comfort care or not hospitalized at the time of death were excluded. Two internal medicine physicians independently reviewed the medical record for each case. Antemortem clinical suspicion of PE, symptoms prior

to death, risk factors for PE, and comorbidities were recorded. In cases of disagreement between the reviewing clinicians, a third physician was consulted and performed an independent chart review. Unanimous agreement was achieved for all cases.

RESULTS: 1,346 autopsy records were reviewed for eligibility. 122 cases of acute PE were identified, 60 met criteria for fatal PE as an inpatient. There were 31 cases of fatal PE with antemortem suspicion and 29 cases without. Antemortem suspicion of fatal PE increased from 39% of cases between 1999-2008 to 66% of cases between 2009-2018. 19 of 29 cases of unsuspected PE had concurrent acute coronary syndrome, sepsis, active pulmonary infection, or decompensated heart failure. [ATJ(S1)] Risk factors for PE were more common in suspected versus unsuspected cases (active malignancy, 18 vs 8; venous thromboembolism, 10 vs 5, respectively). 9 of the 29 cases without antemortem suspicion lacked any of the classic symptoms associated with PE: dyspnea, chest pain, syncope, unilateral leg swelling, or hemoptysis.

CONCLUSIONS: In this case series, rates of clinical suspicion of fatal PE increased over two decades. A lower percentage of cases of unsuspected fatal PE had classic symptoms of PE, and concurrent, acute cardiopulmonary illnesses were common.

LEARNING OBJECTIVE #1: Assess the burden of symptoms, risk factors and concurrent acute illnesses in cases of fatal PE with and without an antemortem clinical suspicion.

LEARNING OBJECTIVE #2: Assess whether prevalence of antemortem suspicion of PE changed over two consecutive decades at a single medical center.

CO-LOCATING BUPRENORPHINE TREATMENT AND HEPATITIS C TREATMENT AT A COMMUNITY-BASED CLINIC RESULTS IN HIGH RATES OF ACHIEVING HCV CASCADE OF CARE MILESTONES

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BACKGROUND: Persons who enter the medical system for medication assisted treatment (MAT) are at a high risk to be infected with hepatitis C (HCV). Little is known about HCV care in patients accessing buprenorphine-based opioid treatment during the era of HCV direct-acting antivirals (DAA). In recent years, we have co-located MAT with the treatment of HCV at a community-based primary care clinic in the Bronx, NY. We evaluated HCV cascade of care in a co-located MAT and HCV program.

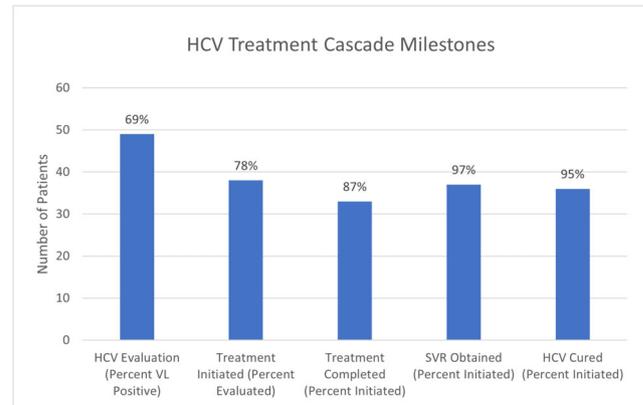
METHODS: From 2015 to 2017, we evaluated the prevalence of chronic HCV in all person who presented for buprenorphine treatment at our co-located primary care clinic. Of those who also had chronic HCV, we determined the cascade of care (HCV evaluation, HCV treatment initiation, HCV treatment completion and HCV cure). We then used logistic regression models to determine associations between patient characteristics (age, race, HIV+, retention in MAT) and meeting the HCV cascade of care milestones.

RESULTS: 242 patients presented for MAT over the study period, of which 71 (29%) were found to have chronic HCV. These patients had median age of 46, 74% were Hispanic and 18% were Black, 10% were HIV positive, 73% were on public insurance, and 52% were retained in buprenorphine care for more than 6 months. Of the 71 patients with chronic HCV, 69% (49) were evaluated by a specialist, 53% initiated treatment, and 46% completed treatment. Of those that initiated treatment 95% achieved HCV cure. We did not find any significant associations between patient characteristics and achieving HCV cascade of care milestones.

CONCLUSIONS: Patients with opioid use disorder carry the highest burden of HCV in the United States, yet treatment is rare. Among a high-risk population of patients accessing MAT treatment in the Bronx, NY, over half initiated HCV treatment when care was co-located, significantly higher than the national average. Importantly, HCV cure rates were high, even among a population of persons using drugs. No patient characteristics negatively affected achieving HCV care milestones. Co-locating MAT and HCV treatment is one important intervention to aid in our national goal for HCV elimination.

LEARNING OBJECTIVE #1: Understand the specific barriers to care for patients who inject drugs.

LEARNING OBJECTIVE #2: Understand how complex medical systems can be optimized to minimize barriers to care.



COMMUNICATION DIFFICULTIES BETWEEN SWISS HEALTHCARE STAFF AND DEAF AND HARD OF HEARING INDIVIDUALS: A QUALITATIVE STUDY

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BACKGROUND: In addition to be at high risk to endorse medical and psychological problems, Deaf and hard of hearing individuals (D&HHI) have limited access to healthcare. They are likely to face communication issues potentially leading to negative experience in healthcare. Limited research explored difficulties encountered by healthcare staff when providing care to D&HHI. A better understanding of these difficulties is important to provide insight into how enhancing quality of care to D&HHI. In response, this research aimed to explore staff and D&HHI's difficulties when interacting in the health care system.

METHODS: This study employed a qualitative design. Thirty-seven semi-structured interviews were conducted with D&HHI (n= 19; 52.6% female) and healthcare staff (n= 18; physicians, nurses, pharmacists, administrative staff; 78% female). Interviews were conducted in French with the assistance of a sign language interpreter when necessary. Conventional content analysis was used to extract common categories and themes.

RESULTS: Content analysis identified individual communication issues and structural difficulties. At individual level, D&HHI reported understanding issues leading to negative experiences in care (e.g. feeling lonely and anxious, giving wrong answers, receiving false diagnoses). Understanding issues were often consolidated by the fear to disturb healthcare providers, preventing them from asking precisions. Moreover, D&HHI pointed out that professionals commonly lack appropriate habits and communication skills (e.g., speaking from behind or in front of the computer, talking too fast, without articulating or over-articulating) and quickly forget about their difficulties. Echoing this findings, most professionals described communication issues (e.g. superficial and indirect communication, inability to ensure proper understanding) and mentioned using sub-optimal strategies (e.g., communication in writing, through a relative). At structural level, Deaf individuals highlighted the lack of available interpreters and hard of hearing individuals reported understanding issues currently worsened by masks worn by staff. Professionals also reported lacking resources (e.g., interpreter, time, specialized staff).

CONCLUSIONS: Findings confirm that both staff and D&HHI face difficulties when interacting leading to negative experience in healthcare. These results suggest that it may be necessary to provide structural measures such as training to healthcare staff to improve their communication skills and enhance D&HHI's experience in healthcare.

LEARNING OBJECTIVE #1: Patient care: To describe Deaf and hard of hearing individuals' experience and communication difficulties in the healthcare system.

LEARNING OBJECTIVE #2: Professionalism: To highlight healthcare providers' communication difficulties with Deaf and hard of hearing patients potentially leading to non-optimal care of the target population.

CONTEMPORARY USE OF LUNG CANCER SCREENING: USING REAL-WORLD DATA TO IDENTIFY OPPORTUNITIES FOR IMPROVEMENT

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BACKGROUND: National estimates suggest that lung cancer screening with low dose computed tomography (LDCT) is used infrequently, despite both evidence and guidelines to support its use. The goal of this study was to understand barriers to lung cancer screening use by quantifying attrition at each step, from identification of eligible patients, to referral, to receipt of screening.

METHODS: We identified established patients ages 55-77 seen at three primary care practices within the Yale New Haven Health System between 1/2015 and 2/2020 using data from the electronic health record (EHR). Among these patients, we identified those with complete smoking data in the EHR and those with partial smoking data. We next identified those eligible for lung cancer screening based on smoking history among those with complete data, and those potentially eligible, from among those with partial data. Within these groups, we calculated the proportion of eligible patients referred for screening, the proportion screened, and the proportion who were not screened but received a chest CT for symptoms. We used descriptive statistics and chi square testing for comparing proportions.

RESULTS: We identified 7,147 established primary care patients ages 55-77 who were seen between 2015-2020. Of these, 5,293 (74%) had complete smoking data while 1,854 (26%) had partial data. Among patients with complete data, 551 (10%) were eligible for lung cancer screening. Among those with incomplete data, 1,284 (69%) were potentially eligible for screening. Overall, among those definitely or potentially eligible for screening (n=1,835), the mean age was 62, 52% were male, 47% were White, 36% were Black and 17% were Latinx.

Among patients with complete smoking data who were eligible for screening (n=551), 52% had LDCT ordered, and 34% had at least one LDCT performed. An additional 26% received a chest CT for symptoms (i.e. not a screening LDCT). Among patients with incomplete smoking data (n=1,284), 10% had LDCT ordered and 3% had received at least 1 LDCT. An additional 21% had a chest CT ordered for symptoms. In the overall study population (n=1,835), we did not observe statistically significant differences in receipt of screening by race, ethnicity, or primary language.

CONCLUSIONS: In this study of lung cancer screening, we identified multiple potential contributors to low lung cancer screening rates, including incomplete smoking data in the EHR, which prevents identifying eligible patients at scale, a substantial proportion of patients who are never referred for LDCT, and loss to follow up among those who have been referred. Future quality improvement initiatives should focus on preventing attrition at each of these steps.

LEARNING OBJECTIVE #1: Describe current use of low dose CT (LDCT) for lung cancer screening in a primary care population.

LEARNING OBJECTIVE #2: Identify opportunities to improve lung cancer screening use by understanding barriers to use.

COST OF TREATMENT CONVERSATIONS BETWEEN CLINICIANS AND PATIENTS LIVING WITH DIABETES THE PRIMARY CARE PROVIDERS REPORTED EXPERIENCE

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BACKGROUND: Diabetes care is one of the most expensive chronic diseases in the US. Out-of-pocket expenses are associated with inadequate medication use among adults living with diabetes. While cost of treatment remains underdiscussed between patients and clinicians overall, little is known about this in the diabetes care setting. Our study aims to describe the prevalence of having cost of treatment conversations between patients living with diabetes and their primary care providers.

METHODS: We conducted a cross-sectional study of primary care providers working in a single Connecticut outpatient clinic between September 2020 and December 2020. All physician residents and attendings were invited to participate. Self-reported responses were collected online using Qualtrics to capture demographics as well as prevalence and comfort level of having cost-of-treatment discussions with patients. Key questions were adapted from prior instruments and included: "How often do you discuss treatment costs with your patients with diabetes?". Disposition towards having cost conversations was captured with the providers' comfort level in discussing cost of diabetes care with patients, and recognizing their role and responsibilities with these discussions. Proportions were used to describe dichotomous and dichotomized ordinal likert-type scale responses. This study was exempt from IRB review.

RESULTS: Fifty seven primary care providers were contacted by email and 26 agreed to participate (46% response rate). Among respondents, 88% were residents (n=23) and 12% were attending physicians; 61% (n=16) were female. Forty six percent (n=12) reported discussing treatment costs with their patients "sometimes" and 42% (n=11) "rarely" discussing costs. Furthermore, 96% (n=25) agreed or strongly agreed that the cost of medications affects medication use in their patients with diagnosed diabetes, and 80% (n=21) agreed or strongly agreed that it was their responsibility to discuss cost of diabetes treatment with their patients; 30% (n=8) of providers feel comfortable having these discussions always or most of the time. Eighty four percent (n=22) of respondents wanted to know more about how to discuss diabetes treatment with their patients.

CONCLUSIONS: In an outpatient primary care clinic, cost-of-treatment is under-discussed between providers and patients living with diabetes, despite providers deeming these discussions important. These results are consistent with prior research even when patients want to engage in these conversations due to cost related medication poor adherence. Providers' reported comfort levels could explain the absence of the cost conversations. Future educational interventions aimed to improve provider-patient communication skills are important to improve the quality of diabetes care.

LEARNING OBJECTIVE #1: Evaluate the value of cost-of-treatment discussions for effective provider-patient communication.

LEARNING OBJECTIVE #2: Recognize patients' needs regarding the affordability of their diabetes treatment.

CREATING EFFECTIVE WORKFLOWS FOR DELIVERING PATIENT DECISION AIDS IN ELECTIVE ORTHOPAEDIC SURGERY

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BACKGROUND: Common treatment decisions can be characterized by poor communication, significant knowledge gaps, and a lack of attention to patients' preferences. To address these issues, shared decision making (SDM) is increasingly advocated as an ideal model of treatment decision-making. Patient decision aids (DAs) have been shown to be an effective means to improve the quality of decisions. However, there are several challenges to effective dissemination and implementation of decision support interventions. Our goal is to identify best practices to disseminate DAs to patients deciding whether to undergo surgery for hip or knee osteoarthritis (OA), herniated disc (HD), or spinal stenosis (SS).

METHODS: Study staff sought to understand surgeon workflow and patient perception from May-Dec 2019. Four spine and OA clinics within the Massachusetts General Brigham System were evaluated. Observations were conducted at 2 spinal surgical and 2 arthroplasty clinics. Phone interviews were conducted with 21 OA and spine patients to explore preferences for receiving DAs. DA distribution data was collected across sites.

RESULTS: One of the eight clinics had established an effective workflow for disseminating DAs— distributing 700 DAs in 4 months. Feasibility of adapting their approach to other sites was assessed, but found barriers due to differences in staffing for new visits. One site piloted two approaches: 1) Medical assistants (MAs) ordered DAs for new OA and spine patients during the visit, 2) MAs ordered DAs after the physician indicated the patient was appropriate. Over 4 months the first approach led to 780 DAs being distributed, the second led to only 97 being distributed. In interviews, 60%(6/10) of spine and 64%(7/11) of OA patients reported varying preferences for when to receive a DA. 71% (15/21) wanted it before seeing the surgeon and 29%(6/21) after the initial consultation. 38%(8/21) felt DAs would be best received from their Primary Care Provider (PCP) or at the point of referral and 24%(5/21) prior to surgeon consultation to be more informed. One patient stated: "The earlier you get information the better. I felt like I spent an entire winter not knowing what was wrong. Even the PCP office could have given me more information."

CONCLUSIONS: There are differences in workflows across orthopedic clinics and conditions, which led to variable uptake and dissemination. Based on patient preference, different timepoints can be considered for ordering DAs either at the point of the PCP referral or prior to initial consultation. As pathways to treatment vary, there is a need to develop touchpoints tailored to clinical practice for patients to reliably receive information about treatment options.

LEARNING OBJECTIVE #1: To ensure that patients are well informed by receiving a patient decision aid to increase their knowledge and involvement in treatment decisions.

LEARNING OBJECTIVE #2: To create best practices to ensure patients receive the information they need from their providers to receive the treatment that match their goals and preferences.

DIAGNOSTIC ACCURACY OF MEDICAL STUDENTS USING A CLINICAL DIAGNOSTIC SUPPORT TOOL: A RANDOMIZED CONTROLLED TRIAL

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BACKGROUND: Technological advancements, including clinical diagnostic support tool (CDST), can support medical students and physicians in providing evidence-based care. To investigate the diagnostic accuracy of medical students based on the history of present illness between a group using CDST, a group using Google, and a group not using Google or CDST (control).

METHODS: Sixty-four medical students and 14 residents who rotated in the Department of General Medicine at Chiba University Hospital from May 2020 to December 2020 were included in this study. The medical students were randomly divided into three groups: 22 in the CDST group, 22 in the Google group, and 20 in the control group. Participants were asked to provide the most likely diagnosis for 20 cases (10 common and 10 emergent diseases). One

point was given for each correct diagnosis, with a maximum of 20 points. The mean scores from the three groups of medical students were compared. We also compared the mean scores among the CDST group, the Google group, and the residents (without CDST and Google). One-way analysis of variance was used to compare the three groups of medical students. The Kruskal-Wallis test was used to compare the CDST group, the Google group, and the residents (without CDST or Google) group. In this study, Current Decision Support[®], which is available free of charge to the faculty members and students of this hospital, was adopted as the CDST.

RESULTS: A total of 64 medical students and 13 residents were included. One resident was excluded because of not obtaining informed consent. The mean scores in each group were 9.5±1.8 for the control group, 12.0±1.4 for the CDST group, 12.1±1.2 for the Google group, and 14.7±1.1 for the residents. The mean scores of the CDST and Google groups were significantly higher than those of the control group (p=0.024 and p=0.027, respectively). The residents' mean score was higher than those in the CDST and Google groups (p=0.012 and p=0.011, respectively). Regarding common disease cases, the mean scores were 7.2±0.9 in the CDST group, 7.0±0.7 in the Google group, and 8.0±0.7 in the residents. There was no significant difference in the mean scores (p=0.149). The mean scores for the emergent disease cases were 4.7±0.8 for the CDST group, 4.9±0.9 for the Google group, and 6.7±0.7 for the residents. The residents' mean scores were significantly higher than those of the CDST and Google groups (p=0.005 and p=0.012, respectively).

CONCLUSIONS: Medical students can list differential diagnoses more accurately by using CDST and Google. Medical students who use CDST and Google can list differential diagnoses in common diseases with the same diagnostic accuracy level as the residents. CDST and Google have become a more important tool for clinical decision making.

LEARNING OBJECTIVE #1: We should understand the effectiveness of a clinical diagnostic support tool and Google in clinical decision making.

LEARNING OBJECTIVE #2: Clinical diagnostic support tools and Google can improve diagnostic accuracy.

DISCORDANCE BETWEEN PROFESSIONAL GUIDELINES AND CLINICAL PRACTICE IN PREOPERATIVE EVALUATION FOR HEAD AND NECK SURGERY

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BACKGROUND: The role of the internist when performing a preoperative risk assessment is to determine the patient's medical readiness for surgery and reduce their perioperative morbidity and mortality. Some studies suggest that routine preoperative assessment tends to include more tests than evidence shows are beneficial. Excessive testing imposes unnecessary burdens on both individual patients and the U.S. healthcare system. However, little is known about whether preoperative testing for head and neck surgery is excessive. The goal of this project was to assess the degree to which professional guidelines for preoperative evaluations are followed in the context of head and neck surgery.

METHODS: We retrospectively reviewed medical records of patients who were able to obtain an outpatient preoperative assessment and underwent surgery in the Johns Hopkins Department of Otolaryngology Head and Neck Surgery (OHNS) during the first two weeks of January 2019 (N=99). We referred to 2014 American College of Cardiology/American Heart Association Guideline on Perioperative Cardiovascular Evaluation and Management of Patients Undergoing Noncardiac Surgery. We collected data on patients' demographic characteristics, preoperative health status, type of procedure, and preoperative testing. We also used the National Surgical Quality Improvement Program (NSQIP) Risk Calculator to compute the preoperative risk of a major adverse cardiac event (MACE score). This data was used to determine what preoperative testing would have been indicated according to professional guidelines. Standard descriptive statistics were used to determine the appropriateness of the preoperative evaluation. In addition to the quantitative

analysis, the professional guidelines were compared to the departmental OHNS recommendations to PCPs.

RESULTS: In 44.3% of the preoperative evaluations, tests were ordered in excess of professional guidelines. We discovered that the departmental OHNS recommendations conflicted with professional guidelines; for example, OHNS advises obtaining an ECG on any patient over the age of 50, although guidelines do not endorse routine age-based preoperative ECG testing.

CONCLUSIONS: Preliminary evidence demonstrates that preoperative testing exceeds professional guidelines. Next steps include reconciling departmental OHNS recommendations with professional guidelines, identifying the reason(s) for guideline discordance in clinical practice, and then intervening accordingly in order to prevent patient harm and reduce healthcare costs.

LEARNING OBJECTIVE #1: Systems-Based Practice: Discuss the importance of guideline concordance in preoperative evaluation as it pertains to individual patients and high-value healthcare.

LEARNING OBJECTIVE #2: Practice-Based Learning and Improvement: Describe how preoperative testing in clinical practice compares to professional guidelines.

EARLY PREDICTION MODEL FOR PROLONGED HOSPITALIZATION IN ADULTS WITH TRAUMATIC BRAIN INJURY; ANALYSIS OF THE NATIONAL TRAUMA DATA BANK

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BACKGROUND: In the United States, traumatic brain injury (TBI) is a significant cause of morbidity and mortality. TBI rates have steadily risen since 2006, and annual healthcare expenses in the United States are estimated at \$35 billion. Thus, predicting which patients with TBI will have poor outcome(s) will optimize decision making, patient care, and improve resource utilization. This study sought to develop and validate a clinical tool for predicting prolonged hospital stay (PROHOSP) in adults after TBI.

METHODS: Data was collected for adults (≥ 18 years) from the National Trauma Data Bank from years 2007-2015. Patients who presented with any TBI who survived emergency department admission were included. Our goal was to use clinical variables that can readily be measured upon arrival to the emergency room (ER). As such, the predictors included patient demographics, mechanism and intent of injury, vital signs, mode of transportation, respiratory status, time from injury to ER arrival, Glasgow Coma Score (GCS), and Injury Severity Score (ISS). Multivariable logistic regression was used to investigate associations between predictive variables and PROHOSP. The samples were split into a training set (70%) and a test set (30%). Model performance was measured using the C-statistic and accuracy [(true positive + true negative)/patient population]. Furthermore, we conducted a calibration curve to assess the accuracy between estimated and observed number of outcome events.

RESULTS: In total, 484,775 adults were included in the study (67% male; median [IQR] age, 54.0 [34.0, 73.0] years; 78% White). The number of patients who fell under PROHOSP category was n=127,912 (26.4%). PROHOSP patients more often had GCS 3 (26% vs 4.2%, $p < 0.001$), were victims of motor vehicle trauma (51% vs 35%, $p < 0.001$), were transported via helicopter to the ER (28% vs 14%, $p < 0.001$), had a higher ISS (22 vs 16, $p < 0.001$). The final model consisted of 12 variables; the C-statistic of 80.5% (95% CI, 80.2% - 80.7%), accuracy of 80.3%, sensitivity of 70.8%, and specificity of 82.1%.

CONCLUSIONS: This study provides an accurate and well-calibrated early predictive model for PROHOSP in TBI patients. Lastly, we translated our findings to develop a web application that is user-friendly for healthcare providers in trauma centers.

LEARNING OBJECTIVE #1: Through the lens of patient care, this study sought to develop a model that could predict PROHOSP in TBI patients. We hope that our model would allow clinicians and families to more easily reach consensus during medical decision-making for TBI patients. With time, the goal would be to improve TBI outcomes nationwide.

LEARNING OBJECTIVE #2: This study sought to raise awareness about the societal burden of TBI. We hope our predictive model can be seen as systems-based practice that helps conserve healthcare resources, streamline care, and increase positive outcomes.

EFFICACY OF A PHARMACIST-MANAGED DIABETES CLINIC IN HIGH-RISK DIABETES PATIENTS, A RANDOMIZED CONTROLLED TRIAL - "PHARM-MD"

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BACKGROUND: Diabetes mellitus affects 13% of American adults. To address the complex care requirements necessary to avoid diabetes-related morbidity, the American Diabetes Association recommends utilization of multidisciplinary teams. Research shows pharmacists have a positive impact on multiple clinical diabetic outcomes. We aimed to determine impact of an education-focused pharmacist managed diabetes clinic model (PMDC) on hemoglobin A1c (HbA1c) and other diabetes core measures at 6 and 12 months follow-up.

METHODS: Open-label randomized controlled trial with 1:1 allocation. Patients 18-75 years old with type 2 diabetes mellitus and most recent HbA1c $\geq 9\%$ were enrolled from a single institution resident-run outpatient medicine clinic. Standard of care (SOC) patients continued with routine follow up with their primary provider whereas the PMDC group had an additional 6 visits with the pharmacist within 6 months from enrollment. Patients were followed for 12 months from enrollment. Data collected included HbA1c, lipid panel, statin use, blood pressure control, immunization status for influenza and pneumonia, and evidence of diabetic complications (retinopathy, nephropathy, neuropathy). Data analysis was done in the intention-to-treat and per-protocol populations.

RESULTS: Forty-two patients were enrolled in the PMDC group and 44 patients in the SOC group. Three patients dropped out (2 patients from the PMDC group and 1 patient from the SOC group). Average decrease in HbA1c for the intervention compared to the control group at 6 months was -2.99% vs. -1.01%, ($p = 0.0021$). (Figure 1) Additionally, the odds of achieving a goal HbA1c of $\leq 8\%$ at 6 months was 3.03 (95% CI= 1.01, 9.12, $p = 0.0488$) in the intervention versus control group. There was no statistically significant difference in the remaining secondary outcomes measured. Missing data during follow up limited power of secondary outcomes analyses.

CONCLUSIONS: Addition of pharmacist-managed care for patients with type 2 diabetes mellitus is associated with significant improvements in HbA1c compared with standard of care alone.

LEARNING OBJECTIVE #1: Medical Knowledge: To acquire knowledge regarding the treatment of high-risk diabetes mellitus patients, and applying this knowledge in patient care and in the education of others

LEARNING OBJECTIVE #2: 2. Patient Care: To assist in making informed decisions about the therapeutic options for the treatment of high-risk diabetes mellitus patients based on scientific evidence

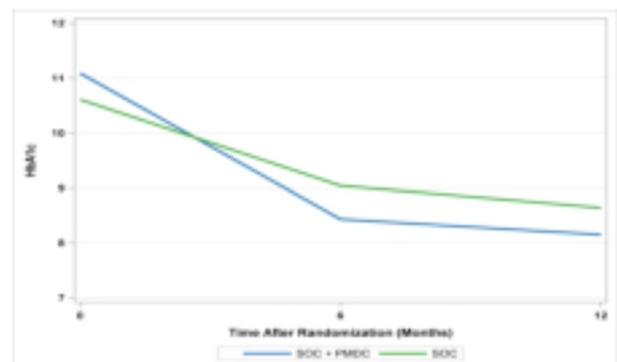


Figure 1: HbA1c values in Intent-to-Treat Population

ESTABLISHING PRESCRIPTION DRUG AFFORDABILITY AS A NEW VITAL SIGN IN PRIMARY CARE: POLICY AND PRACTICE-BASED STRATEGIES TO ROUTINELY ASSESS MEDICATION AFFORDABILITY AT A FEDERALLY QUALIFIED HEALTH CENTER

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BACKGROUND: Nationwide, there have been sharp rises in patients' out-of-pocket costs for medicines, with strong interest in Congress to lower drug costs as U.S. prescription drug spending reached \$335 billion in 2018, and 1 in 4 people had difficulty affording their medicines. During the COVID-19 pandemic with rising unemployment, this situation is worsening. The purpose of this study was to assess how frequently patients at a Federally Qualified Health Center have difficulty affording their medicines and identify policy and practice-based strategies to routinely assess medication affordability.

METHODS: After reviewing patients' health insurance status at a Connecticut community health center, we surveyed adult patients on their ability to afford their medicines during the clinic visit intake process. We then surveyed the clinic's physicians on clinical practice adjustments when caring for patients unable to afford their medicines and conducted brief interviews of area pharmacies to further assess cost barriers patients face when filling prescriptions.

RESULTS: In 2019, the health center's internal medicine clinic had 1,582 patients with Medicaid, 360 with Medicare, 252 with Medicaid/Medicare, 750 with private insurance and 639 with no insurance, with 391 receiving 340B drug pricing assistance. Of 50 patients surveyed, 22% had difficulty affording their medicines in the past year and 16% had difficulty affording their medicines since their last visit. One patient paid \$700 for medicines at one pharmacy, later costing \$16 at another pharmacy. Of 18 physicians surveyed, 100% stated they would want to know during the clinic visit if patients cannot afford their medicines. Interviewed pharmacies reported that pharmacies must pay each time a prescription drug is run through insurance to determine a medication's copay for patients with insurance, and pharmacies are not required to automatically tell patients if a medicine's discounted cash price is cheaper than using insurance.

CONCLUSIONS: Patients' inability to afford their medicines is a common problem and a system-wide approach is urgently needed to identify and alert staff of patients unable to afford their medicines, particularly during the COVID-19 pandemic. We must advocate for comprehensive federal and state policy reform to make medicines affordable, but at the clinic level, patients would benefit from being asked if they can afford their medicines during each clinic visit's routine intake process to improve patients' access to medicines and health outcomes.

LEARNING OBJECTIVE #1: Identify strategies to routinely ask patients if they are able to afford their medicines during the routine clinic intake process/vital signs assessment (Patient Care).

LEARNING OBJECTIVE #2: Explore opportunities to develop transformative systems level interventions to automatically alert the interprofessional clinical team when patients are unable to afford their medicines, in order to prompt needs assessment screening and improve patients' access to medicines and health outcomes (Systems-Based Practice).

EVALUATING THE EFFECTS OF PHARMACIST VISITS ON DIABETIC CONTROL IN A RESIDENCY CLINIC

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BACKGROUND: Diabetes mellitus is a common and complex disease with numerous complications managed by both patients and their physicians. This study looked at the effects of integration of pharmacists in managing patients with diabetes in an internal medicine residency clinic.

METHODS: This was a retrospective chart review conducted in an internal medicine residency clinic. A sample of 108 patients seen by a diabetic pharmacist in 2019 was randomly selected. A control group of 108 patients was

created using a random selection of age and gender matched patients with diabetes who were not seen by a pharmacist. Single and comparative interrupted time series regression analysis was used to examine the effects of pharmacist visits on diabetic control over 1 year following the first pharmacist visit. The primary endpoint was hemoglobin A1C (HgbA1c) as a measure of glycemic control. Secondary endpoints were BMI, weight, and cholesterol (LDL and HDL).

RESULTS: Patients who saw a pharmacist had a higher mean HgbA1c than patients in the control group (9.48 vs. 7.38). The simple interrupted time series model showed that prior to engagement with pharmacists, patients had increasing HgbA1C values ($\beta=0.012$, $p<0.001$), where β represents the trend of HgbA1c over time. Engagement with the pharmacist visits led to an immediate drop in HgbA1C values ($\beta=-1.11$, $p<0.01$). The slope also significantly decreased ($\beta=-0.014$, $p<0.001$), leaving a post-pharmacist visit slope of -0.002 . The comparative interrupted time series model showed that, while the control patients started with significantly lower HgbA1C, their HgbA1C values followed a similar pattern as the pharmacist visit patients over the study period. In fact, they saw an equivalent drop in HgbA1C values over time as their matched intervention patient started pharmacist visits (DID= -0.001 , $p=0.59$), where DID is the difference in difference estimator.

CONCLUSIONS: This study shows that engagement with a pharmacist led to an immediate drop in HgbA1c values. However, patients in the control group who saw resident physicians followed a similar trend in rate and degree of decrease in HgbA1c without a statistically significant difference between the two groups. Therefore, in a teaching residency clinic environment, residents were able to attain similar diabetic control outcomes as patients who saw a pharmacist. A significant limitation in our study is that patients who saw a pharmacist had significantly worse diabetic control and a greater number of non-pharmacist clinic visits (12.9 vs 9.1, $p = 0.02$) over the study period, implying higher medical complexity. Our study does not account for patient complexity where additional support from a pharmacist may lead to clinical significance in patient outcomes and allow the primary care physician to focus on management of other diagnoses.

LEARNING OBJECTIVE #1: Identify additional resources for management of patients with diabetes in a residency clinic

LEARNING OBJECTIVE #2: Evaluate interdisciplinary care between physicians and pharmacists in managing diabetes

IDENTIFICATION OF CRITICAL TOUCHPOINTS WITHIN THE PATIENT JOURNEY BETWEEN PCPS AND PATIENTS WITH OSTEOARTHRITIS AND OBESITY

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BACKGROUND: Obesity is a risk factor for osteoarthritis (OA) development and prognosis. Weight management is a key strategy for managing OA but can be challenging. To understand the medical journey of patients with OA and obesity, interactions between patients and primary care physicians (PCPs) were mapped to identify the roles involved, influential factors, and how treatment decisions are made.

METHODS: A cross-sectional study was conducted in the U.S. among PCPs and patients with OA and obesity. Participants were recruited by email invitation and completed an online survey in January 2020.

RESULTS: 101 PCPs and 304 patients completed the survey. Mean patient BMI was 39.9 kg/m² with mostly female respondents (79%); 56% reported moderate OA severity defined as self-reported frequency of joint pain. Patients with OA and obesity were most often diagnosed with OA by a PCP (54%). Patients (72%) and PCPs (83%) feel PCPs are the coordinator of patient care. Upon OA diagnosis, PCPs reported discussing OA topics: treatments (96%),

impact of weight (89%), causes (83%), progression (70%), and relation to other health conditions (66%). Most patients (61%) recalled discussing weight and weight management when first diagnosed with OA; common topics were the effect of weight on overall health (76%) or on their OA (74%), exercise (66%), and diet (59%). Among patients diagnosed by a PCP (n=164), few (12%) reported discussing weight loss medications, although most (76%) were somewhat interested in prescription weight loss medication use, particularly those with severe OA. Patients attributed their OA to excess weight (73%) and nearly all have seriously attempted to lose weight (8 attempts on average). Most patients (71%) and PCPs (57%) feel personally responsible to actively contribute to patients' weight loss efforts. PCPs believe the biggest barrier to weight management for patients with OA is patient compliance (76%), even more than lack of time to counsel patients (48%). Only 38% of patients and 12% of PCPs agree that they/their patients are motivated to lose weight, and one-quarter (24%) of patients agree they know how to maintain weight loss. Half (51%) of PCPs reported following OA clinical practice guidelines; 61% follow obesity management guidelines but few (14%) view obesity guidelines as very or extremely effective.

CONCLUSIONS: Patients recognize the impact of obesity on their OA and have made serious efforts to lose weight, but struggle to achieve weight loss. As their primary care coordinator, PCPs are uniquely positioned to help patients in their OA treatment journey, including weight management. PCPs need support in interpreting and using available clinical guidelines and need additional resources for effectively managing patients with OA and obesity. Also, patients need education in understanding the tools available for obesity treatment.

LEARNING OBJECTIVE #1: To characterize experiences of people with OA and obesity as they interact with PCPs.

LEARNING OBJECTIVE #2: To improve engagement between PCPs and people with OA and obesity.

IDENTIFYING POTENTIAL INAPPROPRIATENESS OF INPATIENT PHYSICAL THERAPY CONSULTS

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BACKGROUND: Physical therapy (PT) is a valuable tool to help prevent loss of mobility hospitalized patients experience, but is a constrained resource in most hospital settings. The Activity Measure-Post Acute Care (AMPAC) score is a validated tool that has been used to assess inappropriateness of PT consults on a neurosurgery service and covered general medicine service. However, no studies have used AMPAC scores to evaluate inappropriateness of PT consults on an uncovered hospital medicine service. We aimed to assess the potential inappropriateness of PT consults on uncovered hospital medicine services using validated AMPAC score cutoffs.

METHODS: We conducted a chart review of all patients admitted to uncovered hospital medicine services at a large academic hospital for one year. We identified patients who had a PT consult at any time during their admission and obtained age, sex, admission and discharge AMPAC score, and discharge disposition. PT consults were considered "inappropriate" in patients with AMPAC score > 18 based on previous studies validating this as a cutoff for predicting discharge to home. Descriptive statistics were used to summarize age, sex, and discharge destination. Change in mobility over hospitalization was calculated as admission AMPAC – discharge AMPAC (delta AMPAC). Multivariable logistic regression was used to test for independent associations between age group, AMPAC group, and sex with odds of being discharged home.

RESULTS: 6,634 patients were admitted during the study period. Fifty-eight percent of patients (n=3582) had a PT consult during admission. Of those, mean age was 66.3 +/-15.4 and mean admission AMPAC was 16.8 +/- 5.6. Forty-two percent of PT consults were considered inappropriate. Patients 65 or less with AMPAC > 18 represented 23% of all PT consults. Compared to patients with admission AMPAC > 18, patients

with admission AMPAC ≤ 18 had significantly different delta AMPAC [0.32 vs -2.9 t(3097) = -22.2, p < 0.001]. Patients with AMPAC > 18 had increased odds of discharge to home (OR 5.92 [95% CI = 4.86 – 7.21]; P = <0.001) compared to AMPAC ≤ 18. Younger age (<65) also had increased odds of discharge to home (OR 2.01 [95% CI = 1.69 – 2.39]; P < 0.001). Females had increased odds of discharge to home compared to males (OR 1.21 [95% CI 1.03 – 1.43] P < 0.001).

CONCLUSIONS: These results suggest that a large proportion (42%) of PT consults on uncovered hospital medicine services are inappropriate. Using age < 65 and AMPAC > 18, 23% of all PT consults remain inappropriate. If patients who begin the hospitalization with low AMPAC are more likely to lose mobility during their stay, it is even more critical for them to have PT. AMPAC score and age can be used to strategically prioritize inpatient PT consults, an area that needs increasing emphasis during and after the pandemic given the expected increase in hospital-associated disability.

LEARNING OBJECTIVE #1: Understand the importance of mobilizing hospitalized patients

LEARNING OBJECTIVE #2: Understand how AMPAC and age help prioritize PT

IMPLEMENTATION AND PREDICTORS OF EVIDENCE-BASED TOBACCO TREATMENT AMONG US PHYSICIANS

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BACKGROUND: Physicians play a critical role in tobacco cessation treatment. Unfortunately, barriers exist that limit implementation of evidence-based interventions. This study examines implementation of the "5As", introduced by the US Public Health Service (USPHS) clinical practice guidelines. The "5 A's" highlight the need to 1) Ask every patient if they use tobacco, 2) Advise them to quit, 3) Assess willingness to quit, 4) Assist in making a quit attempt, and 5) Arrange follow-up.

METHODS: A national sample of 1,058 US physicians from 6 specialties were surveyed in 2018 (51.8% response rate). Survey domains included: demographics, awareness of guidelines, tobacco treatment practices, perceived barriers to treatment, and perceived efficacy of various treatments. Multiple logistic regression analyzed predictors of implementing guidelines activities.

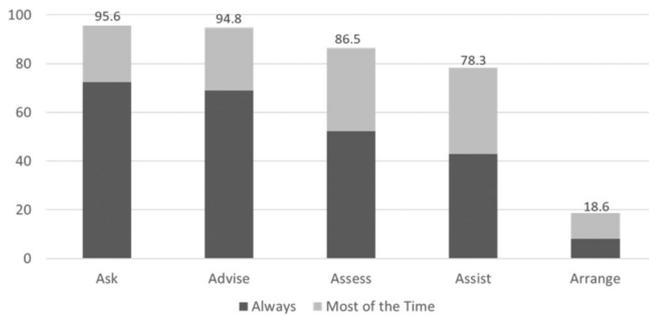
RESULTS: Mean age was 51.3 years old, with the majority male (64.4%) and white, non-Hispanic (63.9%). Nearly all physicians report asking patients if they smoke (95.6%) and advising (94.8%) to stop, while fewer assess willingness to quit (86.5%), assist with a quit plan (78.3%), or arrange follow-up (18.6%). Only 18% reported using the USPHS Guidelines in clinical practice. Time related factors were the most common barriers (53.4%), with patient factors (36.9%) and financial/resource factors (35.1%) cited less frequently. Physician awareness of the USPHS guidelines was a robust and significant predictor of adherence to all five steps of the 5A's. Other significant predictors of adherence included physician specialty in pulmonary medicine, graduating prior to 1990 and higher perceived effectiveness of pharmacotherapy.

CONCLUSIONS: This national survey highlights the need for increased awareness of the latest guidelines for evidence-based tobacco treatments, including community-based resources. Very few physicians report implementing the USPHS clinical practice guidelines into their practice and this gap contributes to fewer physicians assisting their patients with cessation plans and following up. With greater understanding and enhanced training, physicians will be more prepared to effectively address tobacco use.

LEARNING OBJECTIVE #1: Readers will be able to recall the "5A's" of tobacco cessation in clinical practice, detailed in the USPHS guidelines.

LEARNING OBJECTIVE #2: Readers will appreciate the shortfalls in physician best practices in tobacco cessation and the need for system-wide improvement and awareness.

Figure 1. Frequency of delivering the 5A's among US Physicians (N=1054)



IMPROVING CANCER SURVIVORSHIP CARE AT AN INTERNAL MEDICINE RESIDENCY-RUN CLINIC

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BACKGROUND: Improvements in screening, diagnosis and treatment of cancers, combined with an aging population, is leading to an increasing number of cancer survivors. Primary care physicians are now playing a key role in the care of cancer survivors and need to be familiar with the long-term and late effects of cancers and their treatments. Unfortunately, there is a lack of formal training during residency, resulting in deficits and barriers in cancer survivor patient care.

METHODS: To address the lack of formal training of cancer survivors, a curriculum was developed based on the American Cancer Society's recommendations for cancer survivorship care. The curriculum was offered to Internal Medicine residents, years 1-3 and consisted of a one-hour interactive case-based lecture and a handout highlighting key areas of survivorship care. The impact of the course was measured using a pre- and post-six question survey. Three questions evaluated residents' knowledge about survivorship care, two questions evaluated resident attitudes and practice behaviors, and one question regarding demographics.

RESULTS: Thirty residents were invited to participate in the training on cancer survivorship care, 24 completed the pre-test survey, and 19 completed the post-test survey. Knowledge based questions were answered correctly by 67% of the residents after the training vs 51% pre-training. Resident attitudes regarding caring for cancer survivors similarly improved with 84% of residents rating their confidence as a 3/5 or 4/5 (with 1 = not confident and 5 = very confident) compared to 46% of residents pre-training.

CONCLUSIONS: Increasing numbers of cancer survivors means primary care physicians need to be more educated on cancer survivorship care in order for appropriately treat these patients. Cancer survivorship training should therefore be incorporated into the residency curriculum. Results of this study indicate both the deficit in knowledge and confidence among residents as well as the success of incorporating cancer survivorship care into the curriculum.

LEARNING OBJECTIVE #1: Identify common long-term and late effects of cancer and their appropriate treatment.

LEARNING OBJECTIVE #2: Identify problems in psychosocial well-being in the post-treatment period.

IMPROVING SOCIAL SUPPORT DISCUSSIONS IN PRIMARY CARE CLINIC

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BACKGROUND: The physiology by which chronic social isolation stress (SIS) advances cardiovascular, endocrine, neoplastic, and cognitive disease is well understood. SIS is a known risk factor for mortality with effects similar to smoking and obesity. Yet little is known about if and how physicians inquire

about a patient's social support system in the clinic setting. This study aims to highlight the frequency and nature of physicians' social support discussions with patients, in order to improve discussion and documentation of social determinants of health, specifically SIS.

METHODS: This study analyzes data previously collected by the MEDCHAT Study, namely 92 transcribed conversations between patients and physicians during routine primary care visits. The study includes 27 primary care providers at a public hospital in NYC and 92 adult patients who are English-speaking, carry a hypertension diagnosis, and have received primary care from the same provider for at least 3 months. A grounded theory approach is used to categorize conversation themes, including how often SIS is discussed as a risk factor for mortality compared to other risk factors such as medication adherence, diet, weight, exercise, and smoking.

RESULTS: Of 49 patient visits coded to date, SIS came up in conversation 32.7% of the time, including living situation (6.1%), family support (26.5%), community involvement (2.0%), home health (4.1%), and social stress (14.3%). Notably, loneliness was never discussed (0%). There were no conversations in which physicians formally screened for SIS using validated questions (0%). Other risk factors were discussed 98.0% of the time, including medication adherence (98.0%), diet (42.9%), weight (32.7%), smoking (30.6%), and exercise (28.6%). Discussion of SIS was not correlated with the number of other risk factors addressed ($p = 0.254$). Patients themselves initiated discussion of personal relationships in 51.0% of conversations, and physicians did not verbally acknowledge them in 24.0% of these cases.

CONCLUSIONS: The findings to date suggest that, despite evidence that SIS is a risk factor for worsening morbidity and mortality, physicians rarely inquire formally with patients about their social support systems. Improving physician social history-taking to include SIS could be an important health system transformation leading to improved risk stratification of patients for a variety of disease processes, increased ability to connect patients to much-needed social services, and richer physician-patient relationships.

LEARNING OBJECTIVE #1: Recognize Social Isolation Stress as a risk factor with effects similar to smoking and obesity.

LEARNING OBJECTIVE #2: Improve discussion and documentation of social determinants of health, specifically Social Isolation Stress.

INCIDENCE OF AKI AND CLINICAL OUTCOMES IN PATIENTS HOSPITALIZED WITH COVID-19

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BACKGROUND: Throughout the COVID-19 pandemic, research has focused on identifying direct organ targets of SARS CoV-2, prognostic factors for disease course, and therapy options that improve clinical outcomes and mortality. SARS CoV-2 most severely infects cells in the respiratory tract leading to fatal acute lung injury; however it also has tropism for the kidneys. Entry into kidney cells via angiotensin-converting enzyme 2 (ACE2), subsequent homeostasis disruption, and cytotoxic effects of virus-induced cytokines are postulated mechanisms to direct kidney injury. AKI has been demonstrated as a prognostic indicator and risk factor for mortality in COVID-19 patients. We aimed to study the incidence of AKI among COVID-19 patients, risk factors for AKI, and the association between AKI and clinical outcomes including ICU admission and death.

METHODS: This is a single-center retrospective study identifying patients who were admitted to our hospital between March 15th to April 30th 2020 and tested positive for COVID-19 by RT-PCR. All epidemiological, social, and clinical data were maintained confidentially. AKI at any point during hospital course was defined as per the KDIGO criteria. Statistical significance was defined by a p value of <0.05 . Total sample size was 593. Outliers were identified using boxplot graphs utilizing interquartile method and removed prior to detailed analysis, and Fisher's exact test was used for statistical significance with confidence level 95%.

RESULTS: In our study 57.5% patients were male, median age was 64 (IQR 22), average BMI was 29.17, and average length of stay was 6.49 days. 279 patients had GFR <60 on admission, and 281 patients had GFR <60 on discharge. A total of 51.43% patients had AKI. 49.24% of patients had

Diabetes, 63.40% had hypertension, 24.79% required ICU admission, and 33.89% resulted in death. Patients with diabetes (OR 3.01, CI 2.15-4.20, $p < 0.0001$) and hypertension (OR 3.17, CI 2.23-4.51, $p < 0.0001$) were significantly more likely to have associated AKI. Patients with AKI were more likely to have ICU admission (OR 5.35, CI 3.43-8.33, $p < 0.0001$) and death (OR 5.65, CI 3.83-8.34, $p < 0.0001$) as outcomes.

CONCLUSIONS: Our data correlates with previous studies indicating that diabetes and hypertension are risk factors for AKI, and AKI is associated with poorer clinical outcomes including ICU admission and mortality. Many patients unfortunately passed before evaluation by our ICU team, thereby possibly underestimating our ICU admissions. Further analysis to determine the significance of AKI and clinical outcomes in patients with pre-existing CKD, ESRD on hemodialysis, and those requiring renal-replacement therapy will elucidate the impact of SARS CoV-2 on kidney function and mortality during this continued pandemic.

LEARNING OBJECTIVE #1: Investigate the incidence of acute kidney injury (AKI) in patients hospitalized with COVID-19.

LEARNING OBJECTIVE #2: Characterize Diabetes and Hypertension as risk factors in AKI and identify clinical outcomes associated with AKI.

LEVERAGING BEHAVIORAL SCIENCE INSIGHTS TO IMPROVE PATIENT ENGAGEMENT IN DIABETES PREVENTION: A SCREENING FACTORIAL DESIGN EXPERIMENT

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BACKGROUND: Prevention of type 2 diabetes mellitus (T2DM) is a major public health priority. Little is known about how to best leverage health communications to increase uptake of evidence-based preventive strategies such as participation in a Diabetes Prevention Program (DPP), metformin use, or individually-directed weight loss and physical activity. Insights from behavioral economics and health psychology hold particular promise to guide effective messaging strategies.

METHODS: In a screening factorial design experiment we enrolled 144 patients who received primary care at the Ann Arbor VA Medical Center, used Secure Messaging through VA's online patient portal, had a recent hemoglobin A1c test in the prediabetes range, and at baseline were not engaged in any evidence-based strategies to prevent T2DM. Participants completed a baseline survey and were randomly assigned to 1 of 16 study arms. For 3 months, all participants received a weekly Secure Message and a monthly mailing with general information about T2DM prevention. In the experimental arms, messages also included 1 or 2 of the following behavioral science-informed messaging strategies: (1) urgency framing; (2) implementation intentions; (3) preference checklists; (4) tailoring to aspirations; and (5) social norm framing. After 3 months, participants completed a final survey. The primary outcome was self-reported engagement at 3 months in any evidence-based strategy (participation in the DPP or another lifestyle change program, use of metformin, or individually-directed lifestyle change) to prevent T2DM. Secondary outcomes included self-reported engagement in each individual evidence-based strategy to prevent T2DM, perception of risk for T2DM, perceived importance of T2DM prevention, and motivation to prevent T2DM. Multivariable logistic regression and ordinary least squares regression models were used to measure the main effects of each messaging strategy and hypothesized potential interactions between messaging strategies.

RESULTS: No messaging strategies were significantly better than general preventive information in increasing the primary outcome of self-reported engagement at 3 months in any evidence-based strategy to prevent T2DM. However, urgency framed messages significantly increased the odds of participation in a DPP (odds ratio 3.70, $P = 0.02$), messages with urgency framing that were tailored to aspirations increased perceived importance of T2DM prevention (beta 1.21, $P = 0.04$), and preference checklists increased motivation to prevent T2DM (beta 0.82, $P = 0.01$).

CONCLUSIONS: Patient portal messages that leveraged behavioral science insights improved several important self-reported outcomes related to prevention of T2DM, but will need continued refinement to have broader and more sustained effects among at-risk patients.

LEARNING OBJECTIVE #1: To understand how behavioral science insights can be translated into prevention-oriented messages.

LEARNING OBJECTIVE #2: To examine the effects of behavioral science-informed messages on patient engagement in diabetes prevention.

LOST TO FOLLOW UP?: A QUALITATIVE ANALYSIS OF WHY PATIENTS DO NOT RETURN FOR LUNG CANCER SCREENING

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BACKGROUND: Although the US Preventive Services Task Force recommends lung cancer screening with low dose CT (LDCT) among high-risk adults, uptake of lung cancer screening has been low, with only about 14% of eligible patients screened nationally. The goal of this study was to understand barriers to screening within an important population: patients who are referred to lung cancer screening but never complete the test.

METHODS: We conducted a qualitative study of patients referred for lung cancer screening from two safety net primary care practices within a large academic medical center. We included patients who met criteria for lung cancer screening and who had a low dose CT ordered at least six months prior, but had not completed the test. We used semi-structured interviews to explore patients' perspectives on screening. Interviews were transcribed and coded by two independent reviewers. Codes were grouped into themes. Themes were then reviewed and revised using an iterative process until discrepancies among reviewers were resolved.

RESULTS: Our sample included 16 patients (mean age 65 years; 50% female; 44% White, 56% Black, and 13% Latinx). We identified five distinct themes related to barriers to completing lung cancer screening (Table): uncertainty about what lung cancer screening with LDCT entails, concern that screening adds to the burden of medical care, presence of competing priorities, concern about what the test might show, and concern about discomfort during the test. Almost all participants expressed some unfamiliarity or confusion about lung cancer screening.

CONCLUSIONS: Patients cite a variety of reasons for not pursuing lung cancer screening, even when it has been ordered by their primary care doctor. Unfamiliarity with lung cancer screening was very common and remains a critically important barrier. Interventions to improve uptake of lung cancer screening may focus on providing accessible, patient-centered information about lung cancer screening to support informed decision-making.

LEARNING OBJECTIVE #1: Understand patient-identified barriers to lung cancer screening.

LEARNING OBJECTIVE #2: Identify opportunities to improve use of lung cancer screening by addressing barriers patients face.

PHYSICIAN BIAS IN PRESCRIBING ORAL ANTICOAGULATION TO ELDERLY PATIENTS

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BACKGROUND: Atrial fibrillation (AF) is an extremely common heart rhythm disorder which affects up to 6 million adults in the United States and 33.5 million people worldwide. This arrhythmia carries a 5-fold increased risk of strokes, which are often more disabling and fatal than non-AF related strokes. Age is by far the strongest risk factor for stroke. Despite the high risk of stroke in elderly patients with AF, there is evidence that this population is undertreated. Additionally, there is growing evidence that elderly patients on anticoagulation (AC) do not have a heightened risk of intracranial hemorrhage as previously believed.

The objective of this study is to determine the influence of patient age on AC prescribing behaviors in patients with AF and to compare AC prescribing behaviors between internal medicine and cardiology providers.

METHODS: 56 physicians (37 internal medicine, 19 cardiology) were presented eight vignettes regarding patients with newly-diagnosed AF at an outpatient office. The providers were given the patients' ages and hypothetical past medical histories. They were instructed to select the likelihood of initiating oral AC on a scale of 1 to 5 (1 = unlikely, 5 = very likely). The vignettes were paired in four groups of two with each pair describing one elderly patient (> 65 years old) and one younger patient both with equivalent CHA2DS2VASc and HAS-BLED scores. The vignettes were presented to the providers in a random order, and the corresponding CHA2DS2VASc and HAS-BLED of each vignette were not given to the providers.

Providers were then categorized as 'unwilling' or 'willing' to initiate AC in each of the presented vignettes based on the survey responses (unwilling = rating of 1-3, willing = rating of 4 or 5). A chi square analysis was used to compare inclination to initiate AC between each of the paired elderly and young patients and among all elderly and young patients.

RESULTS: Among all providers surveyed, the willingness to prescribe AC was 31% for elderly patients versus 84% for younger patients ($p<0.001$). Internal medicine physicians opted to anticoagulate elderly patients 25% of the time versus 42% for cardiologists ($p<0.01$). There was no statistically significant difference in AC initiation for younger patients between the two specialties.

CONCLUSIONS: Our study shows that physicians are less likely to prescribe AC to elderly patients compared to younger patients, despite similar risks for stroke and bleeding. This demonstrates a potential age-related bias. Cardiologists are more likely to prescribe anticoagulation to elderly patients than their internal medicine colleagues. This survey suggests that internal medicine providers should consider consulting with a cardiologist when deciding whether to withhold AC in elderly patients.

LEARNING OBJECTIVE #1: Determine the influence of patient age on anticoagulation prescribing behavior in patients with non-valvular atrial fibrillation

LEARNING OBJECTIVE #2: Compare anticoagulation prescribing behaviors between internal medicine and cardiology physicians

PILL MANAGEMENT STRATEGIES AND PILL COUNT ESTIMATED ADHERENCE IN A PRAGMATIC CLINICAL TRIAL

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BACKGROUND: Medication adherence is often measured in clinical trials, yet little is known about how patient pill management strategies (e.g. use of a pill box) affect this measurement. We studied how patient strategies influence pill count adherence measured in a pragmatic clinical trial.

METHODS: Patients were part of the HYVALUE study, a trial testing an intervention to improve medication adherence in patients with hypertension. Patients with pill count data who completed a medication management survey at baseline or follow up were included. The survey included 11 medication management strategies (Table). Pill count adherence was calculated as the proportion of the actual over the expected number of pills taken since the last refill. The association between strategies and pill count adherence was determined at each timepoint. Strategies associated with apparent outliers (adherence >1 and <0) were also examined.

RESULTS: Of 960 HYVALUE patients, 595 (61.9%) were included at baseline, 368 (38.3%) at 3- months, and 389 (40.5%) at 6-months. Patients used a median of 2 strategies at baseline (IQR 1.00-3.00). The

most common strategies were finishing previous pills before starting new bottle (54.6%), moving pills to a pill box (48.9%) and combining like prescriptions into one bottle (39.7%). Those who combined like prescriptions had significantly lower measured pill count adherence than those who did not (baseline 0.58 vs 0.72, $p<0.01$; 3-month 0.52 vs 0.68, $p<0.01$; 6-month 0.60 vs 0.68, $p=0.08$). Patients with apparent over-adherence (>1, $n=102$) more often reported taking pills differently than bottle directions ($p<0.01$) or as needed ($p=0.02$). Patients with apparent under-adherence (<0, $n=65$) more often combined like prescriptions ($p<0.01$) and moved pills to a pill box ($p<0.01$).

CONCLUSIONS: Nearly half of patients in a pragmatic trial combined like prescriptions into one bottle; this strategy was associated with calculated lower pill count adherence. Our findings highlight the challenges of interpreting adherence in pragmatic trials and the clinical importance of addressing patient medication management in usual clinical care.

LEARNING OBJECTIVE #1: Clinicians will explore factors that influence patient medication adherence measurements to improve clinical care.

LEARNING OBJECTIVE #2: Researchers participating in pragmatic clinical trials will understand the influence of medication self-management strategies on pill count adherence measurements.

PREVALENCE AND CORRELATES OF COGNITIVE SYMPTOMS AMONG PATIENTS RECOVERING FROM COVID-19 ILLNESS

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BACKGROUND: Many patients recovering from COVID-19 illness report debilitating cognitive symptoms – memory loss, disorientation, impaired concentration – for months after the initial viral infection resolves. The pathogenesis of this so-called “COVID brain fog” remains poorly understood, but often results in profound functional impairment and reduced quality of life. We sought to determine the prevalence of self-reported cognitive symptoms and their clinical correlates in patients discharged home after hospitalization for COVID-19 illness.

METHODS: A subset of patients hospitalized on non-ICU inpatient wards for COVID-19 illness was surveyed an average of three months after discharge home regarding persistent COVID-related symptoms. Cognitive symptoms were assessed by asking “Since your COVID illness, do you now have more difficulty: 1. Remembering conversations a few days later?, 2. Remembering where you placed familiar objects?, 3. Finding the right words while speaking?” Patients answering at least one of these questions affirmatively were coded positive for cognitive symptoms. Covariates included age, sex, race, ethnicity, pre-COVID employment status, length of hospitalization, depression (PHQ-8 score ≥ 10), and COVID-induced PTSD (PCL-5 score ≥ 30). Logistic regression was used to estimate the association between cognitive symptoms and covariates.

RESULTS: Among 144 included patients, mean age was 56 years (SD 16, range 23-92), 40.3% were women, 17.4% were White, 13.9% were Black, 54.2% were Hispanic, 61.1% were employed pre-COVID, and mean length of hospitalization was 7.0 \pm 6.7 days. Overall, 45.1% of patients reported at least one cognitive symptom (24.2% forgot conversations, 34.6% misplaced items, 28.1% had word-finding difficulty), 18.1% reported elevated depression symptoms, and 22.9% reported elevated PTSD symptoms. In adjusted logistic regression models, both depression (OR 4.32, 95% CI 1.12-16.63, $p=0.03$) and PTSD (OR 3.50, 95% CI 1.06-11.51, $p=0.04$) were significantly associated with cognitive symptoms. Such associations were not observed for any other covariates included in the model.

CONCLUSIONS: Nearly half of patients reported cognitive symptoms three months after hospitalization for COVID-19. Both depression and PTSD were correlated with self-reported cognitive impairment, though the direction of effect cannot be determined. It is troubling that such debilitating symptoms are being reported by patients after relatively mild COVID-19 illness.

Objective neuropsychological testing is needed to confirm subjective cognitive dysfunction, and neuroimaging should be performed for clinical correlation. Interventions addressing both cognitive and psychological symptoms may be important to optimize recovery after COVID-19 illness.

LEARNING OBJECTIVE #1: To describe the prevalence and identify correlates of self-reported cognitive symptoms in patients discharged home three months after COVID-19 hospitalization. **LEARNING OBJECTIVE #2:** To inform the development of clinical interventions that may promote recovery after COVID-19 illness.

PREVALENT USE OF BLOOD PRESSURE RAISING MEDICATIONS AMONG US ADULTS WITH HYPERTENSION: NATIONAL CROSS-SECTIONAL STUDY

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BACKGROUND: Many common medications are known to elevate blood pressure (BP) and use of these medications among individuals with hypertension may contribute to difficulty achieving BP control. Thus, we aimed to characterize the use of BP raising medications by US adults with hypertension and estimate their impact on national BP control rates.

METHODS: We conducted a cross-sectional analysis of the National Health and Nutrition Examination Survey, weighted to be representative of all US adults, between 2015-2016 and 2017-2018. Adults who were pregnant, had absent BP screening or did not complete a questionnaire were excluded. We identified medications associated with BP elevation based on national cardiology guidelines and compared prevalent use of BP raising medications by adults with controlled and uncontrolled BP. Hypertension was defined as a BP $\geq 130/80$ mmHg or patient report of taking an anti-hypertensive medication. Controlled and controlled BP were defined by a threshold BP of 130/80 mmHg. We used multivariate regression models with post-estimation predictions to estimate the impact that stopping BP raising medications could have on individual and population level BP control rates.

RESULTS: Among 10,676 survey participants representing 232,701,297 US adults (mean age 56, 47.5% female) 47.2% had hypertension (95% CI, 45.5%-48.9%). Among adults with hypertension, 79.5% (95% CI, 77.3%-81.8%) had uncontrolled BP ($>130/80$ mmHg). Of adults with hypertension, 19.0% (95% CI, 17.4%-20.4%) reported using 1 or more BP raising medications and 3.3% (95% CI, 2.4%-4.1%) reported using 2 or more. Of those with uncontrolled hypertension, 17.5% (95% CI, 15.9%-19.2%) reported using 1 or more BP raising medications, compared to 24.5% (95% CI, 21.2%-27.7%) with controlled hypertension. The most commonly used classes of BP raising medications were antidepressants (8.9%; 95% CI, 7.7%-10.0%), non-steroidal anti-inflammatories (7.2%; 95% CI, 6.1%-8.4%), steroids (2.2%, 95% CI, 1.8%-2.6%), and stimulants (1.1%, 95% CI, 0.6%-1.6%). Predictive models estimated that the cessation of a single BP raising medication among current users could improve population BP control rates by 4.8% (95% CI, 1.4%-8.1%).

CONCLUSIONS: In this nationally representative study, nearly 1 in 5 adults with hypertension reported taking medications associated with BP elevation, many of which have therapeutic alternatives that are not associated with BP elevation. Attention to polypharmacy and prescribing cascades may be a promising approach to improving population BP control and reducing medication burden.

LEARNING OBJECTIVE #1: To identify commonly prescribed medications associated with blood pressure elevation.

LEARNING OBJECTIVE #2: To assess the potential impact of deprescribing on blood pressure control

RISK STRATIFICATION VALUE OF LABORATORY ORDER SETS FOR HOSPITALIZED COVID-19 PATIENTS.

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BACKGROUND: Risk stratification at COVID presentation may inform physician decisions concerning patient admission, level of care triage and treatment regimens.

METHODS: Under IRB exemption, data were abstracted from electronic medical records of consecutively discharged or expired COVID patients who completed baseline laboratory order sets and administrative coding. Demographics, laboratory results and administrative data were archived and analysed using JMP15.2 (SAS, Cary, NC). Aim was to identify each laboratory order set variable associated ($P < .05$) with progression to critical illness defined as intubation or ICU admission while controlling age, sex, race and Elixhauser comorbidities. Univariate logistic regression measured association with attendant receiver operating characteristic (ROC) curve while computing optimal cut-point (Youden Index) for each variable. Random forest (RF) algorithm generated multivariate ROC retaining associated variables that optimized area under ROC (RF-AUROC) representing model accuracy. Continuous data were summarized with median [IQR] compared using Kruskal-Wallis Test.

RESULTS: Among 654 COVID patients discharged or expired between March 14 and October 31, 2020 respectively 123 vs 531 progressed to critical illness or were progression free. Similar ($p > .05$) intergroup baseline data were pulled (68 [56-80] years with 68 % White, 13 % Black, and 19 % other race distribution. Intergroup differences included males (60%) vs females (49 %) ($p = .03$) and BMI 31.5 [27-37] vs 28.1 [24-33] kg/m² ($p < .001$). Baseline COVID clinical traits predictive of progression to critical illness retained by RF analysis sequenced by relative contribution to model precision (AUROC = 0.98) with attendant cut-point, RF explained variance (RFEV, %) and level of significance included: lactate dehydrogenase ≥ 364 U/L (RFEV = 19 %) ($p < .0001$); bands ≥ 17 % (RFEV = 17%) ($p < .0001$); CK total ≥ 88 U/L (RFEV = 15%) ($p < .0001$); CRP ≥ 10.7 mg/dl (RFEV = 13%) ($p < .0001$); D-dimer ≥ 0.71 μ g/ml ($p = .002$); ferritin ≥ 404 ng/ml (RFEV = 9%) ($p < .001$); serum glucose ≥ 144 mg/dl (7 %) ($p = .006$); ANC/lymphocyte ratio ≥ 6.85 (RFEV = 6 %) ($p = .005$); and platelet/lymphocyte ratio ≥ 307 (RFEV = 4 %) ($p = .007$). Four cells assayed with routine CBC contributed 27 % to model accuracy. Bands and CK were stronger predictors than CRP, D-dimer or ferritin. Hyperglycemia predicted progression to critical illness independent of extant DM2.

CONCLUSIONS: Our single-center observational study reports preliminary evidence suggesting a baseline risk stratification model including nine routinely available blood biomarkers controlled for age, sex, race and 38 comorbidities predicts with high accuracy COVID progression to critical illness.

LEARNING OBJECTIVE #1: To assess value of baseline blood biomarkers to identify COVID-19 patient risk of progressing to SARS.

LEARNING OBJECTIVE #2: To describe which CBC cells track with putative inflammatory biomarkers associated with Cov-2 infection.

SIMULTANEOUS ADMINISTRATION OF THE FLU AND ZOSTER VACCINES AND SUBSEQUENT RECEIPT OF THE FLU VACCINE

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BACKGROUND: Fewer than half of US adults receive the flu vaccine each year; many cite exaggerated concerns about side effects. By contrast, the recombinant zoster vaccine often causes mild systemic side effects. We evaluated whether simultaneous administration of the two vaccines was associated with lower rate of flu vaccination in the subsequent year.

METHODS: From a national claims database of commercial and Medicare Advantage patients, we identified a cohort of patients over age 50 who received a 2018-19 flu vaccine (August 2018 – March 2019) plus either a simultaneously or separately administered (within 6 months) zoster vaccine. We required continuous insurance enrollment from August 2017 – March 2020 and adjusted for baseline demographics, comorbidities, flu vaccine timing and location (pharmacy vs medical office), and health care utilization (including receipt of a 2017-18 flu vaccine). We used logistic regression to measure the adjusted odds of receiving a 2019-20 flu vaccine (Aug 2019 – March 2020) following

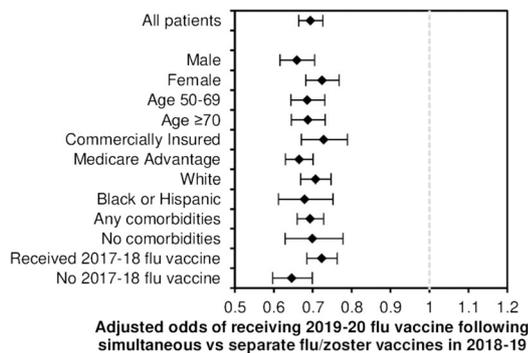
simultaneous vs. separate administration of the flu and zoster vaccines in the prior year.

RESULTS: We included 27,124 patients with simultaneous flu and zoster vaccines and 123,185 who received the vaccines separately. The median age was 72 years; 58% were female; 87% had received a 2017-18 flu vaccine; and 85% had one or more relevant comorbidities. Patients with simultaneous flu and zoster vaccines were less likely to receive a 2019-20 flu vaccine compared to those who received the vaccines separately (87.4% vs 91.4%; adjusted odds ratio 0.69, 95% confidence interval 0.66–0.73). Results were similar across subgroups (Figure).

CONCLUSIONS: Simultaneous administration of the flu and zoster vaccines was associated with a reduction in use of the flu vaccine the following year, possibly due to patient concerns about systemic side effects caused by the zoster vaccine which were mis-attributed to the flu vaccine. To maximize annual flu vaccine adherence, it may be preferable to administer these two vaccines separately.

LEARNING OBJECTIVE #1: Simultaneous flu and zoster vaccine administration is associated with lower rates of subsequent flu vaccination, possibly due to systemic side effects from the zoster vaccine.

LEARNING OBJECTIVE #2: To maximize annual flu vaccine adherence, it may be preferable to administer the flu and zoster vaccines separately.



SIX-MONTH OUTCOMES IN PATIENTS HOSPITALIZED WITH SEVERE COVID-19

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BACKGROUND: Previous work has demonstrated that patients experience functional decline at 1-3 months post-discharge after COVID-19 hospitalization.

Our objective was to determine whether symptoms persist further or improve over time. To do this, we followed patients discharged after hospitalization for severe COVID-19 to characterize their overall health status and their physical and mental health at 6-months post-hospital discharge.

METHODS: Design: Prospective observational cohort study.

Participants: Patients ≥18 years hospitalized for COVID-19 at a single health system, who required at minimum 6 liters of supplemental oxygen during admission, had intact baseline functional status, and were discharged alive.

Main Measures: Overall health status, physical health, mental health, and dyspnea were assessed with validated surveys: the PROMIS® Global Health-10 and PROMIS® Dyspnea Characteristics instruments.

RESULTS: Of 152 patients who completed the 1 month post-discharge survey, 126 (83%) completed the six month survey. Median age of six-month respondents was 62; 40% were female. Ninety-three (74%) patients reported that their health had not returned to baseline at 6 months, and endorsed a mean of 7.1 symptoms. Participants' summary t-scores in both the physical health and mental health domains at 6 months (45.2, standard deviation [SD]

9.8; 47.4 SD 9.8, respectively) remained lower than their baseline (physical health: 53.7, SD 9.4; mental health 54.2 SD 8.0; $p < 0.001$).

Overall, 79 (63%) patients reported shortness of breath within the prior week (median score 2 out of 10 (interquartile range [IQR] 0-5), vs 42 (33%) pre-COVID-19 infection (0, IQR 0-1). A total of 11/124 (9%) patients without pre-COVID oxygen requirements still needed oxygen 6 months post-hospital discharge. 107 (85%) were still experiencing fatigue at 6 months post-discharge.

CONCLUSIONS: Even six months after hospital discharge, the majority of patients report that their health has not returned to normal. Support and treatments to return these patients back to their pre-COVID baseline are urgently needed.

LEARNING OBJECTIVE #1: Medical Knowledge: Consistent with other studies, shortness of breath, fatigue, cognitive issues and musculoskeletal symptoms feature prominently in the constellation of problems reported by survivors of severe COVID-19. It is unclear whether these sequelae are related to SARS-CoV2 itself, a post-viral syndrome, complications from post-intensive care syndrome, or prolonged hospital stays.

LEARNING OBJECTIVE #2: Systems-Based Practice: The impact of COVID-19 extends beyond mortality and hospitalization. Continued impaired health from COVID-19 may have further downstream impact on the ability to return to work and regular life. Policy supporting these patients during this time of compromised physical and mental health (such extended sick leave or accommodations at work) should also be provided, particularly as the Families First Coronavirus Act, which provided some expanded paid sick leave benefits, is set to expire on March 31, 2020.

THE RELATIONSHIP BETWEEN CONTINUOUS POSITIVE AIRWAY PRESSURE ADHERENCE AND HEALTH LITERACY IN PATIENTS WITH SLEEP APNEA SYNDROME: A PROSPECTIVE COHORT STUDY

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BACKGROUND: Sleep apnea syndrome is among the sleep-related respiratory disorders characterized by repeat apnea, hypoxia, and respiratory effort-related arousal during sleep. The standard therapy is continuous positive airway pressure (CPAP) therapy. However, CPAP adherence can be problematic since some patients self-interrupt CPAP usage or use it for a shorter-than-expected duration.

On the other hand, poor medication adherence and poor control of chronic diseases, including diabetes mellitus, are associated with poor health literacy.

We hypothesized that CPAP adherence is associated with health literacy and, therefore, aimed to examine the relationship between CPAP adherence and health literacy.

METHODS: We included patients newly diagnosed with sleep apnea syndrome who had started CPAP therapy between February 2019 and October 2020 with ≥6 follow-up months or who self-interrupted CPAP therapy <6 months. We recorded the CPAP wearing time after 3 and 6 months. Patients were divided into the CPAP adherent (using CPAP for ≥4 hours per night) and non-adherent (self-interrupted CPAP therapy/using CPAP for <4 hours per night) groups. We compared the European Health Literacy Survey Questionnaire 47 (HLS-EU-Q47) median score between CPAP adherent and non-adherent groups after 3 months and 6 months. Additionally, we performed a sub-analysis among CPAP non-adherent patients after 3 months. We compared the HLS-EU-Q47 median score between CPAP non-adherent after 3 months, improved to CPAP adherent after 6 months and CPAP non-adherent after 3 months, still CPAP non-adherent after 6 months.

RESULTS: At 3 months, there were 10 and 27 patients in the CPAP adherent and non-adherent groups, respectively. After 6 months, there were 15 and 22 patients in the CPAP adherent and non-adherent groups, respectively. There were no significant differences in the HLS-EU-Q47 median score after 3 and 6 months between CPAP adherent and non-adherent groups. Among the 27 patients in the CPAP non-adherent group after 3 months, only 6 patients became CPAP adherent after 6 months.

There was a significant difference in the HLS-EU-Q47 median score between the patients who became CPAP adherent to CPAP and who remained non-adherent after 6 months.

CONCLUSIONS: There were no significant differences in health literacy after 3 and 6 months; however, previously non-adherent patients who subsequently became adherent tended to have higher health literacy.

LEARNING OBJECTIVE #1: #. Patient Care

To understand that differences in health literacy may not be a major factor affecting CPAP adherence in the short term, but to be the main factors in the long term.

LEARNING OBJECTIVE #2: #. Patient Care

To understand that it may be possible to predict self-interruption and inadequate CPAP usage through pre-CPAP evaluation of health literacy.

THE USE OF SINGLE THERAPY WITH TOCILIZUMAB VERSUS COMBINATION THERAPY WITH REMDESIVIR IN SARS-COV-2 PATIENTS IN EL PASO TEXAS

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BACKGROUND: In December 2019, severe acute respiratory distress syndrome coronavirus 2 (SARS-CoV-2), emerged in Wuhan, China. SARS-CoV-2 causes a respiratory disease that can progress to viral pneumonia and acute respiratory distress syndrome (ARDS). There have been different treatment strategies used in the management of this illness, however, the clinical field is still lacking enough evidence-based interventions to reduce the outcomes. Our study, therefore, examines the role of Tocilizumab and combination therapy with Remdesivir among SARS-CoV-2 patients located in El Paso, Texas.

METHODS: 154 SARS-CoV-2-positive patients from four different hospitals in El Paso, Texas, were screened and 113 of those were included in this longitudinal observational study from (2/1/2020-10/31/2020). Group one consisted of 80 patients and Group 2 of 33 patients. Recruited patients were given Tocilizumab 4 mg/kg/day q12hr within the first 24 hours of their hospitalization, followed by methylprednisolone 60 mg q8hr for 72 hours in the first group (Group 1). The second group (Group 2) received Tocilizumab as specified in the first group in addition to the administration of Remdesivir within the first 24 hours. Other medications such as ceftriaxone and azithromycin were added to the treatment plan if clinically indicated. The Chi-Square test and Fisher's exact test were appropriately used for associating categorical variables and Bivariate Logistic Regression to assess the odds of risk. An observation is said to be statistically significant if P-value is ≤ 0.05 .

RESULTS: There was a statistically significantly higher proportion for multi-organ damage in Group 1 compared to Group 2 (12.50% vs. 0%) (Fisher's exact p=0.033), and a statistically significantly higher proportion for ventilation use in Group 2 compared to Group 1 (27.27% vs. 11.25%) ($X^2 = 4.48$, p-value 0.034). Patients in Group 1 had a statistically significant lower odds for ventilation use compared to patients in Group 2 OR=0.34 (95%CI=0.12-0.95). Furthermore, there was no statistical significance between Group 1 and Group 2 in mortality outcomes ($X^2 = 2.04$, p-value 0.153).

CONCLUSIONS: This study is unique as it reflects a predominantly Hispanic demographic population in El Paso Texas with different genetics and social backgrounds than the rest of the United States. We concluded that the use of Tocilizumab in SARS-CoV-2 positive patients in El Paso, with or without Remdesivir reported no mortality benefit. Tocilizumab-only treated group showed a lower odd for ventilation use compared to patients who received Tocilizumab and Remdesivir. Nonetheless, a randomized control trial study is recommended to ultimately determine the combination role of Tocilizumab and Remdesivir among this highly vulnerable group of patients.

LEARNING OBJECTIVE #1: The use of Tocilizumab in the COVID-19-positive population of El Paso, with or without Remdesivir reported no mortality benefit.

LEARNING OBJECTIVE #2: Lower ventilation use was observed among patients who received monotherapy with Tocilizumab.

TREATMENT EVOLUTION FOR COVID-19: A COMPARISON OF FIRST AND SECOND WAVES IN ONE HEALTH SYSTEM

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BACKGROUND: The COVID-19 pandemic continues to challenge US healthcare systems. As therapeutic treatments became available, hospitals evolved in their management of COVID. We compared treatments received between first wave (March through July 2020) and second waves (August through December 2020) of the pandemic in one health system.

METHODS: We identified all hospitalized patients with COVID-19 infection in one six-hospital health system between March 1 and December 28, 2020. We abstracted data including social demographics, treatments received, mechanical ventilation, and in-hospital mortality.

RESULTS: A total of 3508 hospitalized COVID patients were identified, including 1314 patients in the first wave and 2194 patients in the second wave. In-hospital mortality was higher in first wave as compared to second wave (19.3% vs. 9.5%, p<0.001). A higher proportion of hospitalized COVID-19 patients received remdesivir (5.3% vs 28.0%, p<0.001) and corticosteroids (31.4% vs 68.9%, p<0.001) in the second wave versus the first wave. Hydroxychloroquine was frequently used in first wave patients but had fallen out of favor by second wave (29.5% versus 0.6%, p<0.001). Tocilizumab was intermittently used in first wave, but was not used in second wave (7.1% vs. 0%, p<0.01). There was no significant difference in the use of convalescent plasma (used by around 7%), and plasmapheresis, immunoglobulin and Ritonavir-Lopinavir between both waves, which were all used in <1% of cases. Multivariate analysis showed there was a decreased odds of mortality with remdesivir use (OR 0.26, p<0.001, 95% CI 1.79- 3.33), even when controlling for age, race, weight, and other treatments.

CONCLUSIONS: As treatments evolved and became more protocolized, we saw an association with an improvement in mortality.

LEARNING OBJECTIVE #1: Hospitals evolved in their management of COVID-19 infection as therapeutic treatments became available.

LEARNING OBJECTIVE #2: Mortality decreased with availability of treatment for hospitalized patients with COVID-19 infection.

UNMET NEEDS IN OSTEOPOROSIS: PRIMARY CARE PERSPECTIVES FROM A NATIONAL ADVISORY BOARD

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BACKGROUND: Osteoporosis (OP) is a serious chronic disease occurring in both sexes; underdiagnosis and undertreatment has resulted in what the NOF has called a "crisis" in OP management. Over 2 million OP fractures (fx) occur/year in the US, projected to grow to 3 million by 2025, and higher than annual incidence of stroke, myocardial infarction, and breast cancer. Although post-fx care often takes place in the primary care setting, OP is not prioritized by many primary care providers (PCPs). The COVID-19 pandemic highlights the importance of OP management to prevent added healthcare resource burden, and subsequent isolation and depression following fx. Described are insights

from an advisory board held to understand how PCPs approach OP, and the unmet needs of OP in the primary care setting.

METHODS: A cross-specialty advisory board including 5 physicians with clinical interest in OP (IM, ObGyn), 1 physician assistant (Endo), and 1 nurse practitioner (Women's Health) was conducted via a virtual platform in July 2020. The group discussed the unmet representation of OP in primary care. Primary care bone experts provided answers to focused online questionnaire, followed by online and live discussions. Quantitative and descriptive findings are reported.

RESULTS: Unmet needs for OP in primary care were identified and grouped into 3 categories: PCP barriers (6), system barriers (3), and patient (pt) barriers (3). PCP barriers included time, competing priorities, education, screening, territorial issues, and follow-up. System barriers included reimbursement, DXA access, and lack of disease state focus; and pt barriers included misperceptions about treatment options, and cost. The numerous and sometimes conflicting guidelines on postmenopausal OP may complicate when and whom to treat. Most used NOF (5/8 advisors) and AACE (3/8) guidelines in their clinical practice. 3 advisors noted that ACP guidelines intended to simplify the process, but, made it harder for highest-risk pts to get tx. Advisors noted that most PCPs rely on DXA for diagnosis of OP. However, those with a history of hip or vertebral fracture (even those seen radiographically and found incidentally) meet criteria for OP and should be evaluated and treated irrespective of DXA T-score. Also, updated 2020 AACE guidelines reinforce that pts with T-score -1.0 to -2.5 and a forearm, humerus, or pelvis fx and/or have FRAX 10 year risk of $\geq 20\%$ or $\geq 3\%$ (hip) should receive an OP diagnosis and be tx accordingly. Most (6/7 advisors) felt that understanding of differences between OP drug classes and mechanisms of action is suboptimal.

CONCLUSIONS: PCPs need additional tools and framework to manage OP pts at high/very high-risk for fx. Advisors identified an opportunity for the physician assistant or nurse practitioner to create an OP niche within a primary care practice to help with education and management.

LEARNING OBJECTIVE #1: Understand the unmet needs of osteoporosis in primary care.

LEARNING OBJECTIVE #2: Recognize the opportunity for an osteoporosis niche within a primary care practice.

VARIATIONS IN PROCESSES OF CARE AND PATIENT OUTCOMES FOR GENERAL MEDICINE PATIENTS TREATED BY FEMALE VERSUS MALE PHYSICIANS

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BACKGROUND: Hospitalized medical patients cared for by female physicians may have decreased mortality rates compared to male physicians. But, this association has yet to be validated outside of the United States and little is known about what may explain this difference. This study evaluates whether there is a difference in mortality, other hospital outcomes, and processes of care between the patients of male vs. female physicians.

METHODS: This is a retrospective cohort study of patients admitted to general medical wards between 2010 to 2017 in seven hospitals in the Greater Toronto Area. We examined the relationship between physician gender and patient outcomes, adjusting for hospital-fixed effects, patient characteristics, processes of care (laboratory tests, imaging, and medications ordered) and physician characteristics (years of experience, specialty, medical school location). We included patients admitted to a general internal medicine (GIM) service through the emergency department who were cared for by a general internist or family physician. Logistic, linear, and negative binomial regression were used in the analysis.

RESULTS: 171625 patient hospitalizations overseen by 172 physicians (54 female, 118 male) were analyzed. Patients treated by male physicians had higher in-hospital mortality (crude rate: 5.21% vs 4.72%) and this persisted through adjustment for patient characteristics and processes of care (OR: 1.13;

95% CI: 1.03, 1.24; $p=0.013$) but this became non-significant after adjusting for other physician characteristics (OR: 1.07; 95% CI: 0.99, 1.17; $p=0.104$). Male physicians ordered fewer radiologic tests, including CT (52.1% vs 54.4%) and MRI (10.2% vs 11.1%) which persisted in the fully adjusted model for both CT (OR: 0.93; 95% CI: 0.89, 0.97; $p=0.002$) and MRI (OR: 0.90; 95% CI: 0.85, 0.96; $p=0.001$).

CONCLUSIONS: Hospitalized medical patients cared for by female versus male physicians had lower mortality rates, adjusting for patient and characteristics and processes of care. Female physicians ordered significantly more MRI and CT tests which did not affect patient mortality. The lower mortality rate in patients of female physicians cannot be explained by processes of care captured by electronic medical data, suggesting that behavioural differences between male and female physicians could play an important role in patient outcomes.

LEARNING OBJECTIVE #1: The study will generate intraprofessional communication surrounding gender-mediated differences in patient care that cannot be explained by electronic medical data, such as time spent per patient. It will stimulate further inquiry and discussion into the ways in which gender may influence inpatient care.

LEARNING OBJECTIVE #2: By elucidating physician gender-mediated differences in processes of care and their potential impacts on patient outcomes and resource utilization, this study will enable practice-based learning and improvement for GIM physicians and hospitalists in their clinical choices to order diagnostic tests and prescribe therapeutics.

Scientific Abstract - Geriatrics, Palliative Care, and End-of-Life

A MIXED METHODS ANALYSIS OF DOCUMENTED SERIOUS ILLNESS CONVERSATIONS AMONG HOSPITALIZED GENERAL MEDICINE PATIENTS

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BACKGROUND: Conducting serious illness conversations (SICs) is a high-value intervention that aligns care with patient preferences. The aims of this study were to better understand the types of patients undergoing SICs in the hospital setting and to analyze documented SIC content.

METHODS: We conducted a retrospective analysis of adult patients with a documented SIC admitted to the general medicine service of an academic medical center-affiliated community teaching hospital from October 2018 to July 2019. We used our enterprise data warehouse (EDW) to obtain patient demographics, basic clinical information, and SIC entries, including patient/family hopes and concerns regarding end-of-life care. A thematic analysis of open-ended SIC entries (what is important to the patient and family, and recommendations for management) was done.

RESULTS: We identified 59 unique patients with a documented SIC: 68% female; mean (SD) age 83 (11) years; 66% Caucasian; 73% Non-Hispanic; 78% public insurance; mean (SD) Elixhauser comorbidity score 5.6 (2.1). Seventy-eight percent of patients had moderate (10-28%) readmission risk and 15% had high (>28%) readmission risk based on a score automatically calculated by our electronic health record (Epic Systems, Inc.). At discharge, 85% had a code status of DNR/DNI or DNI alone. In 95% of cases, clinicians documented patient (or family) understanding of the medical condition(s). Documented prognostication revealed incurable disease in 83% patients, with 24% and 48% having a prognosis of days to weeks and weeks to months, respectively. The most common hope was being comfortable in 88% of patients. Most common worries were pain and other physical suffering in 61% and 83% of patients, respectively. Being with loved ones, comfortable, mentally and physically present and having reliable care to keep patients safe were the most frequently documented themes important to the patient and family. Coordinating support services, symptom management, patient/family support and communication were the most common recommendations.

CONCLUSIONS: Most patients with a structured SIC had clinician prognoses ranging from days to months of life, suggesting that those conversations occurred late in life. Analysis of SIC content indicated that many patients and families do not want aggressive hospital care. While the readmission risk score could be a useful screening tool to identify patients who benefit from an SIC earlier in their disease course, this requires further research. Also, other prediction tools (frailty index, annualized mortality risk) may further stratify and identify appropriate patients for SICs.

LEARNING OBJECTIVE #1: Identify the types of inpatients who undergo Serious Illness

Conversations at a community teaching hospital.

LEARNING OBJECTIVE #2: Identify the values and preferences of patients with a serious illness and their families.

APPROACHES TO INTENSIFY HYPERTENSION TREATMENT IN OLDER ADULTS: DOSE MAXIMIZATION VERSUS LOW-DOSE COMBINATION

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BACKGROUND: Guidelines mention two strategies to intensify antihypertensive treatment: dose maximization, or combination of low-dose medications. Medications may have fewer adverse effects at low dose, however starting new medications increases the risk of medication-specific side effects and interactions, particularly in older adults. Since it is not clearly known which strategy is better, we compared how often each approach is used, their sustainability and effect on blood pressure.

METHODS: In Veterans aged ≥ 65 years (2011-2013) taking ≥ 1 antihypertensive medication at less than the maximum dose (i.e., all had the opportunity for intensification by either approach), we determined medication count and standardized total doses using pharmacy fills. We defined dose maximization as an increase in dose without adding a new medication during 3 months after inclusion; low-dose combination as an increase in total dose that included a medication count increase. We assessed the two approaches in terms of: relative incidence, characteristics associated with use, sustainability of intensified treatment over the next 3 months, and effectiveness (decrease in systolic blood pressure [SBP] over 1 year).

RESULTS: Among 308,108 patients, 69,685 (22.6%) had intensification by low-dose combination, and 238,423 (77.4%) by dose maximization. Low-dose combination was more likely with higher baseline SBP and specialty care and less likely with younger age, higher medication count, and geriatric primary care. Treatment intensity was more likely to be sustained for dose maximization (64.0% versus 50.7%, $p < 0.001$) with more frequent medication discontinuations after low-dose combination (19.3% vs. 6.1%, $p < 0.001$). However, mean SBP was 1.2 mmHg lower (95%CI -1.3 to -1.0 mmHg; $p < 0.001$) for low-dose combination.

CONCLUSIONS: Low-dose combination was less frequently used but associated with slightly lower SBP on subsequent follow-up. The more frequent discontinuation rate after low-dose combination is consistent with concerns that polypharmacy may lead to adverse effects. Older patients and those with mildly elevated SBP and less need for reduction in blood pressure may fare better with dose maximization. To define the benefit/risk ratio of the treatment approach would require evidence about long term clinical outcomes and adverse effects of the two strategies in older adults.

LEARNING OBJECTIVE #1: Dose maximization is the strategy most frequently used to intensify antihypertensive treatment in older Veterans with hypertension.

LEARNING OBJECTIVE #2: Low-dose combination was associated with a higher rate of medication discontinuation, but a stronger effect on lowering blood pressure.

A RANDOMIZED CONTROLLED TRIAL OF A BEHAVIORAL ECONOMIC INTERVENTION TO REDUCE USE OF LOW-VALUE SERVICES AMONG OLDER ADULTS

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BACKGROUND: The Choosing Wisely® campaign recommends avoidance of tests and treatments that do not improve outcomes and can lead to harms. For example, Choosing Wisely recommends that older patients avoid use of hypoglycemic medications to achieve a hemoglobin A1c $< 7.5\%$, sedative-hypnotic medications to treat insomnia or anxiety, and prostate-specific antigen tests to screen for prostate cancer. Yet, use of such low-value care remains common among older patients, and it is unclear how to best engage them and their providers to decrease use of low-value services.

METHODS: We conducted a stepped wedge cluster randomized controlled trial in 8 primary care clinics across 2 health systems. In the intervention, primary care providers (PCPs) were shown the 3 aforementioned Choosing Wisely recommendations and invited to commit to following them by signing a commitment document. Committed PCPs had their photos displayed on clinic posters and received weekly emails with resources to help them and their patients avoid use of the targeted low-value services. Patient education handouts about these services were mailed to applicable patients before scheduled primary care visits and available at the point-of-care. We conducted chart reviews to collect clinical data on decisions about the targeted low-value services. We used a multivariable generalized linear mixed-effects model to compare between the control and intervention periods the odds of patient-months in which a low-value service was used for the 3 patient cohorts combined (primary outcome) and separately for each cohort (secondary outcome). For patients with diabetes, insomnia, or anxiety, a secondary outcome was the patient-months in which applicable medications were deintensified.

RESULTS: Among older adults with diabetes, with insomnia or anxiety, or who were eligible for prostate cancer screening, a low-value service was used in 20.5% of the 37,116 control period patient-months and 16.0% of the 47,306 intervention period patient-months [adjusted odds ratio (AOR) 0.79, $P = 0.03$]. For each individual patient cohort, there were no significant differences in the odds of patient-months in which a low-value service was used. The intervention was associated with higher odds of deintensification of hypoglycemic medications for diabetes (AOR 1.85, $P = 0.03$), but not sedative-hypnotic medications for insomnia or anxiety.

CONCLUSIONS: A behavioral economic intervention that engaged PCPs and older patients reduced use of low-value services across 3 common conditions and increased deintensification of hypoglycemic medications for diabetes. Use of scalable interventions that nudge patients and providers to achieve greater health care value while preserving autonomy in decision-making should be explored more broadly.

LEARNING OBJECTIVE #1: To examine the effects of a behavioral economic intervention on use of low-value health care services among older adults.

LEARNING OBJECTIVE #2: To examine the effects of a behavioral economic intervention on deintensification of medications among older adults.

ASSOCIATION BETWEEN RECEIPT OF CANCER SCREENING AND ALL-CAUSE MORTALITY IN OLDER ADULTS

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BACKGROUND: Guidelines recommend against breast and prostate cancer screenings in older adults with <10 year life expectancy. One study using a claims-based algorithm showed that receipt of cancer screening itself was an independent predictor of lower mortality, suggesting that the algorithm may misclassify individuals when used to inform cancer screening. This finding was attributed to residual confounding since the algorithm did not account for functional status. We aimed to examine if cancer screening remains an independent predictor of mortality after accounting for both comorbidities and function.

METHODS: Using 2004 Health and Retirement Study (HRS) data linked to Medicare data, we constructed cohorts of 65+ years-old women and men eligible for breast/prostate cancer screening, respectively. Cox proportional hazards models estimated association between all-cause mortality over 10 years and receipt of screening mammogram/PSA (assessed using claims), adjusting for variables in a mortality prediction algorithm by Lee et al. that included age, sex, comorbidities, and functional status (assessed using HRS data). We also tested a number of potential confounders of the association between cancer screening and mortality.

RESULTS: Participants included 3257 women, 2085 men. Receipt of screening mammogram was associated with lower hazard of all-cause mortality after accounting for all Lee index variables (adjusted Hazard Ratio [aHR] 0.67, CI 0.60-0.74). A less strong association was found for screening PSA (aHR 0.88, CI 0.78-0.99). Potential confounders that were examined included education, income, self-reported health, marital status, geographic region, cognition, self-care (exercise, regular doctor/dentist visit, flu shot) and self-perceived life expectancy. None attenuated the association between screening and mortality except for the cognitive measure, which slightly attenuated aHR for mammogram from 0.67 to 0.73 and aHR for PSA from 0.88 to 0.92.

CONCLUSIONS: Existing mortality prediction algorithms may be missing important variables that are associated with cancer screening and long-term mortality. Relying solely on algorithms to determine cancer screening may misclassify individuals as having limited life expectancy and stop screening prematurely. While prediction algorithms may inform cancer screening discussions, it remains critical that screening decisions be individualized.

LEARNING OBJECTIVE #1: To improve knowledge around the relationship between cancer screening, predicted life expectancy, and actual mortality in older adults.

LEARNING OBJECTIVE #2: To improve decision-making and discussion around cancer screening in older adults.

BARRIERS AND FACILITATORS TO OLDER ADULTS' USE OF NONPHARMACOLOGIC APPROACHES FOR CHRONIC PAIN: A PERSON-FOCUSED MODEL

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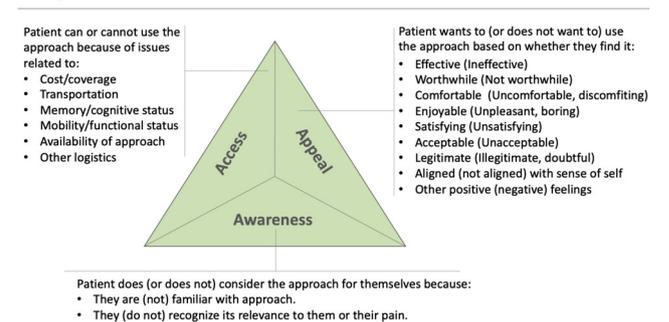
BACKGROUND: In the context of the opioid epidemic and the growing population of older adults living with chronic pain, clinicians are increasingly recommending nonpharmacologic approaches to patients (e.g., massage, physical therapy, exercise) as complements to or substitutes for pharmacologic treatments for pain. Little is known about the factors that influence older adults' use of these approaches. We aimed to characterize the factors that

hinder or support the use of nonpharmacologic approaches for pain management among older adults with multiple morbidities.

METHODS: Semi-structured qualitative interviews with older adults with multiple morbidities living with chronic pain for \geq six months. Interviewers asked about 10 common nonpharmacologic approaches and probed about other "non-medication" approaches the participant used. We coded transcripts to identify factors that hindered or supported participants' use of these approaches, then used the constant comparative method to develop a person-focused conceptual model.

RESULTS: The sample (n=25) was majority female and white, had an average of six chronic conditions, and a mean age of 72 years. All participants had used multiple nonpharmacologic approaches for pain management in the past and all were using at least one at the time of interview. Participants described many factors that influenced their use of these approaches. We grouped these factors into three domains: awareness of the nonpharmacologic approach as relevant to their chronic pain; appeal of the approach; and access to the approach. All domains had to be satisfied for the participants to adopt and continue using a nonpharmacological approach. We propose and illustrate a conceptual "3A" model of barriers and facilitators to guide research and clinical care (Figure 1).

Figure 1. Conceptual model of barriers and facilitators to older adult's use of nonpharmacological approaches for chronic pain management



CONCLUSIONS: Numerous factors influence older adults' use of nonpharmacologic approaches. Some of these factors are not captured in existing research or routinely addressed in clinical practice. Consideration of the 3A domains could enhance clinicians' ability to elicit barriers and facilitators to older adults' use of nonpharmacologic pain management.

LEARNING OBJECTIVE #1: (Patient care) Recognize the range of factors that influence older adults' use of nonpharmacologic approaches for chronic pain.

LEARNING OBJECTIVE #2: (Patient care) Understand how three key domains influence whether older adults consider, initiate, and continue using a nonpharmacologic approach for chronic pain management.

CHARACTERIZING THE CONTENT OF GOALS OF CARE NOTES IN THE ELECTRONIC HEALTH RECORD

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BACKGROUND: Advance care planning (ACP) involves discussions regarding patient values, prognosis, goals of care, treatment preferences, and choice of decision maker to facilitate the match of treatment with goals. Optimally, this process occurs with patients to guide future care. These discussions are often documented in Goals of Care (GoC) notes in the electronic health record. Using qualitative analysis, we characterized GoC notes to understand what content is captured.

METHODS: We analyzed GoC notes from 2016 at one health system using grounded theory qualitative methods. Every tenth note of 4061 was coded by two independent coders using Atlas.ti with iterations until sufficient intercoder

agreement (ICA) and thematic saturation were achieved ($n = 201$ notes). ICA was calculated using Krippendorff's alpha ($Cu\text{-alpha} = 0.801$).

RESULTS: Ninety-three percent of GoC notes contained ACP content with the remainder containing blank notes or clinical content unrelated to ACP. GoC notes with ACP content contained the following information: treatment preferences (87% of notes), decision maker identification (53%), prognosis (51%), advance directive (AD) information (43%), acceptability of future health states (35%), and POLST information (26%). Over one quarter of GoC notes described a comprehensive approach to ACP including documentation about prognosis; patient goals or preferences; and information about an AD, POLST or decision maker.

Most GoC notes (92%) can be classified into one of the following types of ACP conversations: Family Discussion usually because the patient was unable (35%); Patient Discussion (27%); AD/POLST or surrogate description (17%); or Structured ACP Intervention (13%). Structured ACP Intervention notes occurred in the context of particular programs such as cardiac surgery and dementia clinic and were always templated. Twenty-five percent of GoC notes were based on templates, and these notes more often documented an AD, POLST or decision maker (100%) compared to free text notes (54%).

When immediately implemented acute care end of life decisions were described in GoC notes, these were Family Discussion notes 80% of the time. GoC notes that document treatment preferences tend to describe the decision alone rather than details of the conversation regardless of whether preferences come from families (78% v 22%, $p=0.004$) or patients (90% v 10%, $p=0.004$). Of note, two-thirds of discussions related to short term (days to weeks) choices occur in the context of discussions with families as opposed to with patients.

CONCLUSIONS: ACP is designed to engage patients in discussions of goals and values that can guide future care, but GoC notes most often capture discussions with family about acute decisions when the patient is unable to participate. GoC note content might be used to drive interventions to improve earlier discussions.

LEARNING OBJECTIVE #1: Understand Goals of care note content and function.

LEARNING OBJECTIVE #2: Recognize the role of Goals of care notes in guiding advance care planning interventions.

ENGAGEMENT IN ADVANCE CARE PLANNING AMONG A POPULATION OF SERIOUSLY ILL PATIENTS RECEIVING PRIMARY CARE

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BACKGROUND: Advance care planning (ACP) is a process of understanding and sharing values, goals and preferences regarding future medical care, which may include an advance directive (AD). ACP can lead to a better match of treatment with goals and bereavement adjustment. Thus, health systems guiding care for seriously ill patients need to understand the level of patient engagement and unmet need for ACP. We describe baseline ACP engagement among seriously ill primary care (PC) patients in an ACP pragmatic trial at 3 academic health systems.

METHODS: In 50 PC clinics, patients with serious illness (i.e., heart, liver, lung or kidney failure; metastatic cancer; ALS; or vulnerable elders with illness) were identified using electronic health record (EHR) data. Patients with an AD or POLST in the EHR within 3 years were excluded and PC doctors excluded those in hospice or too impaired for survey. The baseline survey asked about ACP engagement using a validated scale, treatment preferences, confidence wishes will be carried out and doctor communication. A mailed survey was followed-up by telephone. We report ACP engagement and

its associations with language, education, treatment preference, confidence and communication.

RESULTS: Among 8693 seriously ill PC patients, 2132 (25%) had an AD or POLST in the EHR within 3 years. After 662 were excluded, 1098 (19%) of 5899 responded to the survey. Mean age was 70 years (range 23-101), 52% were male, 61% White, 18% Hispanic, 10% Asian and 7% Black, 85% spoke English at home, 60% were married and 24% had a high school education or less. Eighty percent of patients had heard of ACP, 57% named or discussed wishes with a decision maker, 38% had signed papers putting care wishes into writing and 22% had discussed wishes with their doctor (Guttman scale, coefficient of reproducibility=0.94). If they had to make a choice, 24% preferred medical care focused on extending life as much as possible, even if it meant more pain and discomfort, 49% care focused on relieving pain and discomfort as much as possible, even if that meant not living as long, and 27% were unsure. More ACP engagement was related to preferring comfort-oriented care and being less likely to be unsure. Of patients who completed all ACP steps including an AD and discussing wishes with physician, 61% desired comfort-oriented care and 15% were unsure. Of patients who completed no ACP steps, 41% preferred comfort-oriented care and 33% were unsure. ACP engagement was associated with speaking English at home, more education, better doctor communication, and more confidence they would receive desired end-of-life care ($p<0.001$ for all).

CONCLUSIONS: Intervention should address the vast unmet need for ACP among seriously ill PC patients. Pragmatic, scalable interventions are needed to engage patients in ACP on the population level.

LEARNING OBJECTIVE #1: Understand variation in ACP engagement among seriously ill primary care patients

LEARNING OBJECTIVE #2: Recognize patient factors associated with a low level of ACP engagement for targeted intervention.

HOSPITAL SCORE AND LACE INDEX TO PREDICT MORTALITY IN MULTIMORBID ELDERLY PATIENTS

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BACKGROUND: Estimating life expectancy of older multimorbid patients often plays a role in the decision of further investigation and therapy. Several models to predict mortality have been developed in hospital settings, but none is broadly used. The HOSPITAL score and the LACE index have been validated to predict 30-day readmission risk, but their ability to predict death has not been well tested. We assessed their performance to predict 30-day and 1-year mortality in older multimorbid inpatients with polypharmacy.

METHODS: We calculated the HOSPITAL score and LACE index among 1,879 multimorbid (≥ 3 chronic conditions) patients aged ≥ 70 years with polypharmacy (≥ 5 chronic medications) in 4 European countries followed over

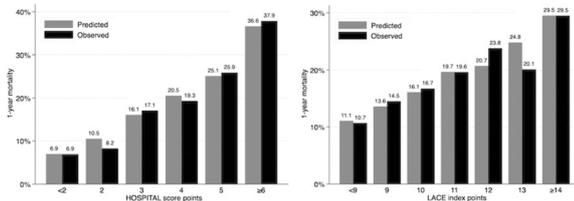
1 year. Our primary and secondary outcomes were 1-year and 30-day mortality, respectively. We assessed the overall accuracy (scaled Brier score, <0.20 considered as good), calibration (observed vs. predicted proportions by deciles and score point categories), and discrimination (C-statistic) of the models, and compared their C-statistics.

RESULTS: Within one year, 375/1,879 (20.0%) patients died, including 94 deaths (5.0%) within 30 days of discharge. The overall accuracy was very good and similar for both models (scaled Brier score 0.08 for 1-year mortality, 0.01-0.02 for 30-day mortality). The C-statistics were identical for both models (0.69 for 1-year mortality; 0.66 for 30-day mortality). The assessment of calibration showed no significant deviation from the reference line, and well-matching predicted and observed proportions for 1-year mortality, except for extreme number of points, where the number of observations was small. The models were less well calibrated for 30-day mortality.

CONCLUSIONS: The HOSPITAL score and the LACE index showed similar performance to predict 1-year and 30-day mortality in older multimorbid patients with polypharmacy. Their overall accuracy was very good, the discrimination was moderate, the calibration was good for 1-year and moderate for 30-day mortality. These simple tools may help to predict the risk of death of older multimorbid patients after an acute hospitalization, and thus to determine the relevance of screening procedures, preventive medications, or even some specific treatments.

LEARNING OBJECTIVE #1: The HOSPITAL score and the LACE index are two models that may help estimate the risk of death of older multimorbid patients within 1 year after a hospitalization.

LEARNING OBJECTIVE #2: This information can support decisions regarding screening procedures, preventive interventions, or specific treatments.



INEQUITIES IN THE CARE OF OLDER ADULTS: IDENTIFYING GAPS IN THE EDUCATION OF GERIATRICS FELLOWS

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BACKGROUND: The events of 2020 amplified inequities in the care of older adults. In Geriatric Medicine our patients are dying at exponentially higher rates, particularly those that are Black and Latinx and those who live in congregate care settings. Social determinants of health (SDOH) and health inequity focused milestones are lacking within Geriatric Medicine fellowship training. A virtual learning collaborative called GERIATrics Fellows Learning Online And Together (GERI-A-FLOAT) was developed by program directors from across the country due to support trainees during the COVID-19 pandemic. In response to the gaps in Geriatric education around SDOH a fellow-lead educational thread was added.

METHODS: To inform our SDOH educational thread, we developed a voluntary, anonymous needs assessment offered to fellows and program directors participating in the GERI-A-FLOAT sessions. We sought to understand prior curricula trainees had been exposed to in medical school, residency or fellowship specific to older adults and racism, ableism, LGBTQ+ health, incarceration, homelessness, ageism, poverty, sexism and immigrant health. Participants prioritized topic areas for the curricular thread.

RESULTS: A total of 52 participants completed the survey of which 15% were faculty members and 85% were trainees in their 1st or 2nd year of fellowship. More than 50% of participants had never had older adult specific

training on sexism, homelessness, immigration, racism or LGBTQ+ health, with more than 70% having no training in the care of formerly incarcerated older adults. The most commonly taught concepts were ableism, ageism and poverty, but more than 40% of participants had no formal teaching in these areas. The highest priority topics based upon knowledge gaps and learning needs were racism, ageism, ableism, LGBTQ+ health, post-incarceration and poverty/homelessness.

CONCLUSIONS: Geriatric Medicine fellowships lack consistent curricula on SDOH and the older adult. This needs assessment helps to begin building a curricular thread and our unique online collaborative allows it to be disseminated widely. Based upon this trainee-driven prioritization, we are planning a six-session series pairing fellows with content experts. We will both evaluate each session and will longitudinally evaluate for improvement in awareness and knowledge of the SDOH impacting our patients and their care. We hope this will also help inform larger curricular milestones for fellowship programs. The time is now to improve the way in which we prepare the next generation of Geriatricians to serve as system leaders and agents of change.

LEARNING OBJECTIVE #1: Understand the existing gaps in the education of Geriatric Medicine fellows around social determinants of health and health inequities in the care of older adults.

LEARNING OBJECTIVE #2: Identify priority topics and innovative virtual learning opportunities for Geriatric Medicine fellows around social determinants of health and health inequities in the care of older adults.

LIFE EXPECTANCY ESTIMATES BASED ON COMORBIDITIES AND FRAILITY TO INFORM PREVENTIVE CARE OF OLDER ADULTS

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BACKGROUND: Long-term prognostication is important to inform preventive care in older adults. Age alone is an insufficient marker of prognosis and several prediction indices incorporate comorbidities in addition to age. Frailty is another important factor in prognostication. We aimed to build on existing life expectancy predictions for older adults by incorporating both comorbidities and frailty.

METHODS: Using the SEER-Medicare data, we identified a non-cancer cohort from a random 5% sample of Medicare beneficiaries. We included adults aged 66-95 who were continuously enrolled in fee-for-service Medicare from 1998-2014. Participants were followed for survival until December 31, 2015, death, or disenrollment. Comorbidity (none, low/medium, high comorbidity) and frailty categories (low and high frailty) were defined using established methods for claims. We estimated 5- and 10-year survival probabilities and median life expectancies by age, sex, comorbidity and frailty.

RESULTS: Study cohort included 404,466 people (3,462,743 person-years), was mostly women (60.3%) and white (81.7%). Frailty scores in participants varied widely in the same comorbidity group. In Cox models, both comorbidity and frailty were independent predictors of mortality. Individuals with high comorbidity (HR 3.12, 95% CI 3.07-3.17) and low/medium comorbidity (HR 1.36, 95% CI 1.34-1.38) had higher risk of death than those with no comorbidities. Compared to low frailty, high frailty was associated with a higher risk of death (HR 1.83, 95% CI 1.79-1.87). Frailty changed prediction in ways relevant to preventive care (i.e. distinguishing <10 year versus >10 year life expectancy) in multiple subgroups (Table).

CONCLUSIONS: Comorbidities and frailty are significant and independent predictors of mortality over 10 years – an important threshold in clinical decision-making for older adults. Our prediction tables can aid clinicians' prognostication and discussion with patients, inform simulation models and population health management and research.

LEARNING OBJECTIVE #1: To demonstrate the effect of incorporating frailty and comorbidities in life expectancy predictions among older adults.

LEARNING OBJECTIVE #2: To discuss the use of predicted life expectancy to inform preventive care in older adults.

LOW-VALUE CARE CASCADES FOLLOWING UNNECESSARY PROSTATE CANCER SCREENING WITHIN THE VETERANS HEALTH ADMINISTRATION (VA)

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BACKGROUND: Low-value prostate-specific antigen (PSA) screening is common and may lead to the overdiagnosis of prostate cancer and the delivery of subsequent unnecessary health services, known as a care cascade. Our objective was to characterize care cascades that Veterans experience following receipt of low-value PSA testing within the Veterans Health Administration (VA).

METHODS: We constructed a national cohort of male VA beneficiaries aged ≥ 75 without history of prostate cancer, prostatectomy, elevated PSA or urology visit in FY17, a cohort for whom PSA testing was likely to be of low-value. Using administrative data, we identified Veterans who received a PSA test in the first half of FY18. Those who did not but did have an outpatient visit during the time frame served as the comparison group. In the 6 months following the PSA test or first outpatient visit, we identified the following care cascade services: 1) outpatient visit for prostate cancer or elevated PSA, 2) urology visit, 3) prostate imaging, 4) prostate biopsy, 5) androgen deprivation therapy, 6) prostatectomy or 7) radiation treatment. We counted care cascade services per 100 Veterans in both groups, adjusting for patient-level sociodemographic and facility-level covariates using propensity score weighting. We calculated the cascade-attributable event rates overall and by service by subtracting the event rate in the comparison group from the rate in the PSA group.

RESULTS: Among the 712,528 Veterans in the cohort, the mean age was 82.5 years (SD 5.6); 85.1% were non-Hispanic White and 7.7% were non-Hispanic Black. Overall, 17,326 (2.4%) received a low-value PSA test, of whom 8.2% experienced at least 1 cascade event. The overall adjusted cascade-attributable event rate was 11.5 services per 100 Veterans (18.2 in PSA group vs 6.7 in comparison group). The adjusted cascade-attributable event rates per 100 Veterans were 4.9 for related outpatient visits (PSA group 7.2 vs comparison group 2.3), 5.7 (9.4 vs 3.7) for urology visits, 0.5 (1.1 vs 0.6) for prostate imaging, 0.11 (0.15 vs 0.04) for prostate biopsy, 0.16 (0.20 vs 0.04) for androgen deprivation therapy, 0.004 (0.007 vs 0.003) for prostatectomies, and 0.11 (0.14 vs 0.03) for radiation treatment.

CONCLUSIONS: Among a national cohort of Veterans, undergoing any care cascade service following low-value PSA testing was common. Care cascades largely consisted of prostate-related and urology outpatient visits, while rates of invasive testing and treatment were relatively low. These findings demonstrate the importance of identifying low-value cascade services to fully capture the extent to which Veterans are subject to low-value care, and may guide de-implementation policies that target those services whose downstream effects are most prevalent and costly.

LEARNING OBJECTIVE #1: To understand care cascades that Veterans experience following low-value PSA testing

LEARNING OBJECTIVE #2: To recognize the importance of characterizing downstream care to capture the extent of low-value care that a patient experiences

MAKING THE MOLST OF IT: INTERNAL MEDICINE RESIDENT KNOWLEDGE AND ATTITUDES TOWARDS END-OF-LIFE CARE CHOICES DOCUMENTATION

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BACKGROUND: The MOLST was created by the NYS Department of Health to document end-of-life care decisions by patients, and if they lacked capacity, by their surrogate decision-makers. As a multi-page document with specific terminology, it may cause confusion among trainees if initially encountered during patient care. This study sought to assess provider awareness of the MOLST form, knowledge of terminology used on it, and attitudes towards its use.

METHODS: From March to June 2020, we invited 137 internal medicine residents at Northwell Health to complete a 13-item cross-sectional online needs assessment survey regarding trainee awareness of the MOLST, knowledge of terminology used, attitudes towards its utility, barriers to use, and prior training received in code status conversations. We performed descriptive statistics.

RESULTS: We received 73 responses (53%). Thirty-two respondents (43%) were PGY1s, 20 (27%) were PGY2s and 21 (29%) were PGY3s. Thirty-three respondents (45%) had received code status training prior to entering residency, and, of those, 15 (45%) felt it was helpful for patient care. While 65 respondents (89%) either agreed or strongly agreed that the MOLST was an important way for patients to express wishes, 20 (27%) only sometimes, rarely or never filled out a MOLST for patients with a prognosis under 1 year. Eleven (14%) did not feel at all confident in their ability to complete it and over half (53%) felt somewhat confident. Over one-quarter (27%) felt the MOLST was difficult to complete due to numerous sections and found it confusing to determine who should sign the form. Over half of respondents (53%) incorrectly thought the MOLST was recognized nationally and a large majority (71%) could not correctly describe a surrogate as defined by NYS. Commonly identified barriers to MOLST completion included the amount of time needed to complete the form, uncomfortable conversations without full understanding of prognosis, confusing language on the form, uncertainty in identifying the correct decision-maker, difficulty reaching family members or surrogates and the inability to identify the correct timing for MOLST completion.

CONCLUSIONS: While there is awareness of the MOLST form and an appreciation for its utility, a large proportion of internal medicine residents feel uncomfortable with and lack the knowledge needed to effectively communicate and document end-of-life care decision-making. Though this was a single institution pilot study, the results suggest the need for more training around MOLST use to improve patient care. Improved training may increase both form use and trainee confidence in having goals of care discussions.

LEARNING OBJECTIVE #1: Identify internal medicine residents' knowledge gaps with different terms used in the New York State (NYS) Medical Orders for Life-Sustaining Treatment (MOLST).

LEARNING OBJECTIVE #2: Describe barriers hindering completion of the MOLST and trainees' attitudes towards end of life orders documentation using the MOLST.

OPTIMIZING TELEMEDICINE FOR OLDER ADULTS: UNDERSTANDING THE PATIENT EXPERIENCE

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BACKGROUND: The COVID-19 pandemic has resulted in a dramatic increase in the use of telemedicine. We aimed to learn from adults aged 65+ about their experiences to improve this mode of care delivery.

METHODS: We conducted a cross-sectional study of adults ≥ 65 years old who received primary care from a large health system in Boston and who had at least one video or phone primary care visit since March 2020. Participants completed the survey via phone or through email. The questionnaire assessed characteristics of the telemedicine visit, satisfaction and convenience of telemedicine, as well as perceived effort of shared decision making (SDM) with their primary care physicians (PCPs) using a 3-item validated index. Items were scored on a 11-point Likert Scale (0 to 10, strongly agree). Participants also reported

their sociodemographics and health characteristics. We used bivariable statistics to examine differences by participant age (65-74 vs. 75+), and multivariate analyses to compare differences in satisfaction of care received via telemedicine.

RESULTS: Overall, 88 (60%) of 145 eligible patients participated. Their mean age was 74 (\pm 4 years), 86% were non-Hispanic white, 36% were male, 13% had 2 or more Charlson conditions; and 7% were functionally dependent. There were no difference in mode of telemedicine used (phone, video, both) by age ($p=0.10$) and 11% had participated in both. Respondents rated high overall SDM with PCPs, and high overall comfort, convenience, and quality with virtual visits; there were no differences by age in these outcomes (Table). However, 28% of participants stated that they were neutral or dissatisfied by their telemedicine visit. In multivariate analysis, there were no differences in satisfaction by age ($p=0.91$), race ($p=0.07$), gender ($p=0.59$), income ($p=0.24$), mode of visit ($p=0.51$) but there were differences by education level ($p=0.01$); those with professional/master's degrees were more likely to report being satisfied compared to those with less education (mean 6.1 vs 4.5).

CONCLUSIONS: The vast majority of adults >65 years old rated their primary care telemedicine visits highly in terms of overall quality, comfort, and convenience, and perceived SDM with their PCPs. Yet, despite these high evaluations, 28% stated that they were either neutral or dissatisfied by their telemedicine visit especially those with less education. Further research is needed to understand how to improve telemedicine visits for older adults of all backgrounds.

LEARNING OBJECTIVE #1: To learn older adults perceptions of the quality of telemedicine visits with their PCPs.

LEARNING OBJECTIVE #2: To learn patient factors associated with being satisfied with telemedicine visits with PCPs.

POTENTIALLY HARMFUL MEDICATION PRESCRIBING BY CLINICIANS WHO PRACTICE IN NURSING HOMES: 2013 TO 2017

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BACKGROUND: The use of potentially harmful medications (PHMs) among older adults is high, contributing to falls, delirium and strokes. Nursing home (NH) residents are particularly vulnerable to PHM use. Our objective was to assess PHM prescribing by clinicians who practice in NHs. **METHODS:** We used the Medicare Provider Utilization and Payment Datasets to identify physicians and advanced practitioners (i.e., 'clinicians') who billed Medicare for NH visits in 2013-2017. We then summed the total number of 30-day scripts written by these clinicians for four classes of PHMs (antipsychotics, sedatives, anticholinergics, and other), identified using the Beers Criteria. We measured PHM prescribing as the proportion of scripts (PHM scripts/total scripts) and patients (patients on PHM/total patients) for each clinician.

RESULTS: We analyzed data from 46,783 NH clinicians. PHM prescribing decreased over time for all drug classes (Figure). Between 2013 and 2017, the median proportion of PHM scripts for antipsychotics, sedatives, anticholinergics, and other PHMs decreased from 0.026 (inter-quartile ratio: 0.027) to 0.023 (0.024), 0.038 (0.077) to 0.035 (0.072), 0.015 (0.012) to 0.013 (0.011), and 0.015 (0.013) to 0.014 (0.011), respectively. The median proportion of patients on any antipsychotics, sedatives, anticholinergics, and other PHMs decreased from 0.62 (0.76) to 0.43 (0.51), 0.67 (0.52) to 0.52 (0.45), 0.38 (0.35) to 0.26 (0.26), and 0.37 (0.30) to 0.27 (0.24), respectively. The decrease was statistically significant at $p < 0.001$ for all comparisons.

CONCLUSIONS: PHM prescribing by NH clinicians decreased over the study period, especially for sedatives and antipsychotics. Nevertheless, we observed large variation in PHM use between NH clinicians.

LEARNING OBJECTIVE #1: To assess PHM prescribing by physicians and advanced practitioners who practice in NHs.

LEARNING OBJECTIVE #2: To measure trends in PHM prescribing by medication class between 2013 and 2017.

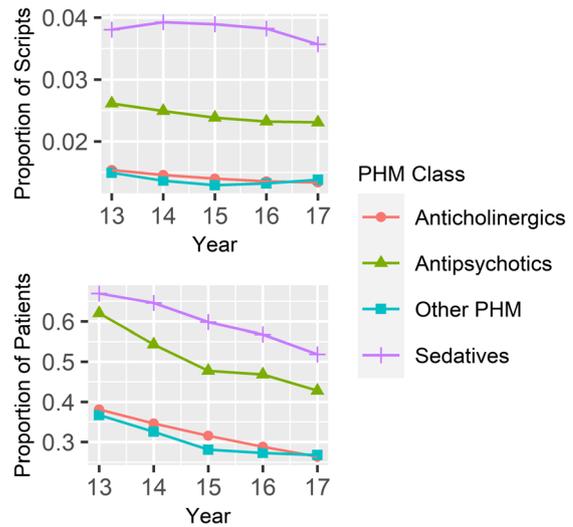


Figure. Median PHM Prescribing by Year and Medication Class

PREDICTORS OF DRUG-RELATED ADMISSIONS IN OLDER MULTIMORBID PATIENTS

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BACKGROUND: Drug-related admissions (DRAs) represent a significant burden for patients and healthcare systems. While around 90% of DRAs would be preventable in older adults, identifying high-risk patients may help to efficiently target preventive interventions. In older patients with multimorbidity and polypharmacy, we developed a score to predict DRAs.

METHODS: Among 1,879 multimorbid (≥ 3 chronic conditions) patients with polypharmacy (≥ 5 chronic medications) in 4 European countries followed over 1 year, we assessed the association between demographics, comorbidities, medications, previous hospitalizations, and hospitalization characteristics, with 1-year DRA. Variables with a $p < 0.20$ in univariable logistic regression were taken forward to backward regression, and retained in the model if the p was < 0.05 . We assessed discrimination (C-statistic), calibration (observed vs. predicted proportions), and overall accuracy (scaled Brier score, < 0.20 considered good) of the score, and internally validated it by tenfold cross-validation.

RESULTS: Within 1 year, 435/1,879 (23.2%) patients had a DRA. The score included 7 variables: previous hospitalizations, non-elective admission, hypertension, cirrhosis with portal hypertension, chronic kidney disease (eGFR < 60 ml/min), diuretic, corticosteroid. Overall accuracy was very good (scaled Brier score 0.05). The C-statistic was 0.64 (95% CI 0.61-0.67). Internal validity was good, with a C-statistic of 0.63 (95% CI 0.59-0.68). Predicted and observed proportions matched well.

CONCLUSIONS: Comorbidities related to drug metabolism medications, and hospitalization history, were associated with DRA. The score we developed may help to identify early after admission patients at higher risk of DRAs, who are most likely to benefit from medication review during hospitalization to prevent DRAs.

LEARNING OBJECTIVE #1: Chronic kidney disease, cirrhosis with portal hypertension, diuretic, corticosteroids, hypertension, non-elective admission, and hospitalization history, were associated with 1-year DRAs.

LEARNING OBJECTIVE #2: These variables could be used in a score to identify high-risk patients who are most likely to benefit from a medication review during hospitalization.

PRESENTING SYMPTOMS OF COVID-19 AND THEIR ASSOCIATION WITH OUTCOMES IN AN ELDERLY AFRICAN AMERICAN PATIENT POPULATION

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BACKGROUND: Older adults are at higher risk for worse outcomes from infection from SARS-CoV-2. Understanding the full spectrum of presenting symptoms of COVID-19 among older adults has significant implications for early detection and patient outcomes. Studies evaluating the presenting symptoms of COVID-19 among older adults suggest that they may present with atypical symptoms or geriatric syndromes. These studies have not reported race/ethnicity, so the findings may not be applicable to persons from racial and ethnic minority groups who are disproportionately affected by COVID-19. We sought to characterize the presentation of African American older adults with COVID-19 and to determine association of these presentations with outcomes.

METHODS: This study was conducted at Grady Memorial Hospital, Atlanta's safety net hospital, which serves a largely African-American low-income population. A retrospective chart review was performed of all patients 65 years or older with a positive SARS-COV-2 test admitted from March 4th – May 20th 2020. Data collected included demographic information and data regarding symptoms, laboratory findings, and outcomes. Clinical outcomes were monitored until June 23, 2020.

RESULTS: 135 patients, with mean age of 76.4, of whom 93.3% were African American, were studied. 88.3% presented with typical symptoms of COVID-19 (fever, shortness of breath, and cough) in association with geriatric syndromes, with the most common geriatric syndrome being altered mental status. Only 8.9% of patients presented with typical symptoms alone. 55.7% of patients presented with atypical symptoms, of whom 83.8% also had typical symptoms. The most common atypical symptoms were anorexia, dizziness, and syncope. Altered mental status also commonly occurred in those presenting with atypical symptoms and was the most common geriatric syndrome overall. 64.5% of patients experienced respiratory failure and 22.3% of patients died. Male gender was significantly associated with respiratory failure. Older age, male gender, shortness of breath, and development of features of sepsis were significantly associated with mortality.

CONCLUSIONS: Our study demonstrates that elderly African American patients with COVID-19 commonly present with typical symptoms, atypical symptoms, and geriatric syndromes together. These patients rarely presented with typical symptoms alone. Given this wide constellation of presenting symptoms of COVID-19 and the high risk of morbidity and mortality, clinicians should have a low threshold for testing these patients for SARS-COV-2 during the COVID-19 pandemic. This study adds to the growing body of evidence that atypical symptoms and geriatric syndromes are common in the presentation of COVID-19 among the elderly.

LEARNING OBJECTIVE #1: Describe the presenting symptoms of COVID-19 in an elderly, African American, patient population.

LEARNING OBJECTIVE #2: Describe the association of the presenting symptoms of COVID-19 in an elderly, African American, patient population with outcomes.

PRIMARY CARE PHYSICIANS' APPROACHES TO VALUE-BASED PRESCRIBING IN OLDER ADULTS: A QUALITATIVE STUDY

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BACKGROUND: Health systems are increasingly implementing interventions to reduce older patients' use of low-value medications, defined as medications whose costs or harms exceed potential benefits. However, providers' perspectives on low-value prescribing remain poorly understood. Our objective was to understand primary care physicians' (PCPs) approaches to value-based prescribing, deprescribing, and meeting patient expectations surrounding low-value medication use through clinical scenarios.

METHODS: We explored 16 PCPs' perspectives on clinical scenarios involving low-value medications as part of a larger set of semi-structured interviews conducted in September and October 2019 that examined providers' views on medication value and low-value prescribing. We first presented a scenario in which an 81-year-old woman presents to clinic prescribed 8 potentially low-value medications and asked participants to prioritize medications to deprescribe. We then presented a scenario in which a 68-year-old man requests testosterone for erectile dysfunction and asked providers to describe their approaches to address the patient's request. Interviews were audio recorded and transcribed. We developed a codebook that 2 members of the research team applied to each transcript. We conducted a thematic analysis to identify salient themes.

RESULTS: We identified 3 key themes across both scenarios. First, when deprescribing, physicians prioritized medications with the greatest potential for harm followed by lack of potential benefit. In reference to the first scenario, one provider stated, "aspirin would be number one [to deprescribe]... because of the increased harm rather than just lack of perceived benefit." Second, physicians emphasized fostering good relationships with patients, often willing to order additional tests to explain decisions about low-value medications. In reference to the second scenario, one physician stated that she would obtain additional blood work because she "owe[s] the patient... more of an in-depth explanation for why I'm not giving it to him." Lastly, while physicians emphasized the importance of shared decision-making, they prioritized patients' well-being over satisfying their expectations. One physician stated "I try to do what I think is best and not let the patient influence me in doing things that I don't think are appropriate or of value..."

CONCLUSIONS: Our findings suggest that PCPs prioritize deprescribing medications that are most likely to be harmful followed by those that are minimally effective. Despite the importance of shared- decision making, providers prioritize patient well-being over their preferences. This research may allow health systems and payers to more effectively reduce low-value medication use by aligning policies and interventions with physicians' perspectives on value-based prescribing.

LEARNING OBJECTIVE #1: To understand how PCPs approach value-based prescribing and deprescribing

LEARNING OBJECTIVE #2: To understand PCPs' strategies to meet patient expectations surrounding low-value medications

PROFILE OF POLYPHARMACY AMONG ADULTS WITH DEMENTIA IN THE UNITED STATES

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BACKGROUND: Polypharmacy has not been well characterized among community-dwelling older persons with dementia (PWD) in the US. While extensive medication use may be appropriate in PWD, it is often unnecessary, discordant with goals of care, and possibly harmful in this vulnerable population. We aimed to profile medication categories contributing to polypharmacy among PWD attending outpatient visits in the US.

METHODS: We analyzed outpatient visits by people age ≥ 65 years from the National Ambulatory Medical Care Survey (2014-16). Dementia status was ascertained by physician diagnoses or receipt of anti-dementia medication. Visits with PWD and persons without dementia (PWOD) were compared in terms of sociodemographic and practice/physician factors and comorbidities. Linear and logistic regression analyses examined the effect of dementia diagnosis on contributions by clinically relevant medication categories, including highly sedating and anticholinergic medications, to polypharmacy.

RESULTS: The unweighted sample involved 919 visits for PWD and 26,542 visits for PWOD, representing 29.2 and 780 million outpatient visits. PWD had a median age of 81 and on average 2.8 comorbidities other than dementia and were 63% female. The mean number of medications in PWD was 8.7 compared to 5.1 in PWOD ($p < 0.001$). After adjusting for confounders including age, sex, and comorbidity burden, PWD had significantly higher odds of being prescribed ≥ 5 medications (AOR 3.1; 95% CI: 2.2-4.3), ≥ 10 medications (AOR 2.9; 95% CI: 2.0-4.2), or at least one highly sedating or anticholinergic medication (AOR 2.5; 95% CI: 1.7-3.7) compared to PWOD. The largest sources of medication use among PWD were cardiovascular and central nervous system medications (mean number of medications in use per visit, 2.0 for each); however, other medication categories, including vitamins and supplements and gastrointestinal and genitourinary medications, were also elevated in PWD compared to PWOD. Results were similar when dementia medication was not used in the ascertainment of dementia and when limiting to primary care visits. The most commonly prescribed highly sedating or anticholinergic medications among PWD included benzodiazepines, gabapentinoids, antipsychotics, urinary antispasmodics, and antihistamines.

CONCLUSIONS: In a nationally representative sample of outpatient visits in the US, polypharmacy was extremely common among PWD and was driven by a wide array of medication categories. Addressing problematic polypharmacy in PWD will require a cross-cutting and multidisciplinary approach.

LEARNING OBJECTIVE #1: Medical Knowledge: The viewer will gain knowledge regarding the prevalence of polypharmacy among persons with dementia attending outpatient visits in the US.

LEARNING OBJECTIVE #2: Systems-Based Practice: The viewer will gain an appreciation for the breadth of medication categories prescribed to persons with dementia in the US, suggesting the need for cross-cutting and multidisciplinary interventions to address polypharmacy in this vulnerable population.

PROTON PUMP INHIBITORS IN OLDER MULTIMORBID PATIENTS: (DE-)PRESCRIBING AND POTENTIAL ADVERSE EFFECTS

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BACKGROUND: Proton pump inhibitors (PPIs) are among the most frequently prescribed medications in the world, often without an appropriate indication. They contribute to polypharmacy and are associated with adverse effects. We aimed to evaluate longitudinal patterns of potentially inappropriate PPI use and deprescribing, as well as risk of readmission associated with PPI use over 1 year, among hospitalized older multimorbid adults.

METHODS: Among multimorbid patients with polypharmacy in 4 European countries, we assessed PPI prevalence at admission, and new prescriptions and deprescribing at discharge, after 2 months and 1 year. We defined potentially appropriate indications as gastro-esophageal reflux disease, Barrett's esophagus, gastro-duodenal ulcer, Helicobacter pylori infection, acute gastritis, gastro-intestinal bleeding, use of non-steroidal anti-inflammatory medications and/or antiplatelets. We used competing-risk regression according to Fine-Gray method, with competing risk for death to assess the association of persistent PPI use (> 2 months) with potential adverse effects (pneumonia, fracture, nephritis, bacterial intestinal infection) leading to readmission, and all-cause readmission.

RESULTS: 57.5% (1,080/1,879) of patients had PPI at admission. 45.9% of patients with PPI had a potentially inappropriate indication. At discharge, 224 (20.7%) PPI users had been deprescribed, while 5.5% had a dose increase. Among PPI users, 13.7% had been deprescribed at 2 months, and 36.8% at 1 year. Among 778 patients without PPI at discharge, 12.8% had a PPI at 2 months, and 17.7% at 1 year. In multivariable adjusted analysis, persistent PPI use was associated with all-cause readmission (N=770, subhazard ratio [SHR] 1.32, 95%CI 1.13-1.54). PPI-related readmission risk showed a pattern of increase not reaching statistical significance (N=62, SHR 1.33, 95%CI 0.80-2.22).

CONCLUSIONS: PPI use was frequent in older multimorbid adults, with almost 50% of use potentially inappropriate. At discharge, PPIs were deprescribed in one fifth of patients with PPI at admission, while a PPI was initiated in one fifth of those without PPI at admission. Persistent PPI use was associated with increased 1-year readmission risk.

LEARNING OBJECTIVE #1: Almost 50% of PPI prescriptions had an inappropriate indication.

LEARNING OBJECTIVE #2: PPIs were associated with a higher risk of 1-year all-cause readmissions.

TREATMENT INTENSITY MODIFICATION IN OLDER PATIENTS WITH TIGHTLY-CONTROLLED BLOOD PRESSURE: ASSOCIATION WITH CARDIOVASCULAR EVENTS, SYNCOPE, AND FALL INJURY

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BACKGROUND: Uncertainty remains about the benefits and harms of deintensification of antihypertensive medication when systolic blood pressure (SBP) is tightly controlled in older adults. We hypothesized that hypertension treatment deintensification would be associated with fewer syncope and fall injury events, without increasing cardiovascular event risk, in older adults with tightly-controlled SBP.

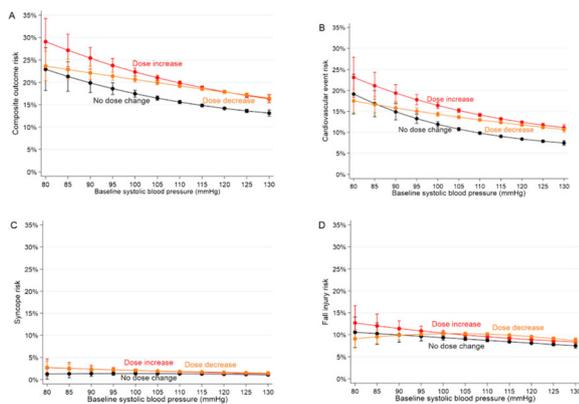
METHODS: We included all Veterans aged ≥ 65 years with baseline SBP < 130 mmHg and ≥ 1 antihypertensive medication during ≥ 2 consecutive visits (2011–2013). We used adjusted logistic regression and inverse probability of treatment weighting (IPTW) to assess the association between antihypertensive medication dose deintensification, compared to stable treatment (no dose change) or dose intensification, with cardiovascular events, syncope, and fall injury within 9 months.

RESULTS: Among 228,753 patients (mean age 75 [SD 7.5] years), adjusted absolute outcome risk (95% CI) was 14.8% (14.6 to 15.0%; reference) for stable treatment, 18.3% (18.1 to 18.6%; $P < .001$) for deintensification, and 18.7% (18.4 to 19.0%; $P < .001$) for intensification. However, when SBP was below 95 mmHg, there was no difference between deintensification and stable treatment. IPTW yielded similar results. Mean follow-up SBP was 124.1 mmHg for stable treatment, 125.1 mmHg after deintensification ($P < .001$), and 124.0 mmHg after intensification ($P < .001$).

CONCLUSIONS: In this large national healthcare sample with robust administrative, medication and vital signs data, we did not find evidence that deintensifying antihypertensive treatment in older patients with tightly-controlled SBP was beneficial. Rather, it is likely that patients' declining clinical state, which was inadequately recognized in the administrative data, may have both prompted attempts at deintensification and led to adverse events.

LEARNING OBJECTIVE #1: Antihypertensive medication deintensification in older adults with tightly-controlled blood pressure was not associated with a lower risk of adverse outcomes.

LEARNING OBJECTIVE #2: Deintensification only slightly modified blood pressure, suggesting that unmeasured confounding was responsible for the association.



TRENDS AND OUTCOMES ASSOCIATED WITH PRESENCE AND SPECIALTY OF USUAL PROVIDER AMONG OLDER ADULTS WITH MULTIMORBIDITY

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BACKGROUND: For older adults with multimorbidity, having a usual provider of care may improve outcomes. A decline in primary care visit rates and rise in specialist visit rates raises questions about who has a usual provider and which physicians are playing this role. We examined trends in the presence

and specialty of usual providers for these adults and the association with preventive care and spending.

METHODS: Using 2010, 2013, and 2016 data from the nationally representative Medicare Current Beneficiary Survey, we performed repeated, weighted cross-sectional analysis of Medicare Advantage (MA) and Fee For Service (FFS) members who were community-dwelling, continuously enrolled each year, and had ≥ 2 chronic conditions. We examined trends and demographic, clinical, and area-level factors associated with self-report of having a usual provider and the provider's specialty (primary care vs other outpatient specialty) using multivariable logistic regression. We examined the associations between having a usual provider and the provider's specialty with preventive care receipt (logistic regression), and outpatient/other medical spending and out of pocket (OOP) costs (linear regression), adjusting for the above factors.

RESULTS: We examined 25,949 adult-years. From 2010 to 2016, those reporting a usual provider dropped from 94.2 to 90.8% overall (-3.6%, $p < .001$ for trend) and within most subgroups [all percentage point estimates are adjusted predictive margins]. Among those with a usual provider ($N = 23,649$), those with a specialist in this role declined from 5.4% to 4.1% (-1.3%, $p < .001$ for trend). Adults were more likely to report a specialist if they had FFS (1.9% vs MA, 95%CI 0.9, 2.9), lived in the Northeast (3.0% vs Midwest, 95%CI 1.6, 4.5) and in urban areas (2.3% vs rural, 95%CI 0.96, 3.6), and had frailty (2.1% in top quartile vs bottom, 95%CI 0.4, 3.9).

Adults with a usual provider were more likely to report screening for hypertension (5.2%, 95% CI 4.1, 6.4), hyperlipidemia (6.3%, 95%CI 4.9, 7.6), diabetes (4.4%, 95%CI 0.4, 8.5), and colorectal cancer (6.4%, 95%CI 2.9, 9.8) and having received their seasonal flu shot (10.7%, 95% CI 8.4, 13.0) and pneumonia shot (5.3%, 95%CI 3.1, 7.4). Having a usual provider was associated with more spending (\$838.6, 95%CI 428.8, 1248.3) and OOP costs (\$65.5, 95%CI 5.9, 125.1). Among adults with a usual provider, those with a specialist provider were less likely to have gotten their flu shot (-4.2%, 95%CI -7.1, -1.3) or their shingles vaccine (-5.3%, 95%CI -7.8, -2.8) and had higher spending (\$663.8, 95%CI 234.5, 1093.0) and OOP costs (\$69.3, 95%CI 6.9, 131.7).

CONCLUSIONS: Older adults with multimorbidity were less likely over time to have a usual provider and to have a specialist in that role. Having a specialist usual provider was associated with higher costs and lower vaccination rates.

LEARNING OBJECTIVE #1: Identify trends in usual provider and primary vs specialty care.

LEARNING OBJECTIVE #2: Understand association between usual provider / specialty with preventive care and spending outcomes.

Scientific Abstract - Healthcare Delivery and Redesign

ALLOCATION OF REGISTERED NURSE TIME IN PRIMARY CARE: A TIME AND MOTION STUDY

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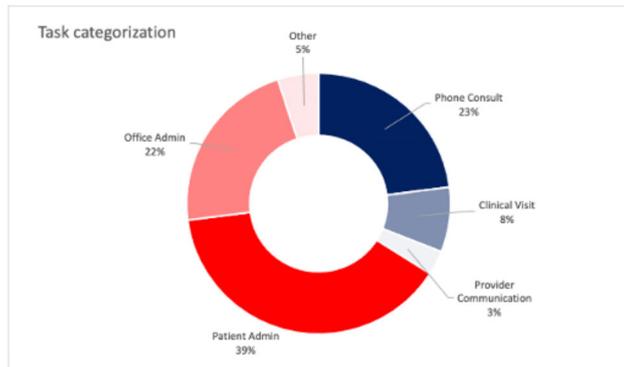
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BACKGROUND: Ambulatory physicians spend 2 hours on administrative tasks within the electronic health record (EHR) for every 1 hour of face-to-face care with patients. Although, we recognize the importance of outpatient registered nurses (RNs) and their role in healthcare delivery, there has been minimal studies evaluating how RNs spend their time in the office. Our objective was to conduct a time and motion study of primary care RNs to discover how their time is allocated.

METHODS: This was a time and motion study conducted at two primary care practices in the New York City metropolitan area. Two observers recorded how RNs allocated their time during two 240-minute observation periods at 1 minute increments. There were a total of 15.5 observed hours. Tasks were placed into 6 categories: communication with provider, face-to-face clinical visit, office administration, patient administration, patient clinical phone

consult, and other. Non-clinical time included granting medication refill requests, navigating issues with the insurance company, etc. Clinical time was defined to include face-to-face clinical visit, patient clinical phone consult and communication with provider.

RESULTS: RN time allocation into each task is included in **Figure 1**. During each 240-minute session, RNs completed a mean of 54 tasks. RNs spent 66% of their time on non-clinical tasks and 34% of time on clinical tasks. Most of the clinical time (74%) was spent on the phone. Only 8% of their time was spent on face-to-face clinical time with patients. Regardless of task category, RNs spent 82% of their time using the EHR.



CONCLUSIONS: RN time allocation demonstrated several similarities to documented physician time allocation. RNs spent twice as much time on administrative tasks as they did on clinical face-to-face or phone time with patients. RNs similarly spend their day completing many short tasks for a variety of patients. RNs spend the majority of their clinical time over the phone. Lastly, the vast majority of tasks require the EHR. Future directions include evaluation of RN satisfaction, usability, burnout, and potential interventions to increase face-to-face clinical time.

LEARNING OBJECTIVE #1: Recognize the impact of EHR on outpatient registered nurse workflow

LEARNING OBJECTIVE #2: Describe the allocation of time for outpatient registered nurses

ASSESSING CORONARY HEART DISEASE PATIENTS' ACCESS TO CARE DURING THE COVID-19 PANDEMIC

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BACKGROUND: Coronary heart disease (CHD) is the leading cause of death in the US, and the COVID-19 pandemic has caused disruptions in care that may further increase CHD deaths. In February, 2020, New York City became the epicenter of COVID-19, providing an opportunity to examine trends in healthcare delivery and challenges to access to care for CHD patients during the first months of the COVID-19 pandemic.

METHODS: We conducted a cross-sectional study of established CHD patients receiving care at 6 primary care and cardiology clinics affiliated with an academic medical center in Upper Manhattan. Participants ≥ 21 were eligible if they attended at least one primary care visit from July 1, 2018 to July 1, 2019. We queried our electronic health record to assess outpatient visit access data during Feb 1, 2020 to June 30, 2020, the height of the COVID-19 pandemic. We additionally collected demographics, visit type and specialty, appointment status and ICD-10 codes. We used descriptive statistics to

examine trends in access to care and visit status by insurance status, race and ethnicity.

RESULTS: Of 975 established and eligible CHD patients receiving outpatient primary care prior to 2020, 773 (79.3%) had ≥ 1 scheduled appointment between February and June 2020. The average age of scheduled patients was 70.9 (SD 10.7); 77 (10%) were Black, 527 (68.2%) Hispanic, 354 (45.8%) male, 402 (52.0%) Medicare, and 240 (31.0%) Medicaid. Of the patients with scheduled appointments, 669 (86.5%) attended ≥ 1 visit (totaling 4825 visits [avg 7.2 visits/patient]) while 104 (13.4%) either cancelled or no-showed. Average weekly visit attendance rates peaked at 66.1% in late Feb and nadired at 38.6% in late March (the peak of the pandemic) before improving to 70.4% by the end of May. Visit attendance rates varied by race/ethnicity (70.0% non-Hispanic Black vs. 57.3% Hispanic vs. 47.1% non-Hispanic Whites) but not by insurance status or age. Of the 4825 completed visits, 563 (11.7%) were video and 2488 (51.6%) were audio-only; 1041 (21.6%) were Cardiology, 3340 (69.2%) Primary care, and 444 (9.2%) Mental Health/Social Services.

CONCLUSIONS: Our preliminary data suggests that the COVID-19 pandemic disrupted healthcare delivery for CHD patients in New York City. More than 1 in 5 CHD patients did not access outpatient services at all during this time, with weekly incomplete visit peaking at more than 60% during the height of the pandemic (vs. rates of $\sim 40\%$ in May 2019). Nonetheless, telemedicine likely helped maintain access to care during the pandemic. Future research is needed to examine reasons why patients were not able to access care and how care disruptions impacted clinical outcomes.

LEARNING OBJECTIVE #1: To assess the extent to which outpatient primary care and cardiology clinics maintained continuity of care for CHD patients during the COVID-19 pandemic.

LEARNING OBJECTIVE #2: To determine which CHD patients were most likely to remain in care based upon demographic factors.

BURNOUT AMONG PRIMARY CARE HEALTHCARE WORKERS DURING THE COVID-19 PANDEMIC

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BACKGROUND: Burnout is prevalent among healthcare workers (HCWs) in primary care, and the COVID-19 pandemic has exacerbated the phenomenon. However, workplace factors that facilitate good job-person fit may be protective against HCW burnout, even during the pandemic. Our objectives were to measure the prevalence of burnout among HCWs in primary care during the COVID-19 pandemic and to understand the association between the working environment, experiences with and perceptions of the pandemic, and burnout. **METHODS:** We surveyed 152 HCWs (primary care providers and staff) in two primary care clinics in one regional healthcare network in the summer of 2020. The survey contained items on burnout (measured using abbreviated Maslach Burnout Inventory), job-person fit for 6 dimensions of the working environment (measured using Areas of Worklife Survey-Short Form), experiences with and perceptions of the COVID-19 pandemic (items from the Pandemic Experiences and Perceptions Survey), and respondent demographic characteristics. We then performed cross-sectional logistic regression analyses of the survey data, using data on the working environment and perceptions of and experiences with the COVID-19 pandemic to predict HCW burnout. Models controlled for HCW clinic tenure and site.

RESULTS: About half of HCWs (49%) reported burnout and 43% reported emotional exhaustion. On average, job-person fit was present for recognition or appreciation at work (reward), a supportive and cooperative workgroup (community), and congruent worker-organization goals and values (values). Better job-person fit was associated with lower HCW burnout in the areas of reward (OR 0.33, 95% CI 0.13-0.86) and values (OR 0.23, 95% CI 0.09-0.58). Most HCWs reported low contact with, high control over, and low person danger from the virus. Those who had contact with the virus often or every day were less likely to be burned out.

CONCLUSIONS: HCWs in primary care were burned out during the COVID-19 pandemic, but increased job-person fit was associated with lower

burnout. Increasing job-person fit along domains like reward and values may create better working environments. These changes may be key to reducing HCW burnout even after the current crisis.

LEARNING OBJECTIVE #1: To understand levels of burnout in primary care during the COVID-19 pandemic

LEARNING OBJECTIVE #2: To identify system-level drivers of burnout in primary care

CARING FOR PATIENTS WITH FUNCTIONAL IMPAIRMENT IN MIDDLE AGE: PERSPECTIVES FROM PRIMARY CARE PROVIDERS

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BACKGROUND: The prevalence of functional impairment in middle age is increasing and associated with adverse health outcomes. While effective models of care have been developed for older patients with functional impairment, we lack similar models for middle-aged patients. Primary care providers (PCPs) and geriatricians may have insights about optimal approaches to caring for these patients, yet little is known about their perspectives.

METHODS: We conducted a qualitative study using semi-structured interviews of PCPs and geriatricians from outpatient settings in the San Francisco Bay Area. We elicited perspectives on care needs of middle-aged patients with functional impairment and approaches to address these needs. We analyzed interviews using qualitative thematic analysis.

RESULTS: We interviewed 29 providers: 14 PCPs and 15 geriatricians. Interviews revealed three key elements influencing care for middle-aged patients with functional impairment: 1) patients' clinical needs, 2) challenges providers face, and 3) care models suited to this population.

First, providers perceived that this patient population often had unmet health-related social needs, such as housing and transportation, in part because existing resources focused on older adults. They noted that even when resources existed for middle-aged patients, patients lacked the support needed to access services, such as help filling out paperwork. Additionally, providers described needs in the clinic, such as longer visits and accessible exam rooms. Second, providers described challenges providing optimal care to this population related to patients' age and eligibility for services. Patients often did not meet age or disability requirements for Medicare and did not qualify for Medicaid. Additionally, providers reported challenges ensuring adequate caregiver support given that patients' family members were often working and insurance coverage for these services was insufficient or absent.

Last, providers identified characteristics of ideal models of care for this population. In the clinic, they noted the importance of multi-disciplinary, team-based, coordinated care with need-based scheduling and co-located services. Outside the clinic, they pointed to the capacity of case management to follow patients through care settings and help patients navigate community resources. They also noted that provider training, experience, and behavior could support ideal care delivery models.

CONCLUSIONS: Providers noted that middle-aged adults with functional impairment face unique care needs related to their life stage and eligibility for services. Providers identified several promising approaches to improve care and outcomes for this population, including clinic-based and case management models.

LEARNING OBJECTIVE #1: Describe primary care provider perspectives on the clinical needs of middle-aged patients with functional impairment.

LEARNING OBJECTIVE #2: Consider ideal models of care to meet the needs of this patient population and mitigate challenges faced by providers.

CHALLENGES TO A SAFE TRANSITION HOME FROM SKILLED NURSING FACILITY FOR PATIENTS WITH HEART FAILURE

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BACKGROUND: Readmission rates for heart failure (HF) patients remain high at 21.9%. Prior work has demonstrated that many HF patients are discharged to skilled nursing facility (SNF) before discharge home, and this subsequent transition is associated with a high readmission risk. Our objective here was to understand the current challenges to safe discharge from SNF to home for heart failure patients.

METHODS: Detailed individual semi-structured interviews with employees across three SNFs in New York City were conducted. Purposive sampling was used to identify staff members who have experience working with HF patients and are involved in the discharge process at the SNF. Audio-recorded interviews were transcribed professionally. Data were analyzed with Dedoose. Transcripts were coded using the constant comparative method to identify themes.

RESULTS: Nineteen employees across these SNFs were interviewed. Participants included 4 social workers, 2 nurse case managers, 2 registered nurses, 1 licensed practical nurse, 4 nurse practitioners, 5 physicians, and 1 administrator. Five major themes emerged on the topic of safe discharge challenges:

- (1) community-level factors, for example, lack of social support or inadequate housing;
- (2) insurance-level factors, for example, reduced SNF coverage and coverage gaps for home care services;
- (3) institution-level factors, for example, high patient volume, rapid patient turn-over, low nurse to patient ratios, resulting in limited time spent on patient teaching;
- (4) provider-level factors, for example, lack of coordinated communication between team members resulting in durable medical equipment not ready at expected time of discharge or poorly coordinated, piecemeal education for the patient or their caregivers;
- (5) patient-level factors, for example, inability to manage themselves due to severe mental illness, cognitive impairment, frailty; and lack of adherence to recommended treatment.

CONCLUSIONS: Challenges to safe discharge from SNF are multifactorial, and these challenges may be more pronounced than what is typically seen at hospital discharge as this population is frailer and often require structured support to ensure a safe transition home. Interventions targeting these challenges are needed to facilitate safe discharge from SNF.

LEARNING OBJECTIVE #1: Systems-Based Practice: SNFs are common destinations from acute care. SNFs are often used to help patients regain strength, function, & independence before returning home, particularly for medically complex patients. Discharge home from SNF is typically the ultimate goal as the majority of these patients were residing at home prior to hospitalization. However, the SNF stay adds another layer of complexity to HF patients' transition back to the community.

LEARNING OBJECTIVE #2: Patient Care: Patient-level factors (such as cognitive impairment and frailty) may interact with systems-level factors (such as provider communication and follow-up) in the SNF to home transition for HF patients. These interactions could impact outcomes for this vulnerable group.

CHANGES IN OPIOID PRESCRIBING DURING THE COVID-19 PANDEMIC

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BACKGROUND: Physicians and patients with chronic and acute pain quickly adapted to changes in healthcare delivery as a result of the COVID-19 pandemic. We hypothesized that shifting to telemedicine, postponing elective procedures, and avoiding emergency care would lead to reduction in opioid prescribing.

METHODS: We performed an interrupted time series analysis of opioid prescribing at an academic medical center in Bronx, NY, comparing opioid prescriptions per week during three periods: baseline (1/1/19 - 3/14/20), COVID-19 restrictions (3/15/20 - 6/6/20), and reopening (6/7/20 - 10/31/20). We examined differences in opioid prescribing by the type of opioid prescription (chronic if the patient had been prescribed for >90 days, or non-chronic) and by the setting (medical specialty, surgical specialty, emergency, or hospital discharge).

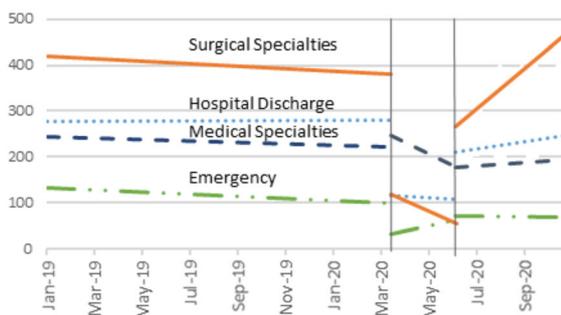
RESULTS: During the study timeframe, there were 51,811 chronic and 88,266 non-chronic opioid prescriptions. Chronic prescriptions in medical specialties increased during COVID-19 restrictions by 35 per week (95% CI: 8, 62), disrupting a negative trend in the baseline period. Non-chronic prescriptions decreased during COVID-19 restrictions by 260 (CI: -333, -187) in surgical specialties, by 67 (CI: -81, -52) in emergency, and by 146 (CI: -199, -93) at hospital discharge; in these settings, non-chronic prescriptions increased during the reopening period, but returned to baseline only in the surgical specialties.

CONCLUSIONS: Chronic opioid prescriptions from medical specialties increased after restrictions were implemented, then stabilized. That they did not decrease is reassuring for patients receiving opioid therapy for chronic pain. It is not surprising that non-chronic prescriptions, likely for acute or peri-operative pain, decreased during restrictions and increased during the reopening period because fewer patients sought care for acute pain and elective surgeries, these findings raise questions for future studies to understand how delays in pain treatment affect patient outcomes.

LEARNING OBJECTIVE #1: Understand how opioid prescribing for chronic pain changed as a result of restriction of in-person visits and use of telemedicine.

LEARNING OBJECTIVE #2: Understand how opioid prescribing for acute and peri-operative pain changed as a result of postponing elective procedures and reduced health-seeking in acute care settings.

Interrupted time series analysis of number of non-chronic opioid prescriptions per week during baseline, restrictions, and reopening periods



CHARACTERISTICS OF HOSPITALS REPORTING UNDER THE INPATIENT PSYCHIATRIC FACILITY REPORTING PROGRAM

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BACKGROUND: In 2014, Centers for Medicare and Medicaid Services integrated seven inpatient psychiatric care measures into the Inpatient Psychiatric Facility Quality Reporting (IPFQR) program, a reporting program

designed to inform consumers and increase quality of care. However, little is known about the characteristics of hospitals participating in the IPFQR program. This study aims to examine whether differences in hospital characteristics exist between low- and high-performing hospitals.

METHODS: Using Hospital Compare, we compared all inpatient psychiatric hospitals participating in the 2018 IPFQR program. We summarized these quality measures into a mean z score. Hospitals were deemed to be low- vs high-quality hospitals if they were below or above the mean, respectively. Data from the IPFQR program was linked to the 2018 American Hospital Association's Survey to obtain information on hospital characteristics. We used proportions and means (standard deviations) to calculate descriptive statistics. **RESULTS:** A total of 1758 hospitals reported IPFQR measures, of which 654 were excluded due to missing data or a lack of psychiatric beds. Of the hospitals included, low-quality hospitals were more often standalone psychiatric hospitals (29.9% vs 20.1%; $p < 0.001$). While not statistically significant, low-quality hospitals were more often non-profit (58.5% vs 55.1%; $p = 0.14$) and non-teaching (15.5% vs 11.6%; $p = 0.077$).

CONCLUSIONS: In conclusion, low-quality hospitals are more likely to be standalone psychiatric hospitals, non-profit, and non-teaching. These findings suggest further investigation into the relationship between IPFQR reporting and hospital characteristics.

LEARNING OBJECTIVE #1: To evaluate how the infrastructure of psychiatric hospitals can influence the quality of care provide to patients.

LEARNING OBJECTIVE #2: To clearly inform and communicate the quality of inpatient psychiatric care to patients.

COVID-19 & TELEMEDICINE: IMPACT ON PRIMARY CARE LABORATORY TESTS, REFERRALS, AND ED UTILIZATION

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BACKGROUND: The COVID-19 pandemic triggered large-scale healthcare delivery changes, specifically unprecedented expansion of primary care telemedicine encounters. Little is known about the impacts of these changes on patient access, practice patterns, and utilization. Understanding these impacts can help primary care clinics learn, adapt and ensure that we incorporate telemedicine in the safest, most valuable way for patients.

METHODS: We performed a cross-sectional descriptive analysis of electronic medical record data from all non-urgent primary care physician and nurse practitioner encounters that occurred from January 1, 2019 to October 28, 2020 in the UCSF Health System, an urban tertiary-care academic medical center. In order to examine pandemic-related changes, we compared the proportion of primary care encounters with associated lab orders, referral orders, and within-5-day emergency department (ED) utilization immediately before and during the COVID-19 pandemic using a date cutoff of March 16, 2020, when the first shelter-in-place (SIP) order was enacted in San Francisco. We also compared these outcomes between telemedicine and in-person visits that occurred during the pandemic (after SIP) in order to examine changes associated with telemedicine. The above comparisons were made using Pearson's chi-squared tests, unless otherwise specified.

RESULTS: There were no substantial differences between primary care patients' age, sex, race, and ethnicity before and after San Francisco's SIP. Before SIP, 97% of primary care visits were in-person versus 18% after. The proportion of primary care encounters associated with a laboratory order decreased from 13.3% to 6.03% ($p < 0.001$). The proportion of primary care encounters associated with a referral order decreased from 41.3% to 31.6% ($p < 0.001$). The proportion of primary care encounters associated with an ED visit within 5 days was 0.419% before SIP and 0.478% after ($p = 0.119$). This difference remained insignificant after excluding ED visits associated with a diagnosis of COVID-19. After SIP, telemedicine visits were associated with fewer laboratory orders (2.54% vs. 21.6%; $p < 0.001$), fewer referral orders (29.7% vs. 39.9%; $p < 0.001$), and similar non-COVID ED encounters within 5 days (0.46% vs. 0.48%; Fisher's exact $p = 0.817$) than in-person visits.

CONCLUSIONS: During the pandemic, primary care clinicians ordered fewer tests and referrals, especially during telemedicine visits. There was no concurrent increase in within-system ED visits. Future research should (1)

verify whether these trends are generalizable to other primary care practices, and (2) examine the relationships between pandemic-related healthcare delivery changes and additional clinical and patient-centered outcomes.

LEARNING OBJECTIVE #1: To characterize overarching shifts in primary care practice patterns and associated emergency department utilization before and during the COVID-19 pandemic.

LEARNING OBJECTIVE #2: To facilitate systems-based learning and improvement as primary care expands into telemedicine.

COVID-19 PATIENT NEEDS AFTER DISCHARGE HOME: A CONTENT ANALYSIS OF MEDICAL RECORDS FROM A COVID REMOTE CARE PROGRAM

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BACKGROUND: In the Spring of 2020, Columbia University Irving Medical Center implemented the COVID Remote Care Program (RCP) consisting of daily telephone follow-up for COVID-19 patients discharged home. To better understand COVID-19 patient needs and to inform the design of programs that support COVID-19 patients after discharge, we conducted a mixed methods analysis of the RCP's medical records.

METHODS: We examined medical records of patients referred to the RCP at the time of discharge from 2 Columbia-affiliated hospitals (New York, NY) between March 26 and May 29, 2020. Medical students (3rd/4th years) called patients daily until COVID-related symptoms had substantially improved and/or patients were connected to primary care. Calls consisted of a structured assessment of new or worsening COVID signs and symptoms (e.g. fever, shortness of breath, oxygen saturation), with thresholds for escalation to supervising physicians, and evaluation for other unmet needs. Data were extracted from a REDCap database used to track assessments. The database included a free-text section to record key assessments and actions not captured by the structured fields. Two investigators independently coded the free-text comments using content analysis.

RESULTS: Of 733 patients referred to the program, 660 (90.0%) were successfully reached by telephone. Patients had a mean age of 60.0 ± 15.4 years, 55.3% were male, 53.8% were Hispanic, 26.8% had Medicaid, and 10% were uninsured. 104 patients (15.8%) were discharged on home oxygen. 809 calls (15.1%) required escalation to supervising attendings. Patients on home oxygen accounted for 49.7% of escalations and required longer monitoring (median 12 days, IQR 7-14 days; 24.0% requiring extensions beyond 14 days) than those not on home oxygen (median 6 days, IQR 4-8 days, p < 0.01; 1.6% requiring extensions, p < 0.01). There were 500 patients with at least one coded free-text comment. After those describing symptom assessment (46.4%), the most common comments pertained to connecting patients with medical and social services (17.3%), counseling on managing COVID-19 symptoms and challenges stemming from isolation (11.1%), addressing complaints related to preexisting chronic diseases (10.2%), and providing emotional support (4.3%).

CONCLUSIONS: The RCP was important for assessing symptomatic worsening in discharged COVID-19 patients. It also provided a connection to follow-up care and resources for unmet socioeconomic and mental health needs at a time when access to primary care was limited. Patients on home oxygen required a higher intensity and duration of monitoring. Future COVID-19 monitoring programs inclusive of socioeconomically disadvantaged populations should expect higher resource needs for patients on home oxygen and include resources for emotional and practical support for patients recovering in isolation.

LEARNING OBJECTIVE #1: To understand the needs of COVID-19 patients in the post-discharge period.

LEARNING OBJECTIVE #2: To inform the design of remote care programs for COVID-19 patients after discharge.

DISCHARGE PRACTICES IN SKILLED NURSING FACILITIES AFFECTED BY COVID-19

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BACKGROUND: Many patients require post-acute care at skilled nursing facilities (SNF) after hospital discharge. While returning from SNF to home is often the ultimate goal for these patients, a safe discharge from SNF often requires additional support from home health care agencies or from patients' families. However, the COVID-19 pandemic affected all aspects of the healthcare industry, complicating transition home.

To understand how post-acute SNF throughput was affected by the COVID-19 pandemic, we conducted a study of discharge processes of patients with COVID-19 at a skilled nursing facility.

METHODS: This was a retrospective study of all residents at our SNF with a positive COVID-19 PCR test between 3/1/20-6/1/20. We defined post-acute patients as those who were admitted to the nursing home 100 days or less before the positive test. Using the facility's electronic medical record, we reviewed all medical, nursing, social work and other notes to identify discharge planning processes. Specifically, we identified if discharge planning was initiated, whether the patient was successfully discharged, and whether there was evidence that the discharge was complicated by COVID-19 related challenges.

RESULTS: Of 350 residents with a positive COVID-19 PCR, 121 were post-acute patients who were admitted to our facility within 30 days of positive PCR or symptom onset. Median age was 79 (interquartile range [IQR], 69-86), 59 (49%) were female, 16 (13%) were Black, 8 (7%) were White, 8 (7%) were Hispanic and 84 (70%) did not report race.

Over an average follow-up time of 185 days, 98 (81%) post-acute patients had discharge planning initiated, of which 81 were discharged to the community. Median length of stay for those discharged was 38 days (IQR 23-98). Discharge sites included home (66 [81%]), assisted living facilities (9 [7%]), and hotels (2 [2%]).

Discharge planning was affected by COVID-19 for 49 (41%) patients. These included symptom development that precluded discharge; logistical issues related to establishing home oxygen; unwillingness for assisted living facilities, home care services, or families to receive COVID-19 positive patients; challenges establishing home care services due to staffing shortages; and family members sick with COVID-19 themselves.

CONCLUSIONS: The COVID-19 pandemic had a multi-layered effect on the ability of nursing home residents to be discharged safely home.

LEARNING OBJECTIVE #1: Practice-Based Learning and Improvement: A diagnosis of COVID-19 has a substantial impact on the ability to safely discharge patients from SNF due to concerns from assisted living facilities, home care services, and families about directly caring for someone with COVID-19.

LEARNING OBJECTIVE #2: Systems-Based Practice: Delayed discharge from SNF may impact their ability to accept new patients, which may have further upstream effects on other aspects of the healthcare continuum such as hospital length of stay.

EXPERIENCES FROM THE DEPLOYMENT OF NON-HOSPITALIST PHYSICIAN VOLUNTEERS DURING THE 2020 COVID PANDEMIC

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BACKGROUND: New York City was the epicenter of the COVID pandemic in the US during early 2020. NYU Langone Medical Center was one of many

New York medical centers that experienced an unprecedented influx of patients. During the onset of the pandemic, clinic leadership identified, oriented, and rapidly deployed a “COVID Army”, consisting of non-hospitalist physicians, to meet the needs of this patient influx. Orientation and training included an hour-long session with an emphasis on the inpatient electronic medical record system and a plan for at the elbow assistance from senior hospitalists. Here, we share feedback from our providers on our capacity building process and use information gathered to offer specific lessons learned in planning for workforce mobilization.

METHODS: A 32-item survey was distributed from March-June of 2020 in order to assess the experiences of these ancillary physicians, all of which were NYU Langone providers. Items included a mix of Likert and open-ended questions on demographics and attitudes toward experiences on the COVID team.

RESULTS: All 272 volunteers received a survey. 67% (n=183) responded. 84 (46%) were from the Department of Medicine, the remainder were primarily from surgical, pediatrics or obstetrics/gynecology. Respondents worked in combination ambulatory/inpatient practices (n=94; 52%) or outpatient only (n=85; 47%) (Mean years in practice: 7.18). 76% felt that the number of patients they were in charge of felt “Just Right” (average: 7). 10% rated the experience as challenging (n=17). On their perception of support and training, 94% and 63% rated the support and training they received as “somewhat” or “very effective”, respectively. 89% (n=99) and 96% (n=107) of supplemental attendings felt valued and valuable to their team, respectively. 87% of respondents identified as being willing to volunteer again. In review of open-ended feedback, we identified a series of themes surrounding areas for improvement. These include the need to 1) invest time into orientations, including training on EHR use, (2) clarify roles and workflow within each team up front, (3) balance team workload if possible, (4) keep teams updated on evolving policies and recommendations, (5) make team members feel valued and supported, and (6) ensure they have the right tools available.

CONCLUSIONS: Given what we have learned from our survey, the continued waxing and waning of community infection, and the unknown length and extent of the COVID pandemic, we recommend providing transparent leadership, frequent communication, and an educational series to ensure everyone is learning together. In addition, clarity is essential, and it is important to be specific in defining the exact roles of ancillary physicians. It is our hope that the lessons learned from our needs assessment can be applied to other hospitals currently in the throes of a surge of COVID inpatients.

LEARNING OBJECTIVE #1: Identify best practices for preparing an ancillary workforce for patient surge.

LEARNING OBJECTIVE #2: Understand tools for quality patient care.

FACTORS ASSOCIATED WITH LOW VALUE CANCER SCREENING IN THE VETERANS HEALTH ADMINISTRATION

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BACKGROUND: Most clinical practice guidelines recommend stopping cancer screening when risks exceed benefits, e.g. if life expectancy \leq 10 years. Screening outside these guidelines represents low value care. In 2010, the Veterans Health Administration (VHA) implemented a patient-centered medical home (PCMH) model expanding population health screenings, patient-centered care, and access. These changes in care delivery could have variably affected cancer screening rates. It is not clear how low value cancer screenings were impacted by patient, provider, or organizational factors in the VHA.

METHODS: Four patient cohorts for prostate, colon, breast, and cervical cancer screenings were formed based on CPT codes in 2017, e.g. PSA tests for prostate cancer. We excluded patients with recent symptoms or a history of high-risk diagnoses that might indicate codes were not screenings. Low value was defined as screening an average-risk patient outside of guideline-recommended ages or if 1-year mortality risk \geq 50% per a validated score.

Multivariable logistic regression models examined the probability of receiving a low value cancer screening associated with patient, provider, and clinic characteristics, and PCMH domains of team-based care, access, and continuity from administrative and survey data. Standard errors were heteroskedastic robust and accounted for clustering within clinics.

RESULTS: In 2017, 6.1 million veterans (including 484,000 women) were seen in the VHA. Descriptive statistics characterizing frequencies of low value cancer screenings are shown in the Table. Predicted probability of low value screening was determined mainly by patient characteristics, especially sex (colon only), race/ethnicity, copay status, and frailty/comorbidity burden. For prostate cancer, probability of a low value screening was 37.5%; for the other cancers, it was $<$ 3%. Provider or clinic-level factors affected $<$ 0.01% of low value probability for any screening. No factor was consistently predictive across all cancers. No PCMH domains were significant.

CONCLUSIONS: Interventions to reduce low value cancer screenings should consider patient-level factors, particularly for prostate cancer. No factors were identified that consistently predict the delivery of low value cancer screenings across four cancer types.

LEARNING OBJECTIVE #1: Not provided by author.

LEARNING OBJECTIVE #2: Not provided by author.

FIGHTING THE COVID-19 PANDEMIC FROM THE CLINIC – IMPACT OF THE PRIMARY CARE PROVIDER

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BACKGROUND: COVID-19 has overwhelmed hospitals at various stages of the pandemic, leading to intense focus on availability of inpatient resources and less attention to primary care contributions. There is clear evidence that medical comorbidities, social determinants of health, and individual behaviors such as mask-wearing affect COVID-19 outcomes. By managing medical comorbidities and modifying social behaviors, it is plausible that primary care physicians (PCPs) improve COVID-19 outcomes. Socioeconomic status (SES) and environment likely affect the number of PCPs and their effectiveness in a community. Notwithstanding these factors, we hypothesize that PCPs contribute to healthier communities and that this will correlate with decreased COVID-19 cases and mortality.

METHODS: We used three surrogate measures of PCP effectiveness: PCP rate (#PCPs/population), flu vaccination rate, and number of preventable hospital stays. We merged county-level data from USA Facts, the New York Times masking survey, the Robert Wood Johnson Foundation County Health Data, and the Health Resources & Services Administration. We ran multiple linear regression models to measure the contributed variance in COVID-19 cases or deaths of the measures of PCP effectiveness after adjusting for age, race, economic, and environmental factors. A second model also measured the effect of PCP rates on mask adherence adjusted for the same confounders. Data were merged and analyzed using SPSS v.25.

RESULTS: Data were available from 2957 of 3143 county equivalents. There were an average of 55 PCPs per 100,000 population. By December 27, 2020 there were 18,750,038 COVID-19 cases and 325,507 deaths nationally. In multiple linear regression models, PCP rate ($\beta=-0.07$), flu vaccination rate ($\beta=-0.067$), and preventable hospital stays ($\beta=0.136$) were all significant ($p\leq 0.001$) contributors to the variance seen in COVID-19 cases after adjusting for confounding variables. Similarly, PCP rate ($\beta=-0.056$, $p=0.003$), flu vaccination rate ($\beta=-0.006$, $p=0.001$), and preventable hospital stays ($\beta=0.166$, $p<0.001$) were significant contributors to the variance seen in COVID-19 deaths. PCP rate was also found to be a significant contributor to variance in mask adherence ($\beta=0.078$, $p<0.001$).

CONCLUSIONS: All measures of PCP effectiveness were significantly correlated with lower COVID-19 cases and deaths and higher self-reported mask adherence even after accounting for SES and environmental factors. The pandemic has exposed an American healthcare system that is detrimentally more reactive than preventative. Our study demonstrates the modest—but significant—success of prevention efforts by PCPs. We hope it will serve to

increase resource allocation and attention toward the primary care sector of the healthcare workforce.

LEARNING OBJECTIVE #1: Identify how increasing resource allocation to primary care may improve systems-based practice.

LEARNING OBJECTIVE #2: Recognize the role that primary care physicians may play in improving COVID-19 outcomes.

IMPACT OF DIABETES GROUP VISIT ON PATIENT CLINICAL OUTCOMES: RESULTS FROM A CLUSTER RANDOMIZED INTERVENTION TRIAL AMONG MIDWESTERN HEALTH CENTERS

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BACKGROUND: Health centers (HCs) care for 2.5 million adults with diabetes, of whom 30% have suboptimal glycemic control (glycosylated hemoglobin, A1C > 9%). Diabetes group visits (GVs) have been shown to improve clinical outcomes but few have reported results from multi-center trials or in the HC setting.

METHODS: In a cluster randomized trial, we assigned 14 HCs to a GV intervention arm or usual care. Intervention sites conducted 6 monthly GV visits with up to 15 adults with uncontrolled type 2 diabetes (A1C ≥ 8%). 75 adult patients were enrolled in GV visits. In usual care, chart abstraction was conducted on 120 patients. Primary outcome was change in A1C from baseline to 12 months. Secondary outcomes were changes in blood pressure and low density lipoproteins (LDL) and processes of care. GV patients completed surveys at baseline, 6 and 12 months. Generalized linear mixed models and linear mixed models were used to test the effects of GV, timepoint and their interaction. Models were adjusted for age, gender, baseline insurance, number of complications, depression and anxiety status.

RESULTS: 195 patients were enrolled (mean age 53 ± 12 years, 61% female, 27% African American, 40% white, 25% Latino, 6% American Indian/Native American, mean baseline A1C 9.5% ± 1.8%). At baseline, the intervention group had higher rates of diabetes-related comorbidities (p=0.04), anxiety (p=0.005) and depression (p=0.0002). GV patients attended an average of 3.5 ± 1.9 GV visits. At 12 months, A1C was not significantly different in the intervention (8.91% ± 1.90%) compared to usual care (9.18% ± 1.68%, p=0.57). However, attending 4-6 group visits was associated with significant reduction in A1C compared to no visits (-0.48% vs. 0.6%, p=0.02). There was no significant difference in blood pressure or LDL. GV patients were more likely to have BMI, A1C and annual lipids drawn compared to usual care (p<0.05). GV patients had more visits with a certified diabetes educator (21% vs. 2%, p<0.001) in the 12-month post-intervention period. Patient satisfaction with current diabetes treatment improved (p=0.02). At 6 months, diabetes social support (p=0.02), diabetes self-empowerment (p=0.05) and diabetes distress improved (p=0.03). Among those who reported a mental health problem, there was an increase in the percentage of patients who reported being prescribed a medication (50% vs. 94%, p=0.01) and seen by a mental health provider (44% to 68%, p=0.01) from baseline to 6 months.

CONCLUSIONS: We did not see improved glycemic control in GV patients compared to usual care. However, GV attendance was associated with improved A1C. GV patients were more likely to have improved processes of care and more engagement with diabetes education post-intervention. GV patients, noted improvements in social support, distress and treatment for mental health concerns.

LEARNING OBJECTIVE #1: The impact of diabetes group visits on clinical outcomes and processes of care

LEARNING OBJECTIVE #2: The impact of diabetes group visits on patient reported outcomes

IMPLEMENTATION FIDELITY OF A COMPLEX BEHAVIORAL INTERVENTION TO PREVENT DIABETES MELLITUS IN TWO SAFETY NET PATIENT-CENTERED MEDICAL HOMES IN NEW YORK CITY

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BACKGROUND: Assessing implementation fidelity is critical for complex interventions to understand the reasons for their success or failure. However, few interventions systematically document and report implementation processes. Therefore, we sought to conduct concurrent process evaluation of CHORD (Community Health Outreach to Reduce Diabetes), a pragmatic, cluster-randomized, controlled trial aimed at evaluating the impact of a Community Health Workers (CHW) led, health coaching intervention (in-person and remotely) on preventing the onset of type 2 Diabetes Mellitus (DM).

METHODS: The study population included primary care patients with pre-diabetes range glycemia at 2 NYC safety-net hospitals (VA NY Harbor and Bellevue - BH). Primary care teams were randomized to receive the CHW-driven, one-year intervention. Of the 559 patients enrolled in the intervention arm, 79.4% completed an intake survey, constituting the analytic sample for fidelity assessment. The Conceptual Framework for Implementation Fidelity (CFIF) was applied to measure implementation fidelity and factors moderating fidelity of the 3 core intervention components: patient goal setting, education topic coaching with CHWs, and referrals made to address social determinants of health. Descriptive statistics and regression models were computed to determine factors related to fidelity.

RESULTS: The 2 study sites contributed 60% (BH) and 40% (VA) of the sample. Protocol adherence was as intended in the protocol for the 3 core components with more than 80% of patients setting ≥1 goal and receiving coaching on ≥1 education topic, and 45.0% receiving ≥1 referral. After adjusting for patient gender, language, race, ethnicity, and age, the study site moderated adherence to goal setting (77.4% BH vs. 87.7% VA) and having ≥1 education session (78.9% BH vs. 88.3% VA). Study site also moderated rate of encounters (median number of encounters 6 BH vs 4 VA). Scores on the Patient Activation Measure had no impact on fidelity of core intervention components.

CONCLUSIONS: The CFIF was a useful approach to collect and analyze data concerning implementation fidelity of a complex behavioral intervention. The fidelity of CHORD implementation varied across its 3 core components and was moderated by implementation site. Despite being implemented in a research setting, interventions may not completely adhere to their core components, which can influence outcomes. Our study emphasizes the importance of examining implementation fidelity of complex interventions and of assessing moderating factors. Our study also empirically tested the CFIF using quantitative concurrent process evaluation of core intervention components.

LEARNING OBJECTIVE #1: Describe the implementation fidelity of a complex behavioral intervention to prevent diabetes mellitus

LEARNING OBJECTIVE #2: Describe how implementation fidelity varies by study implementation site

IMPLEMENTATION SCIENCE APPROACH TO UNDERSTANDING TELEMEDICINE UPTAKE: DO QUALITY METRICS DIFFER BY VISIT MODALITY?

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BACKGROUND: The COVID-19 pandemic has prompted further research on the uptake and accessibility of telemedicine. However, few studies have examined determinants of telemedicine uptake and differences in clinical efficacy by modality, particularly through the mixed methods lens of implementation science. We sought to examine telemedicine implementation in the COVID-19 era using the REAIM framework.

METHODS: We used a mixed methods analysis of in-person, video, and phone visits conducted by 7 provider champions from November to December, 2020 at two primary care clinics in an urban academic medical center caring for predominantly Hispanic, low-income patients. We used descriptive analyses to assess reach (demographics), effectiveness (documented blood pressure [BP] and depression screen; completed flu vaccine and labs at 2 weeks), and adoption/maintenance (frequency, success rates) by modality. Implementation was assessed using thematic analysis of visit-level narrative provider comments collected in real time on barriers and facilitators to telemedicine.

RESULTS: Of 220 patients analyzed, mean age was 65.4±15 years, 13.6% were Black, and 65.5% were Hispanic. Of completed visits, 62 (28.2%) were in-person, 70 (31.8%) phone, 56 (25.5%) video, and the remainder no-shows. Of 108 scheduled video visits, 46 (42.6%) converted to phone visits.

The most common barriers were difficulty with technology set-up, lack of patient access to a compatible device, and patient preference for in-person visits. Key facilitators included assistance from a relative and technology proficiency.

Blood pressure was recorded for 100% of in-person visits, 30% of phone visits, and 28.6% of video visits; depression screening was done for 58.1% of in-person visits, 30% of video visits, and 8.6% of phone visits (based on completed modality). Ordered flu vaccines (n=28) were completed in 93.8% of in-person visits and one-third of phone and video visits. Ordered labs (n=64) were completed for 76.7% of in-person visits, 35% of video visits, and 21.4% of phone visits.

CONCLUSIONS: The second COVID-19 wave saw an even distribution of in-person, phone, and video visits in our healthcare system, with implementation of video visits limited by lack of access to technology and preferences for in-person visits even among telemedicine provider champions. As our preliminary data (further analyses pending) demonstrated gaps in quality metrics (BP, depression screen, vaccines, labs) between in-person and phone/video visits, researchers and administrators should focus on improving quality metrics in telemedicine visits, addressing barriers (i.e., access to tech support/devices), promoting facilitators (i.e., family involvement), and fine-tuning hybrid in-person/telemedicine models.

LEARNING OBJECTIVE #1: To use mixed methods analysis and implementation science to describe the reach, adoption, barriers and facilitators of telemedicine.

LEARNING OBJECTIVE #2: To evaluate whether quality metrics (blood pressure and depression screen; completed vaccines and labs) vary by visit modality.

INTERNAL MEDICINE TELE-TAKEOVER: LESSONS LEARNED FROM THE EMERGING PANDEMIC

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BACKGROUND: Healthcare systems rose to the challenges of COVID-19 by creating or expanding telehealth programs to ensure that patients could access care from home. Traditionally, though, physicians receive limited formal telemedicine training, which made preparedness for this transition uneven. We designed a survey for General Internal Medicine (GIM) physicians within our diverse health system to describe experiences with providing virtual patient care; with the ultimate goal of identifying actionable recommendations for health system leaders and medical educators.

METHODS: Surveys were sent to all faculty outpatient GIM physicians working at NYU Langone Health, NYC Health + Hospitals/Bellevue and Gouverneur, and the VA NY Harbor Health System (n=378) in May & June of 2020. Survey items consisted of Likert and open-ended questions on experience with televisits (13 items) and attitudes toward care (24 items). Specific questions covered barriers to communication over remote modalities.

RESULTS: 195/378 (52%) responded to the survey. 96% of providers reported having problems establishing a connection from the patient's end while

84% reported difficulty establishing connection on the provider's end. Using interpreter services over the phone was also problematic for providers, with 38% reporting troubles.

Regarding teaminess, 35% of physicians found it difficult to share information with healthcare team members during virtual visits and 42% found it difficult to work collaboratively with team members, both when compared to in-person visits. When subdivided, 24% of private and 40% of public providers found info sharing more difficult (p<0.04). 31% of private providers and 45% of public found team collaboration more difficult (ns). Physicians also identified challenges in several domains including physical exams (97%), establishing relationships with new patients (74%), taking a good history (48%), and educating patients (35%).

In thematic analysis of open-ended comments, themes emerged related to technological challenges, new systems issues, and new patient/provider communication experiences. Positives noted by physicians included easier communication with patients who often struggle with keeping in-person appointments, easier remote monitoring, and a more thorough understanding of patients' home lives.

CONCLUSIONS: Provider experience differences were rooted in the type of technology employed. Safety-net physicians conducted mostly telephonic visits while private outpatient physicians utilized video visits, despite both using the same brand of electronic medical record system. As we consider a "new normal" and prolonged community transmission of COVID-19, it is essential to establish telemedicine training, tools, and protocols that meet the needs of both patients and physicians across diverse settings.

LEARNING OBJECTIVE #1: Describe challenges and barriers to effective communication and clinical skill utilization during televisits

LEARNING OBJECTIVE #2: Conceptualize recommendations for educational curricula and health service improvement areas

KEY FACTORS INFLUENCING THE ADOPTION OF A CASE MANAGEMENT INTERVENTION IN EMERGENCY DEPARTMENT SERVICES IN SWITZERLAND: A QUALITATIVE STUDY

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BACKGROUND: Frequent Users of Emergency Department (FUED; ≥ 5 visits/year) are generally vulnerable patients requiring sustained care coordination that is often unavailable in Emergency Department (ED). Case Management (CM) provides an effective means to address these challenges, however its implementation in ED remains unusual. The complexity of CM's implementation highlights the gap between research and practice. This study aimed to explore factors influencing CM adoption in ED in Switzerland. The adoption decision is the outcome of the implementation first stage whereby the decision to implement CM is made.

METHODS: Fourteen semi-structured interviews were conducted with key staff members from the 14 ED invited to participate in a larger study aiming to implement CM in French-speaking Switzerland (adopters [AS] = 9, non-adopter [NA] = 5; 64 % female, 43 % head nurses, 57% head physicians). A content analysis was conducted by two researchers (Master and PhD-level) to identify facilitators and barriers to CM adoption.

RESULTS: Three main facilitators and three main barriers to adoption emerged from the analysis. All AS endorsed positive perceptions of CM. They commonly perceived CM could help address FUED-related challenges and appreciated belonging to a larger inter-professional FUED-related network. Most AS perceived their institution to support CM implementation, which was considered as a core ingredient to adoption. Finally, AS reported positive expectations regarding help and support they would receive from the inviting

research team (e.g., identify training needs for case managers; estimate necessary human resources). Whereas all NAs also endorsed positive perceptions of CM, there was an imbalance between the perceived efforts necessary to implement and the resulting benefits. Half of the NAs mentioned a lack of need (e.g., facing few FUED, having effective systems that address FUED needs), and all NAs reported a work overload with no time nor resources to implement CM that would require additional tasks for teams. Relatedly, NAs were unsure how to identify FUED and perceived the identification tool development as a complex and time-consuming task.

CONCLUSIONS: These findings highlight factors to be taken into account when introducing the idea of implementing a CM in ED, including assessment of the perceived needs of CM, expectations, work overload, resources and institution adherence. Providing a turnkey tool to identify FUED may represent a useful strategy to help increase awareness of FUED in ED and decrease barriers related to the development of such this system.

LEARNING OBJECTIVE #1: Patient care: To implement a Case Management (CM) intervention in Emergency Department (ED) to provide frequent users of ED (FUED) with healthcare tailored to their specific needs.

LEARNING OBJECTIVE #2: System-based practice: To implement a CM intervention to foster awareness, use and responsiveness to the larger system of healthcare to address FUED needs.

LEVERAGING TEXT MESSAGING TO DISSEMINATE A WEB-BASED FAMILY PLANNING DECISION SUPPORT TOOL IN PRIMARY CARE

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BACKGROUND: Widespread use of web-based decision support tools has been hindered by the challenge of disseminating these tools to patients in clinical practice. We piloted two innovative text messaging strategies in Veterans Administration (VA) to deliver "MyPath," a web-based tool integrating assessment of reproductive goals, preconception health information, and contraceptive decision support, to women Veterans prior to primary care visits.

METHODS: From September 2019 to February 2020, we conducted a pilot evaluation to iteratively test text messaging as a strategy to deliver the MyPath intervention, in anticipation of a pragmatic clinical trial of MyPath's effectiveness at improving reproductive counseling. Women Veterans ages 18-44 were sent a text message prior to a scheduled appointment with one of four primary care providers at VA Puget Sound. In Phase 1, we leveraged VA's existing appointment reminder system and embedded an invitation to use MyPath and the weblink in usual appointment reminder texts. After brief initial testing, we initiated Phase 2 by adding a telephone call from staff to alert women to the weblink. In Phase 3, we sent information via a separate stand-alone text and did not call patients.

During all phases, we contacted women after visits to assess whether they saw the weblink, clicked on it, and/or used at least one section of the tool prior to their visit. For the analysis, we included women who attended their appointment, reported receiving VA text messages, and were able to become pregnant (no hysterectomy, infertility, or current pregnancy) to test intervention delivery procedures for the future clinical trial.

RESULTS: Across all phases, 225 unique women Veterans were sent a text message including a weblink to the MyPath tool and 166 (74%) were reached for assessment. Of those, 105 (63%) were included for analysis, with 16 patients contributing to phase 1, 51 patients contributing to phase 2, and 38 patients contributing to phase 3. Phase 1 resulted in the lowest and phase 3 resulted in the highest rates of patients seeing the weblink (50% in phase 1,

63% in phase 2, and 74% in phase 3). Similar trends were seen for patients clicking on the weblink (13% in phase 1, 33% in phase 2, and 45% in phase 3) and using the tool (13% in phase 1, 27% in phase 2, and 39% in phase 3).

CONCLUSIONS: Stand-alone text messages were more effective at gaining the attention of patients than modified appointment reminder texts, even after personalized phone calls were added in phase 2. Stand-alone text messages resulted in nearly half of the target population accessing the tool. One-way text messaging is a scalable, effective means of delivering web-based decision support tool weblinks prior to health care visits.

LEARNING OBJECTIVE #1: Describe a novel strategy for disseminating decision support tools to patients via existing text message systems.

LEARNING OBJECTIVE #2: Identify characteristics of dissemination strategies which were more and less likely to result in patients viewing the decision support tool weblink.

OPTIMIZING PRIMARY CARE DELIVERY VIA TELEMEDICINE FOR OLDER ADULTS: UNDERSTANDING THE PCP EXPERIENCE

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BACKGROUND: COVID-19 has resulted in higher than ever use of telemedicine (TM), or care provided by phone or video. Older adults may face significant challenges in utilizing TM to receive care. To learn how to optimize TM in the care of adults aged 65+, we surveyed primary care physicians (PCPs) about their experiences providing TM since March 2020.

METHODS: PCPs affiliated with a large health system in Boston were included. The study questionnaire was emailed to eligible PCPs and included questions on self-efficacy, attitudes and perceived norms regarding use of TM in the care of adults aged 65+; each item was scored on a 7-point Likert scale from strongly disagree to strongly agree. We also collected PCP sociodemographics including practice setting, panel size, and years in practice. Bivariable statistics were used to compare responses by years in practice (<20 vs. 20+).

RESULTS: Overall, 163 (42%) of 383 eligible PCPs participated; 59% were female, 81% were non-Hispanic white, 80% practiced in a community setting, and 66% had been in practice \geq 20 years. In general, 69% of PCPs were dissatisfied or felt neutral about providing TM. Compared to TM, 75% of PCPs preferred providing care in person. Regardless of years in practice, 82% of PCPs agreed that high quality care could be delivered via TM; yet, only 63% were satisfied with the quality of care they personally delivered via TM ($p=0.005$). PCPs were more comfortable using TM to manage chronic diseases than diagnosing new problems (mean 5.3 vs. 4.6, $p < 0.001$).

In comparison to PCPs in practice 20+ years, PCPs in practice <20 years were more likely to agree that the quality of care via TM was equivalent to in person care (mean 4.0 vs. 3.0, $p < 0.001$), that they planned to continue using TM post pandemic (mean 6.2 vs 5.7, $p=0.04$), and that reimbursement for TM should be the same as an in person visit post pandemic (mean 6.5 vs 5.9, $p=0.04$). In addition, PCPs in practice < 20 years found telemedicine to be more enjoyable (mean 4.1 vs 3.2, $p=0.03$), but also more challenging to do with adults 65+ compared to younger adults (mean 5.8 vs. 5.2, $p=0.02$).

CONCLUSIONS: Regardless of years in practice, PCPs prefer in person care to TM for older adults. However, PCPs in practice < 20 years were more likely to feel comfortable with TM and to plan to continue using it. Yet these PCPs also reported finding TM more challenging for adults >65 years than younger adults; therefore, future work will need to focus on developing both practice and physician specific training to enhance virtual engagement with older adults.

LEARNING OBJECTIVE #1: To learn PCPs perceptions of the quality of care they deliver to older adults via telemedicine.

LEARNING OBJECTIVE #2: To understand practice and PCP characteristics associated with perceived high satisfaction and quality of care delivered via telemedicine.

PATIENT SATISFACTION OUTCOMES WITH REMOTE TRIAGE SERVICES: RESULTS FROM A SYSTEMATIC REVIEW

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BACKGROUND: Technology-based systems can facilitate remote decision-making to triage patients to appropriate levels of care and have been increasingly necessary during the COVID-19 pandemic. Although many calls can be resolved during initial contact, little is known about patient perceptions of these services. We report patient satisfaction outcomes from a larger systematic review of remote triage services.

METHODS: Searches of MEDLINE, EMBASE, and CINAHL were performed from inception until July 2018 for the VA Evidence Synthesis Program under a registered protocol (PROSPERO CRD42019112262). Randomized and nonrandomized comparative studies of remote triage services reporting patient satisfaction outcomes were included. Two reviewers assessed study and intervention characteristics independently for strength of evidence and risk of bias.

RESULTS: The literature search identified 5,026 articles pertaining to remote triage services, of which four (three randomized-controlled trials (RCTs) and one controlled before-and-after study) met eligibility criteria for satisfaction outcomes. No study compared triage modes other than telephone and in-person. The outcomes in each study differed substantively, with no patient satisfaction measure used more than once. Satisfaction measures included overall patient satisfaction, patient perceptions of individual encounters, and the percentage of patients who would use telephone contact again for similar complaints.

All three RCTs examined patient satisfaction among those seeking same-day appointments or after-hours care from their regular physician practices. One suggested patients calling to request a same-day appointment with their physician were less satisfied receiving nurse telephone triage than receiving physician telephone triage or usual, in-person care. Another RCT found when patients called their practices to receive after-hours care, those who received consultation from a practice physician reported significantly higher satisfaction than those who received consultation from a deputizing service. Similarly, the third RCT found that while people calling to request same-day, face-to-face appointments reported no difference in their ability to deal with their medical problem based upon mode, only about half (55.4%) said they would be willing to use a telephone consult for a similar problem in the future.

CONCLUSIONS: Given the diversity of outcomes measured under the satisfaction construct, this systematic review was unable to draw firm conclusions of the effects of studied remote triage services on patient satisfaction. However, patient satisfaction may decrease to the degree patients perceive the triage service to differ from their expectations of care needed, such as if callers expect same-day appointments but receive after-hours advice from nonclinical call handlers.

LEARNING OBJECTIVE #1: Understand current patient satisfaction data for remote triage services

LEARNING OBJECTIVE #2: Recognize the need for additional patient-reported outcomes research given increased use of remote triage services

POPULATION HEALTH: CLINICAL SNAPSHOT OF MILITARY VETERANS ACCESSING A FEDERALLY QUALIFIED HEALTH CENTER

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BACKGROUND: The Veterans Affairs (VA) and Federally Qualified Healthcare Centers (FQHC) commonly serve rural veterans, but formal partnerships are lacking. This VA/FQHC partnership focused on implementing veteran status screening, mental health (MH) identification, and nurse care coordination (CC) efforts to identify all veterans using both systems. Such data can assist the design of intersystem care coordination.

METHODS: Office of Rural Health (ORH) funded these objectives in the FQHC: 1) standardize a screen for veteran status; 2) implement MH screens; 3) implement CC and information sharing with the VA. The ORH funded nurses actively implemented MH screening and CC for all veterans in the FQHC. Data use agreements and release of information forms allowed analysis of healthcare data for all identified veterans from FY 2018-20 (n=782) for both systems. The subjects were derived from veterans accessing a rural Mid-West FQHC divided into three descriptive samples: 1) 129 veterans using both systems (dual use plus CC), 2) 220 veterans using both systems without CC (dual use minus CC), and 3) 433 veterans only using the FQHC. Clinical and demographic data were extracted from VA and FQHC administrative data files enabling comparisons.

RESULTS: Veterans with dual use plus CC were older (64; 15.5) relative to dual use minus CC (58; 15.3) and FQHC use only (56; 18.1), respectively, and were more likely to be male. Comparing dual-users plus CC to minus CC users revealed 43 VA encounters per unique relative to 65 visits per unique, respectively, but the proportion of unique veterans contributing to a VHA visit were equal (59.7% vs 59.1). Proportions of veterans using VA primary care were lower for dual use plus CC (35.7%) relative to dual use minus CC (47.3%). Also, VA dual use plus CC had a lower proportion of emergency room (ER) use (6.2% versus 15.9%) and lab/imaging (31% versus 47%), relative to dual use minus CC, respectively. Commonly encountered MH diagnoses were similar across the three groups; anxiety disorders 13.2%/17.3/13.4; depression 14%/17/12; substance use 7%/8.6/4.6; for dual use plus CC, dual use minus CC, and FQHC use only, respectively. Diagnoses of obesity (6.2%/10.5/24.9), tobacco use (10.1%/12.3/22.4), and infectious disorders (9.3%/15.9/22.9) differed somewhat across the groups.

CONCLUSIONS: Preliminary data suggests that veterans maintain a relationship with the VA regardless of other care. Dual use plus CC may be associated with lower ratio (VHA visit:unique) relative to dual use minus CC with primary care, ER, and lab/imaging being among those VA services with lower use. These preliminary findings deserve further exploration.

LEARNING OBJECTIVE #1: Improve the readers understanding of rural community and VA partnerships

LEARNING OBJECTIVE #2: Enhance insights into ways that community and VA partnerships can impact Veteran care in rural areas.

PRELIMINARY FINDINGS OF A SHARED DECISION MAKING INTERVENTION TO PROMOTE COLORECTAL CANCER SCREENING DECISIONS DURING THE COVID-19 PANDEMIC

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BACKGROUND: Many colonoscopies were delayed or cancelled due to COVID-19. A large backlog of patients awaits colorectal cancer (CRC) screening, and patients may be interested in non-colonoscopy screening options. We aim to identify how to support patients to make informed decisions about CRC screening.

METHODS: This randomized controlled trial enrolled patients whose screening colonoscopy was cancelled or postponed during the COVID-19 pandemic. Patients were assigned to a usual care control arm or shared decision making (SDM) intervention arm and were mailed a 3-page decision worksheet outlining screening options and called by a trained decision coach. The coach reviewed screening options, addressed questions, and ascertained the patients' screening preference. We summarize the results of the calls and examine factors associated with preferences for CRC screening.

RESULTS: 400 patients were assigned to the intervention arm. Mean age: 61. 54% female. 76% white, non-Hispanic. 89% English-speaking. Coaches reached over half the patients (208/400, 52%) and calls averaged 10 minutes. Most patients recalled receiving the worksheet (164/208, 79%) and reviewing it (127/208, 61%). Table 1 shows screening preferences for reached patients. Men were more likely to prefer **colonoscopy** than women (61% vs 41%, p=0.02, Table 1) and those who preferred **other** were older (M=68, SD=5)

than those who preferred **stool tests** ($M=61$, $SD=8$; $p=0.027$). There was no significant difference in preference by language or race ($p>0.59$).

CONCLUSIONS: A short decision worksheet and brief phone outreach to patients regarding CRC screening options supported patients in decisions. Half the patients preferred colonoscopy and the remainder preferred stool tests or other options. Coaches reported that many patients were thankful for the information. Many patients were previously unaware of stool-based test options. Very few patients had more complex questions that required consultation with a GI specialist. The study will survey patients across both arms to assess attitudes toward CRC screening and will track completion rates of screening within 6 months for all patients.

The SDM intervention may support patients in choosing a CRC screening test that best matches their preferences, identify patients committed to following through with the preferred tests, and address the expanding backlog of patients awaiting colon cancer screening.

LEARNING OBJECTIVE #1: Describe implementation of SDM support for colorectal cancer screening for patients whose colonoscopies were cancelled or postponed during the COVID-19 pandemic

LEARNING OBJECTIVE #2: Review outcomes of SDM intervention for patients who were offered options for CRC screening

PRIMARY CARE (PC) UTILIZATION, PREVENTATIVE SCREENING, AND CONTROL OF METABOLIC SYNDROME (METS) IN NON-ALCOHOLIC STEATOHEPATITIS (NASH) LIVER TRANSPLANT (LT) RECIPIENTS

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BACKGROUND: LT recipients, especially those patients with pre-LT NASH, are at high risk of MetS and its complications post-LT. While many patients are co-managed longitudinally by a transplant team, most preventative screening and management of MetS occurs in the PC setting. This study aimed to evaluate PC utilization by NASH LT recipients as well as preventative screening and control of MetS in this high-risk population.

METHODS: We included adults who underwent LT for NASH or cryptogenic cirrhosis at our institution from January 2010–December 2016, had PC data within the electronic medical record (EMR), and had at least 36 months of follow-up post-LT. We completed a comprehensive review of the EMR to investigate PC utilization (timing and number of visits with Internal or Family Medicine practitioners) and adherence to screening guidelines for MetS and routine health maintenance according to the American Association for the Study of Liver Diseases (AASLD) guidelines. We further evaluated control of hypertension (HTN), obesity, diabetes (DM), and hyperlipidemia (HLD) post-LT. We used Fischer's exact test to explore the association of PC utilization with screening and control.

RESULTS: 37 patients met inclusion criteria and were followed for a median of 53 months (range 38–59) with 542 total PC visits. Only 31.4% of visits were classified as routine visits. Patients had a median of 14 visits post-LT (range 2–38) and the median time to first PC visit was 68 days post-LT. Few patients met AASLD guidelines of DM (3/37, 8.1%), HLD (4/37, 10.8%), skin cancer (3/37, 8.1%), and osteoporosis (9/37, 24.3%) screening post-LT. In the first 36 months of follow-up, 59.5% had HTN control, 45.9% were non-obese, 72.4% had DM control, 59.4% had LDL levels at goal, and 48.4% had triglyceride (TG) levels at goal. PC utilization was not associated with adherence to screening recommendations for DM ($p=0.141$) or HLD ($p=0.398$). Higher PC utilization was associated with uncontrolled TG levels ($p=0.005$), but not with HTN, DM, or LDL control.

CONCLUSIONS: Patients had high rates of PC utilization, though few met AASLD guidelines for preventative screening post-LT. PC utilization was not associated with meeting screening recommendations or control of the majority of conditions associated with MetS. Early identification and treatment of MetS may decrease the risk of morbidity and mortality. More research is needed to assess PC providers' knowledge of AASLD guidelines and to further investigate barriers to screening and management of MetS in this high-risk patient population.

LEARNING OBJECTIVE #1: Describe the rates of PC utilization, guideline directed preventative screening, and control of MetS among a sample of NASH LT recipients.

LEARNING OBJECTIVE #2: Explore if PC utilization is associated with adherence to preventative screening recommendations or control of MetS among a sample of NASH LT recipients.

PRIMARY CARE ACCESS DURING THE COVID-19 PANDEMIC: A SIMULATED PATIENT STUDY

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BACKGROUND: The COVID-19 pandemic has tested the capacity of U.S. primary care practices, which were already experiencing resource constraints and declining visit rates. These strains are concerning, since timely access to primary care is essential in addressing patients' general and COVID-19-specific health needs. With greater threats to and higher demand for primary care, new patients may face barriers to establishing care. We performed a simulated patient study to understand how potential new patients experience access to primary care during the pandemic. We assessed availability and wait times for new patient visits and practice guidance for patients with suspected COVID-19 symptoms.

METHODS: We extracted complete primary care physician (PCP) listings from large commercial insurance networks in four geographically dispersed states between September 10 and 14, 2020 ($n=11,521$). After excluding non-physician providers and removing duplicate phone numbers, we identified 2,705 unique PCP practices, from which we randomly sampled 200 practices in each region. Trained team members made simulated patient calls to practices between September 14 and 28, 2020, posing as new patients seeking either a routine new patient visit or a problem-based visit. The main outcomes were primary care visit availability, median wait times, availability and modality of virtual visits, and guidance to patients suspecting COVID-19 infection. We compiled descriptive statistics of these outcomes in the overall sample, by region, and by condition scenario.

RESULTS: Of 800 practices sampled, 447 (56%) primary care offices were confirmed as reachable using the contact information listed in the provider directories. Among the reachable practices, 84% offered new patient appointments and 25% specifically offered virtual new patient appointments. The median wait time was 10 days (IQR 3–26 days). The most common guidance in case of suspected COVID-19 was clinician consultation, which was offered in 41% of completed calls. Callers were otherwise directed to on-site testing (14%), referred to off-site testing (24%), offered a COVID-19 hotline (8%), or sent to urgent care/emergency department (12%). Only 2% of practices had no guidance to offer. About one-fifth (22%) of practices overall offered COVID-19 testing on-site.

CONCLUSIONS: Despite limited accuracy of patient-facing provider directories, timely primary care visits were largely available for potential new patients among reachable practices. In addition to routine services, most primary care practices provided direct COVID-19 consultation and/or on-site testing. Our results demonstrate the central, active role that primary care practices play in the COVID-19 response. Pandemic mitigation strategies should account for and support the central role of these practices in the community-based pandemic response.

LEARNING OBJECTIVE #1: To quantify access to primary care for potential new patients during the COVID-19 pandemic.

LEARNING OBJECTIVE #2: To understand the central role of primary care in COVID-19 management.

RATINGS OF POPULATION HEALTH MANAGEMENT TOOLS ASSOCIATED WITH DECREASED BURNOUT LEVELS AMONGST VA PRIMARY CARE PROVIDERS

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BACKGROUND: Clinician burnout affects half of United States practitioners and is associated with increased major medical errors, poorer quality of care, and decreased patient satisfaction. Population health management tools embedded in electronic health record systems may streamline clinical workflow to ameliorate clinician burnout. However, higher burnout has been associated with perceived information technology burden. No study has examined the relationship between population health management tools and clinician burnout.

METHODS: We analyzed a Veterans Health Administration (VHA) primary care personnel survey administered between July- September 2018. Responders included primary care providers, registered nurses, clinical associates, clerical associates, social workers, pharmacists, behavioral health providers, and nutritionists (n= 5,803, 17.7% response rate). Responders rated the importance of 10 population health management tools (VHA risk prediction algorithm, hospitalizations and emergency department visits, specific medical and mental health diagnoses, 3 VHA quality dashboards/reports, online case management software, local disease-specific registries, housing instability, and specific prescription medications) on a 3-point Likert scale. We assessed burnout presence with a one-item burnout measure. We conducted bivariate analyses between burnout with each tool, and multivariate analyses with burnout as the outcome and each tool as a predictor.

RESULTS: Lower rates of burnout were associated with higher perceived importance of 10/10 population health tools. 39% of those who rated hospitalization and emergency department visits as “Very Important” for population health management reported burnout, compared to 48% and 59% of those rated this factor as “Somewhat Important” and “Not Important”. 37% of participants who rated the Primary Care Almanac as “Very Important” reported high burnout, compared to 47% and 67% of those who rated it as “Somewhat Important” and “Not Important.” In multivariate analyses controlling for team characteristics and respondent demographics, the lowest burnout rates were associated with a “Very Important” rating for the online case management software (OR =.28 p=.000), 2 VA risk prediction algorithms (OR=.38; p=0.001 for both), and the EPRP quality dashboard (OR=.38; p=0.001).

CONCLUSIONS: Perceived importance of population health tools was associated with lower burnout levels, but the causal direction is unclear. These findings may suggest that use of population health management tools reduces burnout, or that respondents with high burnout are too burned out to use them. Further studies are needed to elucidate this directionality and understand how to engage all primary care team members in using population health tools.

LEARNING OBJECTIVE #1: Understand the association between population health management tool use and provider burnout

LEARNING OBJECTIVE #2: Identify strengths and weaknesses within current practice patterns of population health management tool use and mechanisms to improve their efficacy

REMOTE PHYSICIAN CARE FOR HOME HOSPITAL PATIENTS: A RANDOMIZED CONTROLLED NONINFERIORITY TRIAL

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BACKGROUND: Home hospital care is hospital-level care delivered at home for acutely ill patients who would traditionally be cared for in the hospital. Most home hospital models require a physician or advanced practice provider to see patients physically in the home each day. To our knowledge, the importance of an in-person visit has not been rigorously studied. To further

improve the efficiency and scalability of home hospital care, we tested remote versus in-person physician care.

METHODS: We performed a randomized controlled noninferiority trial comparing remote physician home hospital care (remote arm: initial in-person visit followed by daily video visit facilitated by the home hospital nurse) versus usual home hospital care (control arm: daily in-person physician visit). In the remote arm, although the default was to see a patient by video each day after an initial in-person visit, the physician could choose to see the patient in person if felt to be medically necessary on a given day. With the exception of the physician interaction, patients otherwise received the same home hospital services, including twice daily in-person nurse visits, intravenous infusions, continuous remote monitoring, and point-of-care testing. The primary outcome was number of adverse events using multivariable Poisson regression at a non-inferiority threshold of 0.10. Adverse events included fall, pressure injury, delirium, medication error, and others. Secondary outcomes included 30-day readmission, Picker experience questionnaire (scale: 0-15), and global experience (scale: 0-10).

RESULTS: We enrolled 172 patients (84 remote; 88 control); enrollment was terminated early due to COVID-19. Mean age was 69, 40% were frail, and 22% lived alone. Clinically significant differences between the remote versus control arm included more females (61% vs 52%), fewer Whites (38% vs 52%), and more public insurance (78% vs 61%). The mean adverse event count was 0.060 for remote patients versus 0.034 for control patients, which met non-inferiority (p=0.75). For remote vs control patients, the mean 30-day readmission rate was 9.5% versus 8.0% (p=0.78), the mean Picker score was 13.5 versus 13.8 (p=0.52), and the mean global experience score was 9.5 versus 9.5 (p=0.26). Of patients in the remote arm, 20% required in-person visits beyond the first visit (mean, 1.4 additional visits).

CONCLUSIONS: Remote physician visits were noninferior to in-person physician visits during home hospital care for adverse events, readmission, and patient experience. Importantly, 20% of patients required additional in-person physician visits, suggesting tailoring is crucial. Our findings allow for a more efficient and scalable home hospital approach and have far-reaching implications for acute care delivery.

LEARNING OBJECTIVE #1: Describe the effect of remotely delivered physician care for patients hospitalized at home.

LEARNING OBJECTIVE #2: Describe the frequency of remote versus in-home visits that physicians made to optimally care for a home hospitalized patient.

RESILIENCE AND JOB SATISFACTION AMONG ACADEMIC HOSPITALISTS

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BACKGROUND: Many academic centers struggle with hospitalist retention. The role of an academic hospitalist is poorly defined, merging high clinical demands with vague scholarly expectations. Several institutions have implemented programs for facilitated mentorship and professional development to address job satisfaction and burnout in this group. If such programs are to be effective, hospital leadership must understand the key drivers of dissatisfaction. To identify potential areas of focus for future faculty programming, we surveyed hospitalist faculty to characterize levels of satisfaction, resilience, and scholarship.

METHODS: A web-based survey was delivered to all hospitalist physicians at a single academic medical center. Job satisfaction subdomains were assessed using 5-point Likert-like questions. Responses were treated as interval data and expected values (E) were calculated. Areas of focus were identified by an $E \geq 2.5$, indicating a tendency towards dissatisfaction. Burnout was assessed using validated single item measures for emotional exhaustion (EE) and depersonalization (DP). Grit scores were determined using the 8-item Grit-S scale. Experience was dichotomized; ‘Early-career hospitalists’ had ≤ 2 years since end of residency. Analysis used descriptive statistics and non-parametric or categorical tests. For this exploratory analysis, the threshold for significance was set at $\alpha=0.1$.

RESULTS: The response rate was 76% (34/45). 82% (28) self-identified as academic hospitalists. Most hospitalists reported low burnout; only 9% had high levels of EE or DP. Median grit score for all hospitalists was 3.75 [IQR 3.375-3.875]. On a 100-point scale median satisfaction was 70 [IQR 58-82]. There was no correlation between grit score and job satisfaction score ($r = 0.0048$, $p=0.98$). There was no significant difference in grit scores between experienced vs early-career hospitalists, or academic vs nonacademic hospitalists. There was no difference in satisfaction, grit score, or scholarship by degree of burnout. Four satisfaction sub-domains were identified as areas of focus: "Accomplishments of hospitalists are acknowledged and recognized" [$E=3.36$], "The work I do is valued by the institution" [$E=3.25$], "I feel valued by members of other specialties" [$E=2.86$], and "The physical environment is adequate" [$E=2.64$].

CONCLUSIONS: Most hospitalists reported moderate job satisfaction. The median grit was similar to previous studies involving physicians and was not associated with job satisfaction or scholarship. Not feeling valued or having accomplishments recognized were identified as potential drivers of dissatisfaction. Our data suggest that grit is not associated with factors thought to drive hospitalist retention. Longitudinal monitoring of grit and burnout scores may help understand whether these variables are responsive to intervention.

LEARNING OBJECTIVE #1: Analyze associations between hospitalist job satisfaction and resilience measures.

LEARNING OBJECTIVE #2: Identify potential causes of dissatisfaction among academic hospitalists.

SUCCESSFUL LARGE-SCALE, PRIMARY CARE-BASED HEPATITIS C TREATMENT IN AN URBAN, UNDERSERVED PATIENT POPULATION, 2002-2019

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BACKGROUND: The US is tasked with eliminating hepatitis C (HCV) by 2030 and we are not on target to achieve this goal. Studies demonstrate that non-specialist HCV treatment is safe and effective, and thus support using primary care models to expand access to HCV care. The Grady Liver Clinic (GLC) is a primary care-based HCV clinic that was founded in 2002 at Grady Memorial Hospital, Atlanta's safety-net hospital. The clinic is staffed by general internists with expertise in HCV management. Over the past 18 years, the GLC has expanded its capacity, using a multidisciplinary team, to respond to advances in HCV screening and treatment. This study's objective is to describe the growth and impact of the GLC over time by comparing the number and characteristics of patients treated in the GLC from 2018 – 2019 with those treated in the first five years of the clinic's operations.

METHODS: We performed a retrospective chart review of all patients who initiated HCV treatment in the GLC between January 1, 2018 and December 31, 2019. Charts were abstracted for demographic information, laboratory data, fibrosis staging, and details of treatment. We compared findings to those on the patients treated from 2002 – 2007 (data previously collected).

RESULTS: From 2018 – 2019, 882 patients were initiated on HCV treatment as compared to 113 patients from 2002 – 2007. The mean age of those treated in 2018 – 2019 was 61, 67% were male, 82% were black, 48% were uninsured, and 27% had advanced fibrosis or cirrhosis. All patients in 2018 – 2019 were treated with a direct acting antiviral (DAA). 550 of the 882 patients (62%) completed treatment and were tested for cure, and 534 (97%) were cured. Of the remaining 332 patients, 300 (90%) are awaiting testing for cure and 32 (10%) discontinued treatment. In comparison, the mean age of those treated in 2002 – 2007 was 49, 53% were male, 68% were black, 67% were uninsured, and 31% had advanced fibrosis or cirrhosis. All patients in 2002 – 2007 were treated with pegylated interferon and ribavirin. 80 of the 113 patients (71%) completed treatment and were tested for cure, and 34 (43%) were cured. Of the remaining 33 patients, 21 (64%) discontinued treatment and 12 (36%) were lost to follow up.

CONCLUSIONS: The GLC demonstrated significant growth in treatment capacity from 2018 – 2019 as compared to 2002 – 2007. In addition, cure rates

increased significantly as would be expected with the use of DAAs. Building on a successful primary care-based treatment model, the GLC was able to respond to the changes in HCV screening and treatment guidelines that have occurred over the past 18 years. The Grady Liver Clinic serves as a model of primary care based HCV care that is on track to achieve microelimination of HCV in a health system serving an underserved patient population.

LEARNING OBJECTIVE #1: Describe a successful model of primary care-based hepatitis C care in an underserved patient population.

LEARNING OBJECTIVE #2: Describe changes over time in hepatitis C treatment outcomes in a primary care-based hepatitis C clinic.

TELEMEDICINE PERSPECTIVES OF CLINICIANS IN THE DEPARTMENTS OF MEDICINE AND PEDIATRICS: AN OBSERVATIONAL CROSS-SECTIONAL STUDY

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BACKGROUND: While prior studies have found patients are satisfied with video visits, few have explored both specialty and primary care clinician perspectives on telemedicine. Given telemedicine's rapid and wide adoption post-COVID-19, understanding organizational department-wide clinician perceptions can help improve the virtual medicine experience.

METHODS: In July 2020, we administered a 54-question electronic survey to assess the experiences of clinicians [physicians and advanced practice providers (APPs)] in two departments [Medicine (DOM) and Pediatrics (DOP)] at an urban academic teaching hospital. The survey assessed satisfaction, burnout, barriers, impact on clinical workflow, training and support needs. For teaching clinicians, a subset of questions asked about preceptor experiences.

RESULTS: Overall response rate was 39% [200/517, DOM 42% (135/325), DOP 34% (65/192)]; most respondents were physicians [DOM 74% (100/135), DOP 79% (51/65)]. Nearly a third reported that it took longer to prepare for (33%, 65/200), conduct (32%, 64/200) and document (25%, 49/200) video visits compared to in-person visits.

Over half reported they were able to engage in shared decision making (83%) and personally connect with patients (59%) as well or better via video compared to in-person visits. Similarly, over half reported shared decision making (52%) and their personal connection with patients (65%) was better via video compared to phone visits.

Female clinicians felt "more overwhelmed" with video visits than males (32% vs 19%, $p=0.05$), and clinicians who were >50 years of age were "less overwhelmed" than those younger than 50 (35% vs. 20%, $p=0.04$). Clinicians under 50 also reported higher baseline burnout compared to those over 50 (47% vs 33%, $p=0.04$).

The top three telemedicine barriers were patient-related barriers: patient lack of technology access, skill and general reluctance to engage in virtual visits. Training needs focused on integrating learners into workflows and open-ended responses highlighted need for increased support staff before and during visits.

Overall, more than half enjoyed conducting video visits (60%, 119/200), thought its benefits outweigh negatives (69%, 137/200), and wanted to continue using video visits in future (75%, 150/200).

CONCLUSIONS: Despite overall positive telemedicine experiences, barriers to effective telemedicine use included insufficient staff support, patient technology literacy and access, and difficulty integrating trainees into video visits. Further work should explore why female and younger clinicians are more overwhelmed with telemedicine. Creative solutions to overcome barriers and enhance training are needed to support telemedicine's durability and ensure quality clinician, patient and trainee learning experiences.

LEARNING OBJECTIVE #1: Understand clinician perspectives on virtual visits to improve efficiency of telemedicine delivery and reduce burnout.

LEARNING OBJECTIVE #2: Understand barriers to telemedicine, with a focus on clinician-patient relationships and shared decision making.

THE ASSOCIATION BETWEEN BUNDLED PAYMENT PARTICIPATION AND CHANGES IN MEDICAL EPISODE OUTCOMES FOR SAFETY-NET HOSPITALS

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BACKGROUND: Under Medicare's Bundled Payments for Care Improvement (BPCI) program, hospitals have maintained quality and achieved savings for medical episodes. However, safety-net hospitals may not achieve these benefits due to unique organizational challenges. Little is known about how hospital safety-net status affects the association between BPCI participation and outcomes for medical condition episodes.

METHODS: We used 2011-2016 Medicare claims and generalized linear models to conduct a difference-in-differences analysis among Medicare fee-for-service beneficiaries admitted for four medical conditions (acute myocardial infarction, pneumonia, congestive heart failure, chronic obstructive pulmonary disease) at BPCI vs Non-BPCI Hospitals. Our exposure was the interaction between BPCI participation and safety-net status, with hospitals in the top quartile of Disproportionate-Share Hospital payments nationwide defined as Safety-Net and all others defined as Non-Safety-Net. The primary outcome was 90-day total episode spending, with secondary utilization (discharge to institutional post-acute providers, discharge home with home health (HH), and skilled nursing facility length of stay [SNF LOS]) and quality (mortality, readmissions) outcomes.

RESULTS: Our sample consisted of 803 Safety-Net and 2,263 Non-Safety-Net Hospitals, with Safety-Net Hospitals tending to be larger and located in areas with larger populations and more low-income individuals. Among BPCI Hospitals, Safety-Net and Non-Safety-Net Hospitals did not exhibit differential changes in total episode spending (adjusted difference-in-differences [aDID] \$40, 95% CI -\$254 to \$335, $p=0.79$), but Safety-Net Hospitals had differentially greater discharge to institutional post-acute care providers (aDID 1.1 percentage points, 95% CI 0.37 to 1.8 percentage points, $p=0.002$) and lower discharge home with HH (aDID -1.2 percentage points, 95% CI -1.7 to -0.58 percentage points, $p<0.001$). There were no differential changes in other secondary outcomes, including SNF LOS (aDID 0.32 days, 95% CI -0.04 to 0.67 days, $p=0.08$).

CONCLUSIONS: Although safety-net status did not affect financial outcomes under medical condition bundles, safety-net hospitals had differential increases in discharge to institutional post-acute care providers – a pattern that differed from the well-established bundled payment strategy of reducing discharge to such providers. This dynamic may reflect differing patient populations served by safety-net and non-safety-net hospitals and highlight challenges that safety-net hospitals face in redesigning care in response to bundled payments.

LEARNING OBJECTIVE #1: Describe how hospital safety-net status impacts the association between medical condition bundled payment participation and outcomes

LEARNING OBJECTIVE #2: List three policy implications of the effect of hospital safety-net status on the relationship between medical condition bundled payment participation and outcomes

THE IMPACT OF THE COVID-19 PANDEMIC AND STAY-AT-HOME ORDER ON HOSPITAL ADMISSIONS IN A RURAL HOSPITAL

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BACKGROUND: The COVID-19 pandemic has placed an unprecedented demand for healthcare on hospital systems worldwide. Multiple studies have

reported on how the pandemic has impacted hospital admissions of large healthcare systems and population centers. However, 20% of people in the USA obtain their healthcare from a rural hospital. California issued a stay-at-home order on March 18, 2020. We examined the impact of COVID-19 and the stay-at-home order (lockdown) on hospital admissions of a rural community hospital.

METHODS: We performed a retrospective, observational analysis of the top ten diagnoses for admission to Sierra Nevada Memorial Hospital, a 104-bed hospital in Grass Valley, CA. We divided the 2020 data into four time periods: January 1-March 18 (pre-lockdown), March 19-May 15 (lockdown), May 16-July 31 (post-lockdown), August 1-Sept 30 (prior to second wave). Using these parameters, we looked at which cases had the highest variance and how this data compared to that of the previous year (2019). We also analyzed demographic and length of stay data.

RESULTS: Overall hospital admissions decreased 39% during the lockdown as compared to the pre-lockdown period and 29% reduction over same time period in 2019. Admission levels returned to 2019 levels in the post-lockdown time periods. The admission diagnoses that declined the most during the lockdown were: acute kidney failure (-80%), pneumonia (-76%), multi-organ failure (-64%), alcohol withdrawal (-50%), vaginal live births (-42%), sepsis (-36%), heart disease/CHF (-22%). All diagnoses returned to their seasonally adjusted pre-lockdown rates of admission except pneumonia which remained at a -52%, and admissions for alcohol dependency which increased by 37% compared to pre-lockdown levels. Fewer patients >65yo were admitted during lockdown (-8.5%). No change in length of stay or other demographic trends were noted.

CONCLUSIONS: Hospital admissions universally declined during COVID-19 lockdown as expected. Patients over 65yo were not admitted as frequently. All diagnoses returned to expected seasonally adjusted baselines except for pneumonia, which remained lower than expected. This may be due the fact that patients were reluctant to come to the hospital for fear of contracting the virus, or a possible decrease in respiratory infections due to public health measures. Alcohol related admissions increased substantially after the lockdown. This may be due to the emotional, social, economic and psychologic impact of a quarantine and lockdown. Whether these trends continue during the current surge in COVID-19 infections warrant further investigation.

LEARNING OBJECTIVE #1: Patient care: Analyze hospital admissions to determine which diagnoses are affecting patients' health care during the COVID-19 pandemic.

LEARNING OBJECTIVE #2: Systems-Based Practice: Understand the effects of a pandemic and lockdown on a rural hospital's ability to deliver high quality care.

THE SUCCESS OF AND BARRIERS TO REMOTE TELEMEDICINE ENROLLMENT: LESSONS LEARNED DURING THE NYC COVID-19 PANDEMIC

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BACKGROUND: Telehealth drastically reduces the time burden of appointments and increases access to care for homebound patients. During the COVID-19 pandemic, many outpatient practices closed, requiring an expansion of telemedicine capabilities. However, numerous patients, including those admitted to hospitals, were not yet connected to telehealth-capable patient portals. No literature exists on the success of and barriers to remote enrollment in telehealth portals.

METHODS: From March 26 to May 8, 2020, a total of 324 patients were discharged from Mount Sinai Beth Israel (MSBI), a teaching hospital in NYC. During this period, lists of patients anticipated to be discharged within 48 hours were sent to student volunteers daily. The volunteers attempted to contact and enroll patients in a patient portal (MyChart) to allow the completion of a post-

discharge video visit. If patients were unable to enroll, barriers were documented and coded for themes.

After May 8, 2020, MyChart activation transitioned to one that happened in-person. Specifically, patients were approached in their hospital room by Medical Office Specialists, who completed activation at the bedside. We hypothesized in-person rates would fare better compared to remote.

RESULTS: Of the 324 unique patients discharged from MSBI during the first study period, 277 (85%) were not yet enrolled in MyChart. Volunteers successfully contacted 136 patients (49% of those eligible), and 39 (14%) were successfully enrolled in MyChart. Inability to contact patients was the most significant barrier. For those successfully contacted but not enrolled, the most frequent barrier was patients becoming lost to follow-up (29% of those contacted), followed by lack of interest in remote appointments (21%) and patient technological limitations (9%).

Once the project transitioned to an in-person initiative, data was collected from 434 unique discharges. Of these discharges, 52 patients were successfully enrolled in MyChart during the study period (12%) and 60 patients were already enrolled in MyChart prior to their hospitalization stay (14%). Additionally, 124 patients expressed interest and were given an activation code to enroll in MyChart at a later date (29%). Outreach was unsuccessful for the remaining 198 patients (46%), as they were either discharged or deceased prior to contact, uncommunicative, or uninterested in the portal.

CONCLUSIONS: Telehealth is critical for healthcare delivery—a fact that became particularly evident during a pandemic that restricted in-person visits. Despite our initial hypothesis, the data suggests that enrollment in a telemedicine-capable patient portal was feasible, and in fact, perhaps more effective than in-person MyChart enrollment.

LEARNING OBJECTIVE #1: Patient Care: Continuously advocate disease prevention, wellness, and promotion of healthy lifestyles, including a focus on population health.

LEARNING OBJECTIVE #2: Systems-Based Practice: Actions that demonstrate a responsiveness to the larger context of the healthcare system to provide care that is of optimal value.

USING GEOGRAPHIC AND CLINICAL DATA TO RECRUIT VETERANS TO A COMMUNITY-BASED DISEASE PREVENTION PROGRAM

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BACKGROUND: Although cardiovascular disease (CVD) is the leading cause of mortality, CVD risk factors remain sub-optimally controlled and disproportionately affect minority and low-income populations. We describe a novel strategy using patient-level geographic information systems (GIS) data to identify areas of highest CVD risk to recruit participants for an ongoing study of a CVD risk reduction intervention: Veteran peer Coaches Optimizing & Advancing Cardiac Health (Vet-Coach).

METHODS: We linked addresses in Veterans Health Administration administrative and clinical data for Veterans enrolled in VA Puget Sound Primary Care and Women's Health Clinics to data from the 2010 Census Tract Boundary file to identify geographic clusters of Veterans with a diagnosis of hypertension. We used the 2006–2010 U.S. Census Bureau American Communities Survey to characterize census tracts where Veterans reside. We targeted 60 census tracts (from all 398 in King County) with the highest hypertension prevalence rates in our patient population to recruit Veterans with a hypertension diagnosis and at least one blood pressure reading >150/90 mmHg in the past year. A baseline enrollment visit included 3 blood pressure measurements and survey that included demographic data. Mean blood pressures were categorized as normal [systolic blood pressure (SBP) <120 mmHg, diastolic blood pressure (DBP) <80 mmHg], elevated [SBP 120–129 mmHg, DBP <80 mmHg], hypertension stage 1 [SBP 130–139 mmHg, DBP 80–89 mmHg], and stage 2 & above [SBP ≥140 mmHg, or DBP ≥90 mmHg].

RESULTS: The prevalence of hypertension diagnosis in the selected census tracts ranged from 28–65%. Based on census data, compared to other King County census tracts, targeted census tracts had higher rates of poverty [32% vs. 22%, $p<0.001$] and percentage of non-white residents [49.4% vs. 33.8%, $p<0.001$] than census tracts that were not targeted. We recruited 263 Veterans and asked participants to self-report their racial identity and gender at baseline. Our study population is: 57% white ($n=151$), 34% black ($n=89$), 9% Native American ($n=23$), 13% other ($n=34$); 13% of the population are women ($n=35$). Participants reported low income (<40K per year, $n=116$, 44%), and were either retired ($n=96$, 37%) or employed ($n=100$, 38%). The mean blood pressure was 136/81 mmHg and blood pressure categories were identified as 14% ($n=37$) elevated, 42% ($n=110$) stage 1 hypertension, and 27% stage 2 hypertension & above ($n=69$).

CONCLUSIONS: We successfully used geo-coded clinical and administrative data to identify areas with high prevalence of hypertension. These data were used to recruit a diverse population and develop a peer support program focusing on CVD prevention. GIS mapping is a reproducible method that could be adopted by other health systems to target services to disadvantaged communities.

LEARNING OBJECTIVE #1: System based practice: Summarize a strategy to recruit high risk patients in primary care.

LEARNING OBJECTIVE #2: System based practice: Understand the use of patient-level GIS data to identify high risk areas.

VARIATION IN PREVENTABLE EMERGENCY DEPARTMENT UTILIZATION AMONG HIGH-COST HIGH-NEED MEDICAID BENEFICIARIES

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BACKGROUND: High-cost high-need patients in Medicaid are heterogeneous and previous analyses have identified subgroups through an unsupervised cluster analysis of a multi-state sample of patients eligible for a complex case management program. Patients eligible for this program, led through a major health insurer, represent 40% of all adult Medicaid beneficiaries. The subgroups were: 1) women experiencing pregnancy complications, 2) patients with behavioral health conditions, 3) high-cost patients with relatively few conditions, 4) patients with cardiometabolic disease, and two groups of patients with complex illness with 5) relatively low resource use and 6) relatively high resource use. Our goal was to examine the proportion of each subgroups' emergency department (ED) utilization that was preventable.

METHODS: Patients with continuous eligibility for 12 months were included ($N=484,328$). Program eligibility criteria were: 1) age 21 or older, 2) top 5 percent of overall cost of care, 3) predicted to persist in the top 5 percent of cost of care in following 12 months. We used the NYU/Billings algorithm to classify ED visits by level of preventability based on primary ICD code, first assigning ED visits a probability of being emergent or not, then as preventable or not. Those visits considered both emergent and not preventable we report as 'ED not preventable', and the visits either non-emergent or emergent but treatable by primary care or preventable we report as 'ED preventable'. ED visits with a primary discharge code for alcohol or substance use, injuries, or behavioral health are considered not classifiable. We report a category of 'unclassifiable' ED use combining alcohol and substance use, injury, and behavioral health ED care with visits with primary discharge codes new since the algorithm was developed.

RESULTS: Overall mean ED utilization varied from 2.9 visits to 14.7 visits per year by subgroup (Table 1). The proportion of preventable ED visits varied by subgroup from 46–52% (Table 1).

CONCLUSIONS: Subgroups of high-cost high-need Medicaid beneficiaries utilize ED care at widely varying rates. While there is wide variation in ED utilization by subgroup, the proportion of preventable ED utilization is large

and stable across subgroups. These findings can help inform development and testing of tailored interventions to help reduce ED utilization among subgroups of high-cost high-need Medicaid beneficiaries.

LEARNING OBJECTIVE #1: Describe novel subgroups of high-cost high-need Medicaid beneficiaries derived from cluster analysis

LEARNING OBJECTIVE #2: Quantify the proportion of total ED utilization that is preventable among subgroups of a high-cost high-need Medicaid population

VETERAN IMPRESSIONS OF BEDSIDE INTERDISCIPLINARY ROUNDS

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BACKGROUND: Patient autonomy, whole-person care, and communication between healthcare team members are important determinants of patient experience. Bedside interdisciplinary rounds (IDR) are a strategy to practice shared decision making and engage patients in their care. In this study, we sought to understand Veteran patient experiences with a novel bedside IDR structure that was implemented on Rocky Mountain VAMC acute care units in June 2019. **METHODS:** We interviewed hospitalized veterans who participated in bedside IDR on acute care wards at Rocky Mountain VAMC. We conducted qualitative semi-structured interviews about experiences with bedside IDR. Interviews lasted 30-45 minutes, were audio-recorded and transcribed verbatim. We performed thematic analysis to identify key themes.

RESULTS: We interviewed 14 hospitalized Veteran patients between January and March 2020. We discovered several themes about bedside IDR: 1) interdisciplinary team communication, 2) communication with patients, 3) value added by bedside rounding and 4) comfort with bedside rounding. Veterans reported that bedside IDR was important for both care coordination and shared decision making for the interdisciplinary team. One veteran said: "Each [team member] either asked questions or gave their part of the analysis of the problem and it looks like they've decided to go ahead [with a shared plan]." With respect to communication with patients, several Veterans expressed that bedside IDR focused on them: "They talk to you and recognize that you're part of the solution, not just saying 'Your views don't matter.'" The biggest obstacle to patient communication was medical jargon, which patients described as both disengaging and scary. Lack of expectation-setting about the goals of rounds and lack of clarity about the plan also detracted from bedside communication. One patient said: "I don't understand half of it...And they very seldom give you a straight answer." When discussing value added by bedside IDR, veterans named reassurance, opportunity to ask questions and be listened to, a feeling of respect, and ability to build trust with those caring for them. One veteran described his physician: "She was talking to all them but she always was looking at me. It was like, I can talk to her. ...I know she's on my team." Most veterans felt comfortable with bedside IDR; things that caused unease were unclear care plans and technical language, and focus on "only the medical stuff and not the whole person".

CONCLUSIONS: Inpatient Veterans described that bedside IDR served a crucial role in healthcare team care coordination and in the creation of a shared mental model of care. Bedside IDR provided reassurance, built trust and respect, and provided opportunities to ask questions and offer input. The use of technical and vague language disengaged Veterans and threatened these positive experiences.

LEARNING OBJECTIVE #1: Understand hospitalized Veteran experiences with bedside IDR

LEARNING OBJECTIVE #2: Understand key communication challenges for Veterans during bedside IDR

WHOLE PERSON CARE TRANSITIONS OF CARE PROGRAM: EVALUATING A SAFETY-NET SYSTEM'S ROLE IN REDUCING ACUTE CARE UTILIZATION AND INCREASING PRIMARY CARE

USE FOR MEDICALLY HIGH-RISK INDIVIDUALS IN LOS ANGELES COUNTY

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BACKGROUND: Medically high-risk patients face barriers to care continuity, primary care access, and as a result, contribute to a high societal cost and increased health disparities. Among vulnerable patients in the safety net, these barriers can be compounded by factors such as language incongruence, housing instability, mental illness, and substance use disorder. The Whole Person Care (WPC) Transitions of Care (TOC) program provides 30-day intensive care management upon hospital discharge for medically high-risk patients in the safety net, who are supported by community health workers who engage patients in the hospital and link them to primary care, behavioral health, and social services. We evaluated the efficacy of WPC TOC in reducing acute care utilization and increasing primary care use.

METHODS: Demographic and utilization data were pulled from administrative data across WPC institutions, including LAC Department of Health Services (DHS) and Mental Health (DMH), and two Medicaid Managed Care organizations. Emergency department (ED), inpatient (IP), and primary care (PC) utilization 12 months post enrollment in TOC were analyzed using Generalized Linear Mixed Modeling, adjusting for age, gender, Charlson comorbidity score and utilization 12 months prior to TOC enrollment. Adjusted rates of any health utilization visit 12 months pre and post-TOC enrollment were computed using Least Square Mean values post-hoc. Primary care visits within 14 and 30-days of TOC enrollment were also calculated.

RESULTS: The analytic sample included 326 participants with complete data from May 2017 to March 2018. Mean age was 51 years (SD=12.3), 62% were male, 28% Hispanic/Latinx, 37% homeless, 57% had hypertension, 34% had diabetes, and 31% of participants had a primary care visit within 30 days of enrollment. Primary care utilization increased from 57% to 73% ($p<=0.001$) following TOC enrollment, inpatient visits decreased from 96% to 67% ($p<=0.001$) and ED visits decreased from 93% to 75% ($p<=0.001$).

CONCLUSIONS: Although this study is not a randomized controlled trial, these data reflect a decrease in acute care among medically high-risk patients and increased linkage to primary care and social services following hospital discharge. This program highlights the need for patient-centered care which addresses immediate basic needs, provides social support, improves care continuity, and reduces acute care utilization.

LEARNING OBJECTIVE #1: To evaluate a community health worker (CHW) approach in improving patient engagement in care (aligns with learning objective one)

LEARNING OBJECTIVE #2: To evaluate the intervention's effectiveness in comprehensively addressing the medical and health-related social needs of complex patients (aligns with learning objective 6)

"I FEEL I'M GIVING UP SOMETHING BENEFICIAL...": PERSPECTIVES ON TELEMEDICINE FROM THE SAFETY-NET

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BACKGROUND: The COVID-19 pandemic has triggered unprecedented expansion of outpatient telemedicine encounters. Public health systems generally serve low-income, racially/ethnically/linguistically diverse populations, many of whom also face barriers to digital health access. As telemedicine becomes a standard mode of care, it is vital that a range of perspectives informs ongoing implementation efforts to avoid increasing inequity. Thus, we conducted a qualitative study sampling patients from a wide range of clinical settings in a safety-net health system.

METHODS: We performed a descriptive qualitative analysis of semi-structured interviews with 25 participants recruited from the primary care, obstetrics, & pulmonary clinics in the San Francisco Health Network between March & July 2020. We sampled for multiple languages in 3 specialties to obtain a range of perspectives. All were interviewed in their preferred language. Interviews explored a theoretical framework of acceptability of telephone or video visits. Interviews were transcribed in English. Open coding was performed to allow for novel ideas to emerge.

RESULTS: Participants represented a broad range of spoken language (52% non-English-speaking), age (range 20s-70s), race/ethnicity (24% Asian, 20% Black, 44% Hispanic/Latinx, 12% White), & smartphone use (80% daily, 20% weekly or less). All but 2 had experienced a telemedicine visit with a clinician (87% telephone). Most participants expressed that telemedicine visits fulfilled their medical needs, were convenient (decreased wait, travel, & missed work time), & felt satisfied with their telemedicine care. However, most still preferred in-person visits, with some expressing that human interaction was inherently valuable: "Yes, that can be handled by video or telephone but I feel to an extent that I'm giving up something beneficial for my health by not seeing the providers in person" (phone visit patient). Those with strong preference against telemedicine visits expressed concern that tele-visits relied on patients' abilities to monitor their own health, recognize problems, & describe problems accurately, which they felt unqualified to do: "It's different to have a doctor check you & assess you based on what's physically going on with you & hearing these things & seeing it himself than for you to try to explain" (video visit patient).

CONCLUSIONS: Almost all participants were accepting of telemedicine but most still preferred in-person care. A reason for this preference was lack of confidence in monitoring their own health. Thus, future research should explore how patient self-efficacy & health literacy relate to comfort with telemedicine. It is unknown if these perspectives would change with higher rates of video visits.

LEARNING OBJECTIVE #1: To describe underrepresented patients' preferences regarding telemedicine implementation in primary care, obstetrics, & a specialty care setting

LEARNING OBJECTIVE #2: To contribute a broad range of patient perspectives to inform the implementation of telemedicine programs for diverse populations

Scientific Abstract - Health Equity and Social Determinants of Health

ADDRESSING NEEDS AND BARRIERS TO TREATMENT THROUGH SECURE MESSAGING IN A SMARTPHONE APP FOR PATIENTS LIVING WITH HIV

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BACKGROUND: Patients living with HIV (PLWH) face barriers to care and unmet social needs, which can negatively impact engagement in care and viral suppression. PositiveLinks (PL) is a mobile health intervention promoting linkage to and retention in HIV care. Through the PL app, PLWH access medication adherence, mood, and stress tracking; appointment reminders; labs; a community message board; and a secure messaging (SM) portal to

communicate with their care team outside of the clinic. Previous analysis of PL showed that PLWH used SM to discuss social needs and barriers to treatment with their providers. This study evaluates the role of SM in addressing participant-reported barriers and needs.

METHODS: Participants completed a clinic-created Barriers to Treatment questionnaire at baseline and 6 months post-enrollment to evaluate basic needs and barriers to care, including the presence or absence of distrust of the medical system. Messages exchanged in the SM portal from 2016 to 2017 were coded for content (e.g. social needs) and subtopics (e.g. difficulty with insurance). Messages were coded by two team members with discrepancies resolved by consensus. The codebook was refined until high reliability was achieved. Patients were stratified by (1) use or non-use of SM related to social needs and (2) changes to reported barriers or needs. We compared groups using Fisher's Exact T-tests.

RESULTS: Participants (n=87) enrolled in PL from 2016 to 2017. 49 were excluded from analysis due to missing questionnaire data. The remaining 38 participants included 20 men, 16 women, and 2 transgender women. Mean age was 43.8 years (SD 10.9) and 31 were non-white. Of the 144 messages related to social needs, participants most often discussed insurance issues (37%), transportation (28%), ancillary service coordination (20%), scheduling assistance (22%), and housing issues (18%). Many messages addressed multiple topics. Participants who discussed social needs or insurance issues showed a significant decrease in distrust of the medical system after 6 months ($p=0.01$ and $p<0.01$, respectively). We did not find significant changes to overall barriers to care or basic needs.

CONCLUSIONS: PL participants who engaged in SM showed a decrease in their distrust of the medical system. Other barriers and needs are likely multifactorial and may require intervention beyond SM. Our study reflects the importance of a low-barrier, patient-generated means of communication in building relationships with care providers, further highlighting the important role of case managers who can assist with non-medical needs in the care of PLWH. SM enables PLWH to address barriers to care and needs with their providers, while also alerting the care team to problems requiring larger-scale solutions.

LEARNING OBJECTIVE #1: Identify reasons patients use mobile health interventions to contact providers.

LEARNING OBJECTIVE #2: Identify the potential for secure messaging to address barriers to treatment and social needs.

ALLOSTATIC LOAD, METABOLIC SYNDROME AND SELF-RATED HEALTH IN NON-HISPANIC WHITES, NON-HISPANIC BLACKS, AND MEXICAN AMERICANS ADULTS

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BACKGROUND: Allostatic load (AL) and metabolic syndrome (MetS) are concepts describing the long-term effect of exposure to chronic stress and the comingling of cardiometabolic risk factors, respectively. AL is a summary index of the cumulative burden resulting from the body's adjustment to the physiological dysregulations over time and defines body "wear and tear." Only a few studies focus on the relationship between MetS and physiological dysregulations defined by h₁ALS. Unfortunately, many of these studies are restricted to small samples, with relatively little attention is paid to the effect of MetS on racial/ethnic differences in AL. The aim of this study is to examine the associations between metabolic syndrome (MetS), high allostatic load score (h₁ALS) and self-rated poor health status in non-Hispanic White (NHW), non-Hispanic Black (NHB), and Mexican American (MA) adults.

METHODS: The 2015-16 and 2018-18 US National Health and Nutrition Examination Survey data (n=4403) were used for this study. Odds ratio from multivariable logistic regression analysis was used to examine the association between MetS, h₁ALS, and self-rated poor health status, adjusting for age, education, gender, income, lifestyle behaviors, and marital status.

RESULTS: The rates of MetS in NHW, NHB and MA participants with h₁ALS were 56.9%, 58.8%, and 51.9%, respectively ($P < 0.05$). The

corresponding rates for self-rated poor health status were 26.7%, 31.9%, and 46.5%, respectively. h_ALS (OR=2.02; 95% CI: 1.54-2.65) and MetS (OR=1.68; 95% CI:1.32-2.16) were independently associated with increased odds of self-rated poor health status. MetS was associated with 9.03 (95% CI: 6.23-13.05), 20.30 (10.95-37.71), and 5.78 (95% CI: 3.34-10.63) increased odds of h_ALS in NHW, NHB, and MA, respectively. An increase in age was found associated with 1.02 (95% CI: 1.01-1.03), 1.02 (95% CI: 1.00-1.04), and 1.03 (95% CI: 1.02-1.04) increased odds of h_ALS in NHW, NHB, and MA, respectively.

CONCLUSIONS: This study presents some evidence of metabolic syndrome as a potential risk factor for body wear and tear. The effect of metabolic syndrome on body wear and tear was much more pronounced in non-Hispanic Blacks than non-Hispanic Whites and Mexican Americans. Thus, suggesting the need for race/ethnic-specific interventions tailored toward metabolic syndrome awareness. Race/ethnic-specific lifestyle interventions, including patient education regarding the deleterious effect of weight gain and smoking may help to mitigate the impact of metabolic syndrome and self-reported poorer health including body wear and tear.

LEARNING OBJECTIVE #1: To understand the contribution of metabolic syndrome (MetS) to racial/ethnic differences in allostatic load

LEARNING OBJECTIVE #2: To examine the associations between metabolic syndrome (MetS), high allostatic load score (h_ALS) and self-rated poor health status in non-Hispanic White (NHW), non-Hispanic Black (NHB), and Mexican American (MA) adults.

A MULTI-SITE MIXED-METHODS STUDY OF DE-IMPLEMENTING RACE-BASED EGFR REPORTING

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BACKGROUND: Kidney function is calculated using estimated glomerular filtration rate (eGFR) equations, which include a “Black race” variable. The validity and appropriateness of including race, a social construct, has been questioned due to delays in kidney care for Black patients that may occur when using higher race-based eGFR values. At 5 large academic medical centers that de-implemented race-based eGFR, we sought to 1) assess health professionals’ perspectives on the change process and 2) examine reclassification of patients’ kidney function.

METHODS: We conducted interviews of key stakeholders between September 2020 and January 2021 using a semi-structured interview guide based in the Equity Based Framework for Implementation Research (EquIR). Interviewees were identified using snowball sampling of change champions at each institution. Interviews were coded for overarching themes. We extracted electronic health record data on self-identified Black patients seen in the outpatient setting within the past 2 years, obtaining creatinine, age, and sex. We recalculated eGFR without race, and identified patients who newly crossed clinically relevant thresholds of eGFR < 60 (reduced kidney function), 30 (medication dosing considerations), and 20 ml/min (eligibility for transplant evaluation).

RESULTS: We interviewed 25 key stakeholders, including physicians (76%), medical and graduate students (12%) and medical residents (12%). Ongoing thematic coding includes perceptions, change

motivation, barriers, facilitators, key stakeholder engagement, change strategies and characteristics, implementation process, dissemination strategies, lessons learned, and future directions. Most interviewees reported structural racism as a barrier to change; for example, “People have been so willing to accept that Black people and only Black people are different from every other human being on the planet for all of this time...that says a whole lot more about our history around race in this country than ... legitimate science.” At one site, removal of race from the eGFR calculation reclassified 8.1% (2,606 of 32,141) Black patients into more severe kidney disease – 2,198 (6.8%) to eGFR <60; 269 (0.8%) to eGFR <30; and 139 (0.4%) to eGFR <20 ml/min. Of 2,198 patients reclassified to eGFR <60 ml/min, 46.9% were under age 60. Analyses of eGFR reclassification is ongoing at 4 sites.

CONCLUSIONS: Qualitative evaluation can identify important considerations in institutional de-implementation of race-based eGFR. Eight percent of Black patients were reclassified with more severe kidney function with removal of race from eGFR, with frequent reclassification of younger patients. Critically studying de-implementation of the race variable provides insight into efforts of large academic institutions to improve health equity and decrease bias in clinical algorithms.

LEARNING OBJECTIVE #1: Evaluate the potential impact of de-implementing race-based eGFR on patient care

LEARNING OBJECTIVE #2: Describe communication skills/strategies used in de-implementing race-based eGFR

AN UNEXPECTED RISE IN ATTENDANCE FOR HOSPITAL FOLLOW-UP VISITS DURING COVID-19 PANDEMIC AMONG MEDICARE POPULATION

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BACKGROUND: Post-hospital follow-up visits are important in reducing readmissions and in improving continuity of care in medically complex patients. However, these clinic visits can have low attendance. With the COVID-19 pandemic, there is concern that at-risk populations, particularly older adults or patients with multiple comorbidities, are even less likely to attend these visits. The goal of our retrospective study was to determine the impact of COVID-19 on hospital follow-up visits and to identify factors associated with clinic attendance.

METHODS: We conducted an observational study using electronic health record data from two university system-based internal medical practices that see predominantly underserved populations. All patients (≥ 18 years of age) scheduled for a post-hospital follow-up visit between 01/2018 and 10/2020 were eligible to be included. We compared hospital follow-up visit completions from before the COVID-19 pandemic (01/2018- 02/2020) to during the pandemic (07/2020- 10/2020). Given the large variability in follow-up visits that were scheduled early in the pandemic, we excluded visits from 03/2020- 06/2020. Our primary outcome was the proportion of post-hospital follow-up visits that were completed. We evaluated differences in visit completions based on patient and clinical characteristics, including age, gender, race/ethnicity, insurance, primary language, marital status, patient portal activation, having an established primary care physician, and use of telehealth. We performed bivariate analysis for differences in the completion rates using chi-square tests.

RESULTS: We studied a total of 7,818 scheduled hospital follow-up visits, of which 6954 were within the pre-COVID-19 era and 864 during the pandemic. We found no overall difference in the proportion of completed hospital follow-up visits between the two periods (42% for pre-COVID-19 and 43% for during COVID-19, $p=0.4$). However, there was a significant increase in the percentage of completed hospital follow-up visits among individuals insured by Medicare during the COVID-19 pandemic (53% vs. 46% pre-COVID-19, $p=0.02$). Interestingly, this difference disappears ($p=0.19$) when all telehealth visits are excluded from the analysis. No significant effect was seen when comparing completion rates by patient’s age, race/ethnicity, preferred language, marital status, patient portal status, or by established PCP.

CONCLUSIONS: We found that patients with Medicare were significantly more likely to attend a hospital follow-up visit during the COVID-19 pandemic than prior to the pandemic. The rapid integration of telehealth visits may have led to the increase in clinic attendance. This finding warrants further investigation as there may be utility of telemedicine beyond the pandemic, including for older adult and Medicare populations.

LEARNING OBJECTIVE #1: Determine the impact of the COVID-19 pandemic on attendance to hospital follow-up visits

LEARNING OBJECTIVE #2: Identify patient characteristics associated with hospital follow-up visit completion

A QUALITATIVE EVALUATION OF HEALTH COACHING, TEXT MESSAGING, AND EDUCATIONAL INTERVENTIONS TO IMPROVE SELF-CARE AMONG AFRICAN AMERICAN ADULTS WITH UNCONTROLLED DIABETES

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BACKGROUND: Limited qualitative research has evaluated promising patient-centered interventions for diabetes self-management in primary care. The Management of Diabetes in Everyday Life (MODEL) study is a pragmatic randomized controlled trial designed to compare the effectiveness of health coaching (HC), motivational text messaging (TM), and educational support (ES) among African American adults with uncontrolled diabetes. This study sought to assess differences in patient experience according to treatment arm. **METHODS:** MODEL participant focus groups stratified by treatment arm were conducted during 2017-2019. Two experienced qualitative researchers (mg, cg) conducted thematic analysis in two cycles to document and reflect on coding through analytic memoing, and organizing and condensing codes into categories and themes

RESULTS: Fifty-eight individuals participated in 8 focus groups with mean age 53 (range 41-65), 66% women, and 72% high school graduates. Key themes included: 1) motivation for MODEL study participation, 2) desire for more personal engagement, 3) varying levels of satisfaction with participation, and 4) recognition of intervention benefits. Findings common to all treatment arm participants included strong motivation for participation related to perceived personal benefit, gaining information about diabetes, getting diabetes under control, and helping family or friends prevent diabetes; desire for increased personal engagement with staff during and between study visits; reported both satisfaction and concerns with participation; and benefits of support for behavior change, improved self-care management, and improved health. HC and TM arms reported making behavior changes related to healthy eating, physical activity, and medication adherence. Only HC participants reported benefits related to health coach communication, characteristics, and improved self-efficacy. HC participants also reported highest satisfaction, but inconvenience related to scheduling multiple visits and travel. TM satisfaction was also generally high; messages were perceived as motivating, promoting accountability, but sometimes repetitive. TM arm participants wanted more personalized and interactive text messages. ES arm participants reported lowest satisfaction and lack of disease-specific assistance to improve diabetes self-care

CONCLUSIONS: This qualitative study provides strong guidance for programs seeking to improve self-care for uncontrolled diabetes in vulnerable populations. The study found compelling motivation for participation in primary care-based self-care interventions, enhancements to increase satisfaction with participation, recognition of program benefits, and preference for interventions with more personal engagement

LEARNING OBJECTIVE #1: Participants will describe ways to improve diabetes care using qualitative research techniques to assess patient experience in primary care

LEARNING OBJECTIVE #2: Participants will identify how patient-engagement through health coaching and text messaging interventions can improve diabetes care

ARE RACIAL/ETHNIC MINORITIES RECENTLY DIAGNOSED WITH DIABETES LESS LIKELY THAN WHITES TO RECEIVE GUIDELINE-DIRECTED CARE FOR PREVENTION OF DIABETES COMPLICATIONS?

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BACKGROUND: Racial/ethnic disparities in diabetes care are a pervasive public health problem. Racial/ethnic minorities, including Non-Hispanic Blacks (Blacks) and Hispanics, are disproportionately affected by diabetes complications such as retinopathy and neuropathy. Patients who receive guideline-directed preventative care early in the course of diabetes can reduce their risk of long-term complications. We aimed to identify racial/ethnic disparities in receiving guideline-directed care among a nationally representative sample of participants who were recently diagnosed with diabetes.

METHODS: We conducted an analysis of 2011-2017 data from the National Health Interview Survey. Associations between race/ethnicity and having a visit to an eye specialist, a foot specialist, and having blood pressure and cholesterol checks in the prior year were assessed via logistic regression, among participants who were diagnosed with diabetes within the past 5 years. We tested for effect modification of associations with race/ethnicity by socioeconomic status (SES), where low vs. high SES was defined as having income <200% or ≥200% of the federal poverty line. We also used the Karlson-Holm-Breen method to measure the percentage of the association of race/ethnicity on the primary outcome of annual visits to eye specialist mediated by insurance.

RESULTS: In a sample of 7,341 participants, Hispanics had lower rates of any insurance coverage (75.9%) than both Non-Hispanic Whites (Whites) (93.2%) and Blacks (88.1%; $p < 0.001$). After adjustment for age, sex, SES, health insurance, general health status, US region, marital status, body mass index, and number of comorbidities, Hispanics were less likely than Whites to have had an eye exam in the prior year (OR 0.80, 95% CI 0.64-0.98, $p = 0.04$). Also, Hispanics had lower odds of having their blood pressure checked than Whites (OR 0.45, 95% CI 0.30-0.68, $p < 0.001$). There was no significant effect modification of race/ethnicity by SES detected on the multiplicative scale ($p[\text{interaction}] > 0.05$). Insurance coverage mediated 42.8% of the total effect of race/ethnicity on rates of annual eye specialist visits for Hispanics as compared to Whites. There was no significant mediation effect for Blacks compared to Whites.

CONCLUSIONS: Hispanics recently diagnosed with diabetes were less likely to receive guideline-recommended care for prevention of diabetes complications as contrasted to Whites. Lack of insurance may partially explain those differences. Future work should also consider the role of English-proficiency and provider-related factors in these differences.

LEARNING OBJECTIVE #1: Identify racial/ethnic barriers to guideline-directed care for people recently diagnosed with diabetes to prevent diabetes complications

LEARNING OBJECTIVE #2: Understand the role of socioeconomic status and insurance in receiving guideline-directed care

ARE THERE DISPARITIES IN MEAN BMI, PROVIDER DIAGNOSIS OF OBESITY, AND PROVIDER RECOMMENDATION FOR WEIGHT MANAGEMENT IN SEXUAL ORIENTATION MINORITIES WITH BMIS ≥ 30?

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BACKGROUND: National data shows that lesbian and bisexual women are more likely to be overweight and obese compared to straight women. Little is known about whether provider recommendation for weight management varies across these populations. The purpose of this research is to compare, among lesbian, bisexual, and straight females with BMIs \geq 30: 1) the average BMI; 2) the proportion of patients who receive a diagnostic code for obesity; and 3) the proportion who receive a provider recommendation for weight management.

METHODS: We retrospectively analyzed 536 patient records from four outpatient academic internal medicine practices at the University of Pennsylvania between January 1, 2019 to December 31, 2019 to determine variations in average BMI, proportion of ICD-10 codes for obesity, and proportion of weight management recommendations offered by providers among lesbian, bisexual and straight females with BMIs \geq 30. We classified provider recommendations as a definite yes, possible yes, and no. Multivariable linear (BMI outcome only) or logistic regression was used to evaluate the associations between sexual orientation and each of the following outcomes: BMI, receipt of obesity diagnosis, and weight management recommendations.

RESULTS: There were no significant differences in BMI, receipt of obesity diagnoses, or receipt of weight management recommendations between lesbian, bisexual, and straight females with BMIs \geq 30. However, only about half the patients with BMIs \geq 30, regardless of sexual orientation, did not receive a weight management recommendation as recommended by the USPSTF guidelines.

CONCLUSIONS: Disparities in BMI, receipt of obesity diagnoses, or receipt of weight management recommendations between sexual orientation minority and heterosexual females do not exist in this urban population. However, provider recommendation for weight management was suboptimal in all the groups.

LEARNING OBJECTIVE #1: Patient Care: In alignment with the patient care goal, we analyzed communication with and education of patients in the context of providing a weight management recommendation in accordance with USPSTF guidelines. This study showed that provider recommendation for weight management in patients with BMI \geq 30 was suboptimal in all the groups but there were no differences in provider recommendation based on sexual orientation.

LEARNING OBJECTIVE #2: Professionalism: This study is in alignment with the core competency of professionalism as it investigates a potential source of healthcare inequity among 2 sexual orientation minority populations and encourages and checks provider adherence to ethical principles of treating all patients equally.

ASSESSING FOOD INSECURITY IN URBAN PRIMARY CARE CLINICS

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BACKGROUND: Food insecurity is defined as a state of inconsistent access to food due to resources and other factors such as transportation. COVID-19 has worsened insecurity by making it harder for at-risk patients to go to a store or to continue going to a food bank. We evaluated the prevalence of food insecurity at two urban clinic sites. Our objective was to characterize the food insecurity at these sites as well as identify the associated risk factors those patients may have.

METHODS: We conducted a quality improvement project to survey patients seen in our outpatient primary clinics in Arizona. The survey screened for food insecurity using the Hunger Vital Signs tool, a 2-question screening tool,

suitable for clinical or community outreach that identifies families or individuals as being at risk for food insecurity. Patients that screened positive were given a referral to a nearby food bank. A follow-up phone call was given to the food insecure patients and we communicated with the food bank to check on our referrals. Data were collected and analyzed in Microsoft Excel. Factors such as age, gender, employment, chronic health conditions, and insurance were assessed.

RESULTS: After surveying patients at our test sites (n=4931), we had a positivity rate of 2.15%. Out of all the positive screens (n=106), 35 refused service. There were statistically significantly more females than males screened positive for food insecurity (P<.001). 67% of the food insecure patients were female and 33% were male. The 41-64 year-old age group was 60% of all referrals. Patients identifying as White made up 60%. Medicaid was used by 64%. Cardiovascular disease was the most prevalent chronic condition among this group. Employment was at 37.7% with the rest either being retired (18%), disabled (17%), unemployed (24.5%), or they refused to answer (2.8%). Of note, food insecure patients spanned across 29 zip codes in the greater Phoenix area.

CONCLUSIONS: Clinicians should evaluate for food insecurity, especially amidst COVID-19. It is sometimes assumed that only the unemployed or the homeless are food insecure, but our data showed that 37.7% of the food insecure patients were employed. Among this group, the majority (60%) were aged 41-64. This was an interesting finding because, according to the US Bureau of Labor and Statistics, this age group has the highest working capacity. There is a gender disparity towards females. One reason could be that females tend to be the primary caregiver at home and thus more likely to be sensitive to food concerns. Further research is needed to address this gender disparity, and to find other resources to address the working capacity in our patients. Our project highlights complex factors that help address the issue of designing food supply for a wide geographic distribution of patients.

LEARNING OBJECTIVE #1: Recognize the value of screening for food insecurity and cooperating with social programs to address patient needs.

LEARNING OBJECTIVE #2: Identify SDOH as an essential portion of medical history and entry into the EHR.

ASSOCIATION BETWEEN NEIGHBORHOOD OVER-CROWDEDNESS, MULTIGENERATIONAL HOUSING AND COVID-19 IN NEW YORK CITY.

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BACKGROUND: COVID-19 illness severity and related health outcomes have been shown to differ by socioeconomic status. In New York City (NYC), Black and Hispanic individuals are more likely to be hospitalized, have more severe disease and are more likely to die from COVID-19 than non-Hispanic white patients. Existing well-described disparities in health status, access to healthcare and other social determinants may account for these differences. Over-crowded and multigenerational housing may pose a special risk with COVID-19 infections, putting vulnerable individuals at increased risk of contracting more severe disease at home due to multiple exposures and higher inoculum resulting from reduced personal space. This study sought to examine the association of disproportionate over-crowding and multigenerational housing on COVID-19 cases rates by zip code in New York City

METHODS: In this zip code tabulated area (ZCTA)-level analysis, we used NYC Department of Health disease surveillance data in March 2020 merged with data from the Centers of Disease Control and American Community Survey to model suspected COVID-19 case rates by zip code over-crowdedness. We defined suspected COVID-19 cases as emergency department reported cases of pneumonia and influenza-like illness, percent over-crowdedness by ZCTA as estimated proportion of households with greater than 1 occupant per room, and percent of multigenerational housing by ZCTA as proportion of residences occupied by grandparent and a grandchild less than 18 years of age in quartiles. In order to account for similarities between neighborhoods over both space and time, we employed Bayesian hierarchical Poisson integrated nested Laplace approximation regression model with

controls for known COVID-19 clinical risk factors (prevalence of obesity, coronary artery disease, and smoking) and related socioeconomic risk factors related to COVID-19 exposure (percentage below federal poverty line, median income by zip-code, percentage White, and proportion of essential workers).

RESULTS: Our analysis examined 39,923 suspected COVID-19 cases across 173 zip code tabulation areas (ZCTAs) in March 2020. After adjusted analysis, in reference to quartile one, case rates increased by 67% (IRR 1.67, 95% CI = 1.12, 2.52) in ZCTAs in the quartile four of percent over-crowdedness, while case rates increased 77% (IRR 1.77, 95% CI = 1.11, 2.79) in quartile four of multigenerational housing.

CONCLUSIONS: Over-crowdedness by zip code may be an independent risk factor for severe COVID-19. Social distancing measures such as school closures that increase house-bound populations may inadvertently worsen the risk of COVID-19 contraction in this setting

LEARNING OBJECTIVE #1: Understand the role of overcrowded and multigenerational housing in the spread of COVID-19

LEARNING OBJECTIVE #2: Understand how housing conditions may relate to racial/ethnic disparities in COVID-19 case rates.

ASSOCIATION OF AGE AND GENDER WITH CONCERNS ABOUT LIVE DONOR KIDNEY TRANSPLANTATION AMONG AFRICAN AMERICANS

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BACKGROUND: Live donor kidney transplantation (LDKT) is the superior treatment for kidney failure, a condition which disproportionately affects African Americans. However, African Americans are less likely to receive LDKT compared to others, which may be related to their concerns about LDKT. African Americans' concerns about LDKT are poorly understood, and it is also unclear whether concerns vary according to individuals' characteristics.

METHODS: We conducted a cross-sectional, secondary analysis of baseline enrollment data from the Talking about Living Kidney Donation Support (TALKS) trial, which studied the effects of social worker and financial interventions on 300 African Americans' activation towards LDKT. We asked participants to answer questions about their concerns regarding the LDKT process, including their potential need for postoperative social support, future reproductive potential, recipient and donor money matters, recipient and donor surgical outcomes, and their interpersonal concerns. Answers ranged from 0 ("not at all concerned") to 10 ("extremely concerned"). We described and compared participants' concerns both overall and stratified by four age (≥ 45 versus < 45) and gender categories, using ANOVA. We also conducted sensitivity analyses using multivariable linear regression models adjusting for education, employment, income, marital status, health literacy, and social support.

RESULTS: Participants' top concerns were donor safety (median [IQR] 10 [5-10]), recipient safety (5 [0-10]), money matters (5 [0-9]), and guilt/indebtedness (5 [0-9]), while lack of help at home (0 [0-5]), ability to have children (0 [0-0]), and relationship change (0 [0-5]) were of least concern. There were no statistically significant differences in concern for donor safety, recipient safety, money matters, or feelings of guilt/indebtedness across age and gender groups. However, younger females had statistically significantly higher mean concern about future reproductive potential (3.77, 95% CI 2.77, 4.77), when compared with all other groups. Older males had statistically significantly higher mean concern about postoperative social support (1.79, 95% CI 0.19, 3.38) compared to younger females.

CONCLUSIONS: African Americans' most frequently cited concerns about LDKT were donor and recipient safety and potential financial strain. Younger females were more concerned about future reproductive potential compared to others and older males were more concerned about postoperative social support. Interventions to improve rates of LDKT among African Americans should include reproductive counseling for female LDKT candidates of child-bearing age and address older males' needs for increased social support.

LEARNING OBJECTIVE #1: Appreciate that concerns about live donor kidney transplantation within a racial/ethnic group vary based on demographic characteristics

LEARNING OBJECTIVE #2: Learn about opportunities for intervention to decrease disparities in live donor kidney transplantation among African Americans

ASSOCIATION OF RACE/ETHNICITY AND SOCIOECONOMIC STATUS WITH COVID-19 30-DAY MORTALITY AT A DIVERSE, URBAN PHILADELPHIA MEDICAL CENTER

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BACKGROUND: COVID-19 has disproportionately affected low-income communities and people of color. Previous ICD-10-based studies demonstrated that race/ethnicity and SES are not independently correlated with in-hospital COVID-19 mortality. In Philadelphia through August 14th, 2020, relative to white per capita cases, Black, Hispanic, and Asian residents experienced per capita case rates 115% higher, 64% higher, and 11% lower, respectively. The purpose of our study is to determine through manual-chart-review if race/ethnicity and/or SES independently affects COVID-19 outcomes.

METHODS: We performed a retrospective cohort study of adult patients hospitalized with COVID-19 from March 1st to June 6th at Thomas Jefferson University Hospital. We extracted patient demographics, comorbidities, symptoms, and outcomes through triple-manual-verified chart review. We matched patient addresses to census tracts to group patients into non-low-income, low-income, and very-low-income areas (US Housing and Urban Development definitions) and low-middle-high neighborhood population density terciles. The primary outcome was 30-day mortality or discharge to hospice. The secondary outcome was ICU admission. We used a bivariate analysis to assess categorical variables, which included binned continuous variables, and outcomes relationships, then a logistic regression to develop four adjusted models. Model 1 included age, sex, and race/ethnicity; Model 2 added SES factors (residency prior to admission, population density, and residence in a low-income area); Model 3 added five pre-selected comorbidities of interest; and Model 4 added to Model 3 any bivariate-analysis significant variables.

RESULTS: The study included 426 patients. Death occurred in 16.7%; 3.3% were discharged to hospice; and 20.0% were admitted to the ICU. In the bivariate analysis, "very low-income area" and race/ethnicity were associated with the primary outcome, and middle and high-density neighborhoods were associated with the secondary outcome. Race/ethnicity was not associated with the primary or secondary outcome in all our adjusted models. In Model 4, age greater than 75 (Odds Ratio [OR], 11.01; 95% confidence interval [CI], 1.96 to 61.97) and renal disease (OR 2.78; 95% CI, 1.31 to 5.90) were significantly associated with a higher odds of the primary outcome; "very low-income area" (OR 0.29; 95% CI, 0.12 to 0.71) and BMI 30-35 (OR 0.24; 95% CI, 0.08 to 0.69) were significantly associated with lower odds of the primary outcome.

CONCLUSIONS: When controlling for demographics, SES, and comorbidities, race/ethnicity was not independently associated with the composite primary outcome. Very-low SES, as extrapolated from census-tract-level income data, was significantly associated with lower odds of the primary composite outcome.

LEARNING OBJECTIVE #1: Identify if race/ethnicity and/or socioeconomic status (SES) are associated with 30-day mortality or discharge to hospice in patients hospitalized with COVID-19.

LEARNING OBJECTIVE #2: Identify independent risk factors for COVID-19 death.

BARRIERS TO PRIMARY CARE ACCESS FOR TRANSGENDER INDIVIDUALS

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BACKGROUND: Transgender individuals face many barriers to healthcare access, including discrimination. At the same time, transgender patients have high healthcare needs, and a noted affinity for using electronic platforms to communicate and access health information. Little is known about how this affinity translates to experiences in healthcare. In this study, we sought to identify barriers and facilitators to accessing healthcare for transgender patients, and describe their use of health information technology to facilitate care.

METHODS: We conducted hour-long, semi-structured interviews with transgender patients of the specialty transgender clinic of a tax-supported safety-net medical center in the Midwest. We used maximum variation sampling to recruit patients from a range of age groups, and experiences with secure messaging. Recruitment occurred until theme saturation was reached. Interviews were audio-recorded, transcribed, and analyzed for themes.

RESULTS: Twenty-two patients participated in the study. The patients identified the lack of available providers as a major barrier to accessing primary care. Some spoke of traveling hours to receive care at the Transgender Wellness Clinic. One said, "Let's say I had a cold and I needed to go to my primary care doctor to get cold medicine. I feel like I couldn't find a doctor to help me [close to where I live] because I am trans." Others spoke of the lack of providers in relation to previous negative experiences in healthcare, and having to educate providers about transgender health. One patient recounted, "I told [the doctor] I was on HRT and they were like what does that stand for? So then I had to explain it and then they were stumbling on their the rest the entire interaction... They couldn't even talk to me." Conversely, patients noted having knowledgeable, confident, and gender-affirming providers as a facilitator to care. Describing a positive experience, a patient said of their physician, "There aren't any weird questions. [It] feels like it's second nature to him to [treat transgender patients]. Like he is able to engage with me as a person." The use of the patient portal was another noted facilitator. Patients especially appreciated secure messaging for fast access to their providers, and as an alternative to speaking on the phone.

CONCLUSIONS: Transgender patients identified the lack of knowledgeable providers as a major barrier to accessing primary care. While the patients spoke highly of their experiences with the Transgender Wellness Clinic, the clinic is limited in its capacity for providing primary care for all patients, especially those who live farther away. Increasing the number of primary care providers who are knowledgeable and confident about delivering care to transgender patients is needed to overcome this barrier.

LEARNING OBJECTIVE #1: To identify barriers to primary care for transgender individuals.

LEARNING OBJECTIVE #2: To identify facilitators to primary care for transgender individuals.

CHALLENGES WITH SOCIAL DISTANCING DURING COVID-19 AMONG HISPANICS IN NEW YORK CITY

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BACKGROUND: Hispanics in the US are disproportionately affected by COVID-19. While social distancing and quarantining are effective methods to reduce its spread, Hispanics, who are more likely to be essential workers and live in multigenerational homes than non-Hispanics, may face challenges that limit their ability to carry out these preventative efforts. Our aim was to elicit

experiences of Hispanic adults with social distancing and quarantining during the pandemic.

METHODS: We recruited self-identified Hispanic adults from a community health center in East Harlem, NY, from 5/15/2020 to 11/17/2020. Interviews were conducted in Spanish or English, using a semi-structured topic guide informed by the Health Belief Model. Socio-demographic data were also obtained. Audio-recordings were professionally transcribed. We used thematic analysis to iteratively code the data. Each transcript was independently coded by two research members, then reconciled by a third. Similar codes were combined into categories, which were then consolidated into broader themes.

RESULTS: The 20 participants had a mean age of 47.6 (SD 17.0) years, 65% were female, 65% were US-born, and 55% completed high school. Most identified as either Puerto Rican (40%), Mexican (35%), or Ecuadorian (30%). Four major themes emerged. (1) Fear of contracting and transmitting COVID-19 was high. One participant said, "You don't know who has it so I'm really scared. I live with my daughter and grandson. I don't want to infect them." (2) Multiple practices to reduce transmission risk were used, "I do the food shopping, wipe everything down, put everything away. Then I'll just leave. I haven't really touched my mom going on four months. I don't want to give it to her." (3) Several barriers to social distancing exacerbated transmission risk and fear of contracting COVID-19, "I have neighbors who there's over 10 people in the apartment. How do you self-quarantine in a situation like that?" (4) Mental and financial well-being were often endangered, "There's no work. I haven't paid rent or electricity in three months. We're struggling to survive."

CONCLUSIONS: Despite understanding risks for contracting COVID-19 and taking appropriate precautions, Hispanic patients faced numerous challenges to social distancing and quarantining, such as living in crowded, multi-generational households, being essential workers and providing unpaid care to family members. Such challenges took a toll on their physical, emotional, and financial health. Our findings suggest that a tailored approach to public health messaging and interventions for pandemic planning are warranted among members in this community. Further research is needed to understand and mitigate the long term physical and psychological consequences of the pandemic among Hispanics.

LEARNING OBJECTIVE #1: Identify differences in needs regarding social distancing during COVID-19 among Hispanics.(Patient Care)

LEARNING OBJECTIVE #2: Further evolve knowledge of social determinants challenging preventative behaviors among Hispanics.(Medical Knowledge)

CLINICAL PRESENTATION AND OUTCOMES OF MORTALITY IN HISPANIC PATIENTS HOSPITALIZED WITH 2019 NOVEL CORONAVIRUS IN NEW YORK CITY

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BACKGROUND: The disease causing the coronavirus disease 2019 (COVID-19) has exposed health and outcome disparities in vulnerable and minority communities, with marked differences in infection, hospitalization, and overall mortality rates. The increased hospitalization and infection rates of Hispanic communities in the United States has been previously reported, but differences in outcomes during inpatient stays and end of life is less clear.

METHODS: We conducted a retrospective case series of consecutive index hospitalizations between March 13 and April 4, 2020, with a reverse-transcriptase polymerase chain reaction seropositive for SARS-CoV-2. Clinical demographics, labs and outcomes were extracted from the electronic health records (Epic Hyperspace, Madison, WI). Race and ethnicity were self-reported by patient. Our primary outcome was to assess whether there were significant differences in the early mortality during the COVID-19 pandemic by Hispanic ethnicity. Our secondary outcome was the proportion of do not resuscitate (DNR) code status or hospice status at the time of death. Continuous

variables were compared using two sample t-tests and categorical variables were compared using Wilcoxon rank-sum test. Logistic regression analysis for death as outcome was performed, with inclusion if $p < 0.05$.

RESULTS: There were 1,351 patients with an index admission during the study period, with 307 (22.7%) self-identified as Hispanic. Significant differences between Hispanic and non-Hispanic patients included average age (54 vs 64 years, $p < 0.001$), BMI (30.1 vs 28.2 kg/m², $p < 0.001$), history of diabetes (45.3% vs 30.8%, $p < 0.001$) and asthma (14.5% vs 11%, $p = 0.041$). The overall mortality rate did not differ between Hispanics (26.7%) from other ethnicities (25.3%; p -value = 0.640). However, there was a significant difference in mortality between Hispanics and non-Hispanics in the 40-65 age range (25.2% vs 16.6%, $p = 0.024$). Age ($p = 0.003$), female gender ($p = 0.030$) and admission leukocyte count ($p = 0.028$) were all significant predictors in multivariate logistic regression for death. The proportion of patients who were DNR at the time of death was greater in Hispanics (41.0% vs. 10.2%; $p < 0.001$). Hispanics were also less likely to die on Hospice from COVID-19 than other ethnicities (9.6% vs. 24.5%; $p = 0.006$).

CONCLUSIONS: Hispanic patients hospitalized for COVID-19 were younger, were more likely to have diabetes and asthma, and had a higher inpatient mortality in the 40-65 age group. Significant differences in the proportion of deaths who were DNR and who were hospice were also observed. Further research exploring the role of cultural values and advanced care planning discussions in self-identified Hispanics is required to better understand these differences.

LEARNING OBJECTIVE #1: Patient care

LEARNING OBJECTIVE #2: Practice-Based Learning and Improvement

COMMUNITY AND PROVIDER ACCEPTABILITY OF THE COVID-19 VACCINE: A SYSTEMATIC REVIEW AND META-ANALYSIS PROTOCOL

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BACKGROUND: The novel coronavirus disease (COVID-19) vaccines may help control the current pandemic but would require immunization levels that would achieve herd immunity. This study aimed to quantify current COVID-19 vaccine acceptance rates, as well as characterize the determinants, enablers and barriers to vaccine acceptability across the globe by synthesizing published evidence.

METHODS: A systematic review and meta-analysis of studies was performed on studies assessing the acceptability of a COVID-19 vaccine published between November 1st, 2019 and November 31st, 2020. PubMed, Embase and Cochrane central were searched for eligible studies. Data extracted from retained studies was analyzed using STATA statistical software. A quantitative and narrative synthesis was produced.

RESULTS: A total of 35 eligible articles (38 studies) involving a total of 70,997 participants across 7 regions and 35 countries were included. All studies were cross-sectional survey designs. The pooled vaccine acceptance rate across 32 studies was 71% (95% CI: 66 – 76%, $p < 0.001$, $I^2 = 99.4%$, range: 29-97%). The pooled vaccine acceptance rate of parents for their children across 4 studies was 52% (95% CI: 37-67%, $p < 0.001$, $I^2 = 99.1%$). Vaccine uptake was significantly higher among males (N=13 studies), older age groups (N=7), and healthcare providers (N=2). Enablers of vaccine uptake included perceived individual susceptibility to COVID-19 infection (N=11), prior influenza vaccination (N=7) and high vaccine effectiveness (N=6). The most common barriers to vaccine uptake were general negative attitudes towards vaccines/vaccine hesitancy (N=8), concerns over vaccine safety and efficacy (N=6), vaccine side effects (N=5), and misinformation or conspiracy beliefs around the experimental COVID-19 vaccines (N=2).

CONCLUSIONS: There is a good acceptance of COVID-19 vaccines globally despite wide variations across countries. Public health campaigns may

benefit from capitalising on identified enablers and dispelling important barriers with regards to vaccine safety

LEARNING OBJECTIVE #1: To assess the current acceptance rates of a potential COVID-19 vaccine uptake.

LEARNING OBJECTIVE #2: To determine socio-demographic and clinical characteristics in study populations that affect vaccine acceptance and determine potential enablers and barriers to vaccine

COMPARISON OF COVID-19 MITIGATION AND DECOMPRESSION STRATEGIES AMONG HOMELESS SHELTERS: A PROSPECTIVE COHORT STUDY

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BACKGROUND: The congregate living situation in homeless shelters poses a challenge in preventing the rapid transmission of SARS-CoV-2 among shelter guests and staff members. Despite multiple federal and local governmental COVID-19 response guidelines for homeless shelters, there is limited guidance on the details of overflow and decompression strategies. Furthermore, the effectiveness of the strategies remains unknown. The present study aims to compare the effectiveness of different mitigation strategies of SARS-CoV-2 transmission in homeless shelters to provide implications for future public health practices.

METHODS: We conducted a prospective cohort study between March 30 to May 13, 2020 that followed guests in two Massachusetts homeless shelters, which adopted different strategies to depopulate their guests. One set up temporary tents in its parking lot, while another depopulated guests to a community gym and a hotel with assistance from the local government. We assessed the odds ratios of positive PCR tests between the two shelters' guests after adjusting for loss to follow up, age, gender, and race using inverse probability weighting method. Moreover, we calculated likelihood ratio to explore the value of performing daily temperature and COVID-19 symptom screening.

RESULTS: A total of 206 guests (123 at Quincy and 83 at Brockton) were included in the final analysis. The median durations (IQR) of the follow-up period in Quincy and Brockton shelters were 19 (14 – 20) days and 17 (16 – 30) days, respectively ($p = 0.144$). During the follow-up period, 4 (3.3%) Quincy guests and 10 (12.0%) Brockton guests had positive test results at the follow-up ($p = 0.014$). Four guests at Quincy and 61 at Brockton lost to follow-up ($p < 0.001$) during the study period. The guests residing in the shelter that used temporary tents to depopulate the guests had 6.21 times (95% CI=1.86, 20.77) higher odds of testing positive for SARS-CoV-2 than their counterparts after adjusting for loss to follow up, age, gender, and race. (Table 1) Daily temperature and symptom check performed poorly in detecting positive infection.

CONCLUSIONS: The study highlights the importance of having stable and adequate extra indoor space in homeless shelters in protecting guests from SARS-CoV-2 infection. In addition, daily temperature and symptom check should be combined with routine SARS-CoV-2 RT-PCR testing. To adequately accommodate guests is a pressing issue for homeless service providers, especially under the rising homelessness due to mass unemployment, housing, and eviction crisis.

LEARNING OBJECTIVE #1: Stable and adequate indoor decompression strategy for homeless shelters significantly better protection than temporary tents for shelter guests from SARS-CoV-2 transmission.

LEARNING OBJECTIVE #2: Daily temperature and symptom check alone performed poorly as surveillance measure and should be combined with routine SARS-CoV-2 RT-PCR testing.

COVID-19 VACCINE ACCEPTABILITY AND HESITANCY IN MULTIETHNIC COMMUNITIES IN LOS ANGELES COUNTY

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BACKGROUND: The Coronavirus disease 2019 (COVID-19) pandemic has disproportionately affected multiethnic communities, where pre-existing comorbidities and social determinants magnify these disparities. Given the increased risk of infection and adverse health outcomes among multiethnic communities, understanding vaccine uptake is vital to narrowing COVID-19 related disparities. Using qualitative, community-engaged methods, we aimed to understand (1) barriers and facilitators for vaccine acceptability in high-risk multiethnic groups within Los Angeles County, and (2) factors contributing to misinformation, hesitancy, and acceptability of a proposed COVID-19 vaccine in racial/ethnic groups with a history of medical mistrust or mistreatment.

METHODS: We conducted virtual 2-hour focus group interviews from November 2020 to January 2021 with ethnic groups in Los Angeles County, including residents in high poverty zip codes and essential workers. Focus groups were stratified by race/ethnicity and age: <50 and ≥50 years. A semi-structured interview guide, developed using previous vaccine hesitancy literature, was used to facilitate discussions on hesitancy and acceptability of COVID-19 vaccines. Trained facilitators and community representatives who self-identify with each ethnic group led the focus groups. Participants were asked to contribute and reflect as individuals and experts from their communities to obtain broad views of each race/ethnic group. Transcripts and field notes were analyzed to develop prominent themes shared across ethnic groups and specific to each community.

RESULTS: Eight focus groups were conducted with Filipino, Native American, Pacific Islander, African-American, and Latinx adult participants (N=45). Four broad content areas emerged: (1) common questions, misinformation, and concerns; (2) social determinants of health, accessibility, and affordability; (3) population-specific considerations; and (4) requests in vaccine delivery. Multiethnic communities perceived hesitancy in the COVID-19 vaccine due to a lack of information/misinformation about the development process, including data access and politicization, safety and efficacy, and socioeconomic/structural barriers in accessing the vaccine. Most notably, participants had skepticism about the vaccine's effectiveness and adverse effects and expressed concern of mistreatment or mismanagement in receiving the vaccine, or getting "the short-end of the stick."

CONCLUSIONS: Although there is COVID-19 vaccine hesitancy among multiethnic communities, many participants were hopeful that additional information and trusted community-based culturally congruent outreach would increase acceptability. Public health and vaccine readiness campaigns should include trusted sources of community outreach and population-specific considerations.

LEARNING OBJECTIVE #1: Identify factors to COVID-19 vaccine acceptance and hesitancy among multiethnic communities.

LEARNING OBJECTIVE #2: Identify communication strategies to address concerns with the COVID-19 vaccine among multiethnic patients.

DID PRIMARY CARE PHYSICIANS PRESCRIBE OPIOIDS DIFFERENTLY TO THEIR MINORITY PATIENTS? EVIDENCE FROM EPISODES OF NEW LOW BACK PAIN AMONG ELDERLY ADULTS FROM 2007-2014

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BACKGROUND: Significant racial and ethnic differences in opioid prescribing have been documented. How much of these differences is attributable to the same physician prescribing opioids differently to their minority patients is unknown. We examined racial and ethnic differences in opioid prescribing by the same physician for new episodes of low back pain among elderly adults from 2007 to 2014, temporal trends in these differences, and racial and ethnic differences in subsequent chronic opioid use.

METHODS: We used 2006-2015 claims data from a random 20% sample of Medicare beneficiaries. We examined 274,771 patients with new low back pain (no diagnosis code for low back pain and no filled prescription for an opioid in the prior 365 days) cared for by 63,494 physicians. We excluded patients with cancer or on hospice. We used multivariable regressions to examine the binary outcome of any opioid prescribing in the first year of the new low back pain episode (day 1-365) as a function of race and ethnicity, also controlling for demographics, health status, and disability. Fixed effects for physicians were included to examine differences by the same physician in prescribing opioids to their minority patients. We also examined the outcome of subsequent chronic opioid use (being prescribed at least 180 days of opioids in days 366-730).

RESULTS: In adjusted analysis, 11.5% of white patients (95% CI 11.4 to 11.6) with new low back pain received an opioid in the first year, while the same physician was 1.5 percentage points (95% CI -2.2 to -0.8) less likely to prescribe opioids to their Black patients, 2.7 percentage points (95% CI -3.5 to -1.8) less likely to prescribe opioids to their Asian patients, and 1.0 percentage points (95% CI -1.7 to -0.3) less likely to prescribe opioids to their Hispanic patients. The same physician was more likely to prescribe prescription NSAIDs to their minority patients (e.g., 23.8% for white patients versus 27.6% for Hispanic patients). This racial and ethnic difference in opioid prescribing did not decrease between 2007-2010 and 2011-2014. White patients with new low back pain were more likely to develop subsequent chronic opioid use than minority patients (e.g., 1.8% for white patients versus 0.5% for Hispanic patients). About 60 percent of the racial and ethnic difference in opioid prescribing for new low back pain was attributable to within-physician differences.

CONCLUSIONS: The same physician prescribed opioids less frequently to their minority patients with new low back pain than to their white patients between 2007 and 2014. White patients were more likely to develop subsequent chronic opioid use. These results suggest that there may have been unequal treatment of pain by physicians when the associated morbidity and mortality of opioids were less known.

LEARNING OBJECTIVE #1: To examine whether the same physician prescribed opioids less frequently to their minority patients between 2007 and 2014.

LEARNING OBJECTIVE #2: To examine racial and ethnic differences in subsequent chronic opioid use.

DIETARY QUALITY OF INDIVIDUALS RECEIVING SNAP AND FOOD PANTRY ASSISTANCE

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BACKGROUND: Food banks and the Supplemental Nutrition Assistance Program (SNAP) are widely available resources for individuals facing food insecurity, yet the dietary quality of individuals using these programs is not well characterized. We describe the dietary quality of individuals who use both

food pantries and SNAP to identify nutritional gaps and opportunities to improve food assistance programs.

METHODS: We analyzed baseline data from a randomized controlled trial examining the timing of monthly food pantry visits on dietary quality at two large food pantries in Dallas County, Texas. Eligible participants were English or Spanish speaking adults receiving SNAP benefits who had used the food pantry within the last 4 months. Sociodemographic data were collected by the food pantries. At baseline, we administered the validated, 26-item dietary screener questionnaire (DSQ), used to assess daily intake of fruits, vegetables, dairy, whole grains, added sugars, calcium, and dietary fiber over the past month. The DSQ was read aloud in the participant's preferred language and administered between October 2019 and March 2020. We calculated descriptive statistics for dietary intake variables and compared to nationally recommended intake values.

RESULTS: We analyzed baseline DSQ data from 320 participants (mean age 47 years; 90% female; 45% Black/African American; 37% Latino/Hispanic; median household income at 50% of the federal poverty level). Overall dietary quality was low; no participants met the minimum recommended intake for all core nutrients combined. For each nutrient separately, 29.1% or fewer met the recommended intake (Table 1). While median added sugar intake and median calcium intake were close to recommended daily values, median values for fruit, vegetables, fiber, and whole grains were far below recommended daily values.

CONCLUSIONS: Despite receiving SNAP benefits and food pantry assistance, few participants met the recommended intake values. Novel solutions are needed to improve the dietary quality of individuals receiving food assistance; behavior change interventions and program and policy interventions should focus on improving access to and intake of produce, whole grains, and fiber.

LEARNING OBJECTIVE #1: Identify areas for improvement regarding resources for patients with food insecurity

LEARNING OBJECTIVE #2: Improve knowledge about dietary quality of patients with food insecurity

DISPARITIES IN PRIMARY CARE ACCESS FACING BLACK AND LOW-INCOME PATIENTS DURING THE COVID-19 PANDEMIC: EVALUATING SHIFTS IN APPOINTMENT COMPLETION

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BACKGROUND: As COVID-19 surged in March 2020, primary care practices rapidly shifted to telehealth. Black and low-income patients have historically faced greater barriers to primary care, leading to worse health outcomes relative to non-Black and higher-income patients. To evaluate the effect of telehealth on these disparities, we examined primary care appointment completion rates as telehealth utilization fluctuated within a large Mid-Atlantic health system with over 50 primary care practices.

METHODS: We identified scheduled primary care visits during two periods: (a) "Shutdown" (March 10 to May 31, 2020) and (b) "Post-Shutdown" (June 1 to October 31, 2020). Appointments were categorized by type (telehealth or in-person) and completion status. Patients were defined as low-income if the median family income in their ZIP-code was <200% of the federal poverty level. Multiple logistic regression was used to assess the association between Black race and low-income status with completion of scheduled appointments during the Shutdown and Post-Shutdown periods as compared to the same time frame in 2019. All models adjusted for race, income, insurance, and Charlson Index.

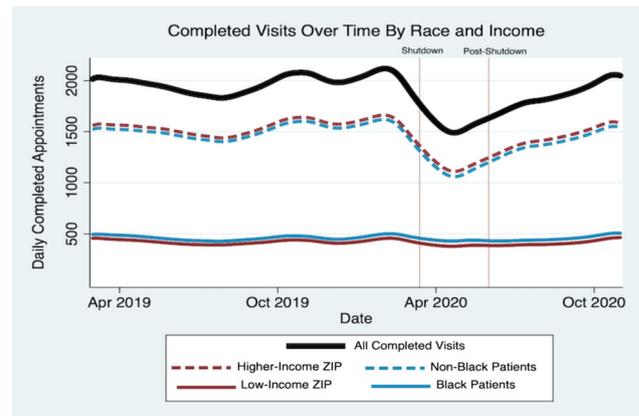
RESULTS: During the Shutdown, 52.5% of appointments (n=211,225) were completed as compared to 69.6% (n=226,181) the year prior. In both Post-Shutdown and its control, 68.6% were completed (n= 416,547 and 429,627 respectively). Telehealth accounted for 0.6% of appointments pre-pandemic, 78.9% during the Shutdown, and 35.6% Post-Shutdown. Black and low-

income patients were more likely than controls to complete appointments both during Shutdown (OR 1.63, 95%CI 1.47 to 1.81 and OR 1.20, 95%CI 1.08 to 1.34, respectively) and Post-Shutdown (OR 1.38, 95%CI 1.28 to 1.48 and OR 1.12, 95%CI 1.01 to 1.25, respectively).

CONCLUSIONS: Black and low-income patients had a greater chance of appointment completion in the Shutdown and Post-Shutdown periods relative to non-Black and higher-income patients. Although we cannot causally link these findings to telehealth's expansion, our findings highlight the need to understand telehealth's impact on primary care access and create a more equitable health care system.

LEARNING OBJECTIVE #1: Assess shifts in primary care visit completion for Black and Low-income patients during the COVID-19 pandemic

LEARNING OBJECTIVE #2: Identify strategies to promote more equitable primary care access



DIVERSITY IN DIABETIC CLINICAL TRIALS: AN EVALUATION OF ETHNIC GROUPINGS IN RANDOMIZED CONTROL TRIALS AND PROSPECTIVE COHORT STUDIES

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BACKGROUND: An estimated 30.3 million people in the United States have diabetes. It is well documented that certain ethnicities are at a higher risk for its development. In 2018, prevalence of diabetes was highest among Native American/Alaska Natives at 14.5% followed by Hispanics of Mexican descent at 14.4%, non-Hispanic blacks at 11.4%, and non-Hispanic whites at 8.6%. While previous investigations have touched on these disparities in health outcomes among ethnic groups, there is need for further research to better understand how to treat patients from different backgrounds. Golden et al state that a major gap in our current understanding of ethnic disparities in diabetes is a failure of most studies to clearly define ethnic subgroups.

METHODS: We set out to determine the extent of this phenomenon by evaluating: 1) how many diabetic clinical trials utilized ethnic subgroupings in their findings and 2) how many diabetic clinical trials studied different outcomes amongst the ethnic subgroupings. We collected data from three major internal medicine journals: New England Journal of Medicine, JAMA, and Lancet. The keyword "diabetes" was used to identify all articles containing the word in its title or abstract. Articles that were included in the analysis were either randomized clinical trials or prospective cohort studies. We compared the number of ethnic groupings reported in journal articles from two different time periods: 1984-1989 and 2014-2019. A total of 116 articles were reviewed. Data from the studies were analyzed using a chi2 and fisher exact test. P values < 0.05 were considered significant.

RESULTS: Our results showed an increase in ethnic subgroupings examined in diabetic trials since the initial period of 1984-1989; 60% of studies in the late time period had >2 ethnic subgroupings examined, compared to 17% in the

early time period. However, most of the studies that did include >2 ethnic subgroupings did not examine differences in clinical outcomes amongst the groups. Only 23.5% percent of these studies discussed a difference in outcomes.

CONCLUSIONS: Historically, ethnic categories only included Black versus non-Black. While there has been an increase in the number of articles including >2 ethnic categories, there are still few that utilized ethnic groupings to stratify data. The studies included in our research missed an opportunity to elucidate a full understanding of the differences in health outcomes between distinct patient populations. For us to understand the impact of current diabetic guidelines in various ethnic groups, we must investigate how different groups respond to treatments. This study should serve as a call to action to clinical investigators to further consider varying outcomes among ethnic groups in all research.

LEARNING OBJECTIVE #1: Explain the significance of studying different ethnic subgroupings in diabetic clinical trials.

LEARNING OBJECTIVE #2: Assess the current environment of diabetic clinical trials and determine areas for improvement.

DOCUMENTING LIVER CANCER BURDEN ACROSS SAN FRANCISCO NEIGHBORHOODS

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BACKGROUND: Liver cancer incidence has more than tripled in the past four decades, making it the fastest rising cancer in the U.S. There are substantial disparities in liver cancer incidence and mortality, with higher rates among racial/ethnic minorities compared to non-Hispanic Whites. Liver cancer incidence has also been shown to vary by neighborhood factors, including ethnic enclave and neighborhood socioeconomic status (SES). We aim to identify neighborhoods that are disproportionately affected by liver cancer in San Francisco.

METHODS: Census tract aggregation zones were developed by the Greater Bay Area Cancer Registry in collaboration with Westat and the National Cancer Institute based on similarities in population sociodemographic characteristics: poverty, rurality, and racial/ethnic minority (i.e., non-White) composition. Using the 13 zones covering San Francisco, we calculated the distribution of late-stage disease diagnosis and overall 5-year risk of death using Greater Bay Area Cancer Registry data. Hazard rate ratios (HR) and 95% confidence intervals (CI) were calculated using sequential multivariable Cox proportional hazard regression models to estimate the associations of sociodemographic and clinical factors, as well as zones with 5-year overall death among liver cancer cases.

RESULTS: A total of 1,237 primary liver cancer cases were diagnosed between January 1, 2008 and December 31, 2017. Proportion of liver cancer cases diagnosed at distant stage ranged from 9% to 18%. It was highest in the South, Center East, Northeast, and Center zones and lowest in the North zone. Overall 5-year survival ranged from 22% to 58%. It was lowest in the Center North and Downtown zones and highest in the Center West, and Southwest zones. In multivariable analysis, the Downtown (HR 1.70, 95% CI (1.15-2.51)), Center East (HR 1.51, 95% CI (1.07-2.12)) and East (HR 1.53, 95% CI (1.09-2.14)) zones were associated with increased risk of death, after adjusting for age, sex, year of diagnosis, and neighborhood SES. However, this association was no longer significant after adjusting for race/ethnicity. Other factors associated with higher risk of death include being unmarried (HR 1.24, 95% CI (1.05-1.46)), having no insurance (HR 1.55, 95% CI (1.18-2.04)), having Medicare only or Medicare plus private insurance (HR 1.37, 95% CI (1.02-1.84)) and having any public/Medicaid/Military insurance (HR 1.19, 95% CI (1.01-1.41)).

CONCLUSIONS: The burden of liver cancer varies by neighborhood in San Francisco, largely related to variations in sociodemographic factors. Neighborhood-specific data can help target initiatives to reduce the burden of liver cancer in San Francisco by engaging health care systems, government, community groups, and residents.

LEARNING OBJECTIVE #1: To evaluate the role of sociodemographic, clinical, and neighborhood factors on liver cancer burden in San Francisco.

LEARNING OBJECTIVE #2: To inform work with local organizations to create targeted initiatives to reduce the burden of cancer in San Francisco.

DOES THE RACE DISTRIBUTION IN VACCINE TRIALS MIRROR THE US POPULATION? A REVIEW OF THE EVIDENCE

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BACKGROUND: Equity in healthcare access and outcomes is a priority of modern medicine. Vaccination represents one of the most effective and ubiquitous interventions to reduce morbidity and mortality. Consequently, the racial distribution of trial populations should mirror that of intended recipients. We compared the racial distribution of subjects enrolled in preapproval vaccine trials to the US population at large.

METHODS: All current adult and pediatric vaccines recommended by the CDC were identified. The source documents utilized for FDA approval as well as relevant peer reviewed manuscripts were reviewed and racial constitution identified.

RESULTS: Mean recruited trial composition is 71.12% white, 8.58% black, 3.30% native american, 0.4% pacific islander, 4.82% asian, 19.57% hispanic and 7.55% other compared with a general population which is 72.4% white, 12.6% black, 4.8% Asian, 0.9%, native american, 0.2%, Hawaiian and other Pacific islander, 16.2% Hispanic and 9.1% other/biracial. However significant heterogeneity is noted amongst individual trials (Table). Gardasil IV as an example manifests a composition of 77.8% White, 2.7% African American, 7.1%, Asian and 12.4% other with some of the studies included being >95% white. In contrast others saw minority overrepresentation with Pfizer's COVID vaccine trials being 28% hispanic.

CONCLUSIONS: Increasing the diversity of research trial participation remains one of the most enduring and important challenges within our scientific and medical systems. As reflected in our data, ideal representation is yet to be achieved. Maintaining and improving US population health, depends on robust public health strategies with vaccination as a core component. Consequently, designing representative vaccine trials remains critical to a more equitable healthcare future.

LEARNING OBJECTIVE #1: To determine the racial composition of vaccine safety trial populations

LEARNING OBJECTIVE #2: To provide a sense of the generalizability of current vaccine trial data

EARLY IDENTIFICATION OF HOMELESSNESS VIA A ONE-QUESTION SCREENING TOOL

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BACKGROUND: Numerous studies have demonstrated associations between homelessness and poor health, including high chronic disease burdens and an increased risk of premature death. Hospitalized homeless patients have longer lengths of stay, and higher rates of discharge against medical advice and 30-day readmissions. Early identification of homelessness is key to addressing these disparities via social work and care coordination. However, there is little consensus on the most effective screening tool. We describe the creation, implementation, and evaluation of a one-question homelessness screening tool in two NYC hospitals.

METHODS: To enable early social work engagement, the Emergency Department (ED) was chosen as the site for intervention. Patients' addresses are confirmed during registration, and a follow-up on housing status was added. After a review of the literature, and multiple rounds of stakeholder discussion the decision was made to use one question: "Do you have stable housing?" If the patient answers no, the registrar clarifies and chooses one of the following:

Living in Shelter, Living on Street, Other Unstable Housing, or Refused/Unable to Obtain. Training materials and troubleshooting guides were created for staff.

To assess the sensitivity of this screening, a comparison was made between screening results for visits from March-June 2019 and a previously-identified cohort of 164 homeless patients (confirmed by social work documentation to be homeless throughout the study period). Sensitivity was calculated as the number of encounters where a known homeless patient screened positive, divided by all cohort encounters (= True Positives / [True Positives+False Negatives]).

RESULTS: During March-June 2019, 49,501 patients were screened, with 2.9% of patients noted to be homeless. The known cohort of 164 homeless patients accounted for 373 total ED visits during the study period. Overall sensitivity for homelessness and unstable housing was 71.6%; sensitivity for homelessness alone was 76.2%. Full results and comparisons are reported in Table 1.

CONCLUSIONS: A novel, single-question screening was implemented in two EDs, requiring minimal staff training. It performed similarly at both sites, and achieved reasonably good sensitivity for street and shelter homelessness. This is a potentially generalizable tool that can be administered by non-clinical staff, and can be linked to clinical and social work pathways to provide more effective and population-appropriate inpatient and outpatient care. Further research should examine care trajectories and outcomes of patients who screen positive in the ED.

LEARNING OBJECTIVE #1: Describe the test characteristics of a homelessness screening tool

LEARNING OBJECTIVE #2: Appreciate the importance of homelessness screening

ECONOMIC CONSIDERATIONS IN THE DISPARITIES LITERATURE ON ACCESS TO BIOLOGICS

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BACKGROUND: Biologics are being approved at an accelerating pace for the treatment of a wide range of diseases, and in some cases are the standard of care because of their effectiveness. Both socio-political phenomena and economic phenomena may determine access to biologics, whose costs are measured in tens of thousands of dollars per patient-year. However, there are few data addressing disparities in access to biologic therapy, and to our knowledge there is no scoping or systematic review on access to these medications across disease states. Identifying gaps in the literature on biologics disparities is a step towards clarifying how the benefits of new biologics are distributed.

METHODS: We used PRISMA guidelines for scoping reviews to review studies of racial and socioeconomic disparities in biologic access available in PubMed, Embase, or Web of Science. We assessed whether their design or interpretation considered six features of the pharmaceutical economy and its regulation: the biologics supply chain, trade agreements, patents, the research and development history of particular drugs, insurance reimbursement, and non-insurance drug policies which also may affect access to drugs. The following study characteristics were extracted as well: databases used, sample size, setting, drugs of interest, variables analyzed, and population demographics.

RESULTS: The search strategy yielded 1,187 results. One-hundred studies met criteria for review. Access disparities were studied at least once in 37 biologics, but the older biologics such as infliximab and trastuzumab were most studied by far, with between twenty and thirty-four studies on each. Sixty-six studies considered insurance reimbursement and thirteen studies considered FDA approval in their design or interpretation, but trade law, patents, and other drug policy were rarely considered in this literature.

CONCLUSIONS: It is very clear that trade agreements and patents are rarely considered in this literature, and this is a notable gap given their well studied

effect on access to medications in policy literature. The categories of “research and development history” and “non-insurance drug policies” as we defined them captured heterogeneous topics related to the pharmaceutical economy requiring more individualized consideration. Future studies should focus on diseases with the highest level of burden, particularly for the marginalized, and take an interdisciplinary approach to identify and monitor drivers of inequality and deprivation in the drug development pipeline.

LEARNING OBJECTIVE #1: To understand the scope of existing disparities literature on access to biologic medications, particularly which medicines have been most studied, and the racial and insurance demographics of patients included in those studies.

LEARNING OBJECTIVE #2: To consider two different bases for studying access to medications: the social and historical contexts which may give rise to disparities, and the economic and industrial factors which create the infrastructure for distributing novel medications.

ELECTRONIC HEALTH LITERACY AMONG SAFETY NET PATIENTS IN LOS ANGELES COUNTY

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BACKGROUND: The digital divide describes barriers to telehealth access that disproportionately affect patients served by the safety net health system, many of whom are Limited English Proficient (LEP). Electronic health (eHealth) literacy may be a predictor of telehealth uptake, yet few studies have evaluated eHealth literacy in underserved populations. In this study, we describe eHealth literacy in a linguistically diverse sample of patients with chronic disease served by safety-net clinics in Los Angeles County.

METHODS: Patients age >18 years with a diagnosis of diabetes mellitus and/or hypertension and their caregivers were recruited from three primary care safety-net clinics in Los Angeles County for a focus group study on this system’s patient portal. Participants completed the eHealth Literacy Scale (eHEALS), a validated eHealth literacy assessment. Additionally, they were asked about digital device access, Internet access and use patterns, and demographic information. We examined differences in these measures across English-speaking and Spanish-speaking groups (LEP) using chi-square, t tests, and Wilcoxon rank-sum tests.

RESULTS: A total of 71 participants (62 patients and 9 caregivers) completed the questionnaire. The mean age of the respondents was 56.3 years old and most reported Spanish (50.7%) as their primary language. More than half of participants (52.1%) reported personal home access to a computer, tablet, or laptop and used a phone that could connect to the Internet (67.1%). The mean score for ten eHEALS items was in the moderate level for eHealth literacy, 26/50 (SD 7.92). There was no difference in the mean eHEALS score across language groups. Analysis of the individual eHEALS items revealed that the majority of participants (73.1%) responded it was “important” or “very important” to be able to access health resources on the Internet. Spanish-speaking participants were more likely to rate the Internet as “useful” (versus “undecided” or “not useful”) for making decisions about their health (69.7%) compared to English-speaking participants (60%; p<0.05). Less than half of the Spanish-speaking participants agreed or strongly agreed that they knew how to use the Internet to answer their health questions (46.7%) compared to English-speaking participants (67.6%, p<0.05). In both groups, scores for perceived skills in appraising Internet health resources and perceived confidence in using Internet information to make health decisions were the lowest of any of the individual survey items.

CONCLUSIONS: In this linguistically diverse sample, eHealth resources were largely perceived as useful and important, yet perceived skills and confidence in engaging with these were low, particularly among LEP participants. More studies are needed to determine if patient readiness to engage with eHealth resources contributes to lower levels of telehealth utilization in this population.

LEARNING OBJECTIVE #1: To gain knowledge of eHealth literacy in underserved communities

LEARNING OBJECTIVE #2: To understand potential barriers to eHealth engagement

ENGAGING AFRICAN AMERICAN PATIENTS WITH DIABETES TO FORM A PATIENT ADVISORY COUNCIL FOR THE MANAGEMENT OF DIABETES IN EVERYDAY LIFE

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BACKGROUND: Research on African-Americans requires greater participation and control of the process as these communities are suspicious of the intentions of researchers and are unaware of their potential role in setting the research agenda. The objective of this study is to describe the formation of a Patient Advisory Council (PAC) whose role was to advise a diabetes community randomized trial funded by the Patient-Centered Outcomes Research Institute (PCORI)

METHODS: The goal was to have PAC members advise the research across all phases of the trial. Several primary care and specialty clinics agreed to refer uncontrolled diabetes patients and controlled patients would represent the clinic in the PAC. Plans were to recruit up to 18 members to have 10-15 attending regularly. Stipend and refreshments were provided. As a PCORI funded project, a patient- investigator was required. In a liaison capacity with the research team, the patient-investigator lead the formation of the PAC using three principles of patient engagement: reciprocal relationships, co- learning, and trust, transparency, and honesty

RESULTS: The PAC members met monthly at a prominent community hospital. This study relied on group discussions, observations, meeting minutes and written records, member surveys, and key informant interviews of members for the period 2014 – 2020. Reciprocal relationships were developed by having investigators attend PAC meetings and learning from members how to promote the study, review protocol materials (logo, nutrition posters and text messages), and dashboards on recruitment and retention. Major obstacles to the formation of PAC included not being able to recruit beyond 7 members left from the 2014-2016 group; About 40 different referrals were attempted since 2016. The greatest success was a MODEL Health Fair to recruit patients and 15 people filled out an interest form; 1 male and 7 females were recruited. A general PAC orientation was held as well as a 4-hour research ethics workshop illustrating the Tuskegee Experiment using a movie. Currently, there are 16 members and 12-15 attend regularly. Zoom is used for meetings.

CONCLUSIONS: Perspectives from patients most affected by health disparities should be represented in advisory groups, especially, minority, elderly, and frail. Governance model for the PAC has tested trust and transparency of investigators. A top heavy 2 Co-Chairs and Secretary was redesigned to one Chair and 3 committee leaders (Communications, Health & Wellness, and Professional Development); all members fall under one of these leaders. The PCORI engagement plan is malleable allowing evolution of initial plan

LEARNING OBJECTIVE #1: Participants will describe ways to engage African American patients with diabetes to serve as patient advisors

LEARNING OBJECTIVE #2: Participants will identify how to develop a plan for the formation of a Patient Advisory Council that meets PCORI rubric

FOUNDATIONS IN EQUITY: A NOVEL, VIRTUAL, INTENSIVE, FOUNDATIONAL CURRICULUM ON HEALTH EQUITY FOR ENTERING FIRST-YEAR MEDICAL STUDENTS

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BACKGROUND: Our goal was to deliver a theory-grounded foundational curriculum in health equity to all incoming medical students to equalize varying baseline knowledge. This content needed to provide historical context and be delivered prior to other teaching about disparities that could negatively bias students.

METHODS: We implemented a 3 week pre-clinical foundations block on health equity and the social determinants of health, specifically focusing on structural oppression and racism. Content was informed by critical race theory and racial identity development theories. A foundational goal was to identify explicitly that race is a social construct and a complex variable that is not neatly utilized in research. The final curriculum was delivered 100% virtually using diverse instructional designs.

RESULTS: Students (N=104) submitted feedback about the block, a 27 item multiple- choice assessment (mean score 97%), and a pre- and post-block reflection. In feedback, students overwhelmingly reported the content was essential to their medical training. Regarding the explicit learning objectives (LOs), 95% reported understanding the influence of social determinants and medical care to overall health; 98% reported understanding race as a social construct and the ways in which race has been and is used and misused in medical education and clinical care. 72% reported exploring how their individual identity and unconscious bias impacts personal relationships, decision making, and healthcare setting experiences. The final 2 LOs, to identify strategies clinicians and healthcare delivery systems can use to engage with determinants of health and to formulate strategies to discuss race within scientific and health care settings and put antiracism into practice, were rated by students as completely met (51% and 55% respectively) and partially met (47% and 40% respectively).

CONCLUSIONS: An implicit goal of work about racism and bias is to create internal discomfort, which may impact students' perception of the block as favorable. The lower ratings of the last 2 LOs are likely the result of fewer evidence-based strategies to address these complex issues. Students noted the block was intense and required more time for experience and processing. This highlights the need to revisit, reinforce, enhance this content throughout future curriculum.

To our knowledge, this mandatory foundational curriculum is the first to be delivered completely using multi-modality remote learning. It addressed issues of interpersonal bias, positionality, and structural racism in an explicit effort to elucidate the drivers of health equity. Future directions include tracking student reflections throughout their development to observe the long-term impact of this curriculum.

LEARNING OBJECTIVE #1: Prof: Explore the impact of a course on health equity, structural oppression, and bias on incoming medical students.

LEARNING OBJECTIVE #2: ICS: Employ an understanding of structural and interpersonal bias when communicating with patients.

HEALTH CARE EXPENDITURES AND UTILIZATION AMONG HISPANIC INDIVIDUALS WITH AND WITHOUT LIMITED ENGLISH PROFICIENCY

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BACKGROUND: One in seven people in the United States speaks Spanish at home, and 26 million have limited English proficiency (LEP). The 1964 Civil Rights Act outlawed discrimination based on national origin, which courts interpreted as requiring medical providers to assure language access for non-English speakers. Yet individuals with LEP may face barriers to healthcare access, and little is known about whether they receive less care than other persons.

METHODS: We analyzed data on adults (age >17) from the Medical Expenditure Panel Survey (MEPS) (n = 22,811-25,577 annually), which collects data on healthcare use of and expenditures from a nationally representative sample of the non-institutionalized US civilian population. Our main analyses used pooled data from 2014 to 2018. We also examined time trends from 1999/2000 to 2017/2018. We assessed per capita health care spending (by insurers and out-of-pocket payments) and utilization of health services (outpatient and emergency department visits, hospitalizations and medication prescriptions), comparing Hispanics with LEP (defined as completing the survey in a language other than English) to other Hispanic and non-Hispanic English proficient (EP) adults. Estimates were derived from multivariable linear regression analyses adjusted for age, sex, income, education, health status, and insurance. We repeated this analysis for respondents with two or more self-reported chronic medical conditions. Lastly, we examined expenditure trends since 1999/2000, before recent LEP policy changes.

RESULTS: Mean per-capita medical expenditures for Hispanic adults with LEP were \$1,122 (95% CI \$754 -\$1491), or 26% lower than for EP Hispanic adults, and \$2,100 (95% CI \$1,718 -\$2,483), or 31% lower than for EP Non-Hispanic adults. LEP adults had lower expenditures for every type of health service in both adjusted and unadjusted analyses. They also had significantly fewer outpatient and ED visits, and received about one-third fewer prescriptions. Among persons with two or more chronic conditions, gaps in total expenditures were even larger. The gap in total health care expenditures between LEP adults and EP non-Hispanic individuals widened by \$1,652 (95% CI, \$1,025 -\$2,278) between 1999/2000 and 2017/2018. However, the gap between LEP and EP Hispanic adults changed little over time.

CONCLUSIONS: LEP is associated with reduced health care use, whether measured by healthcare expenditures or visits, particularly for people with chronic diseases. The LEP-EP care gap has persisted or widened over two decades. Achieving health equity for LEP individuals will require a cultural shift that welcomes immigrants along with policies and practices that increase the availability of interpreter services, provide adequate reimbursement for such services, and increase the number of multilingual healthcare providers.

LEARNING OBJECTIVE #1: To elucidate inequalities in utilization of healthcare for Hispanic adults with limited English proficiency.

LEARNING OBJECTIVE #2: To assess time trends in these language-related inequalities.

IMPACT OF 2017 IMMIGRATION POLICY CHANGES ON MISSED APPOINTMENTS AT TWO MASSACHUSETTS SAFETY-NET HOSPITALS

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BACKGROUND: Since early 2017, health care providers across the US have observed that immigrant patients have been avoiding healthcare due to fear of immigration enforcement and changes in the public charge rule. We are unaware of prior studies that have evaluated the impact of immigration policy changes on healthcare utilization since the January 2017 presidential inauguration.

METHODS: We used a difference-in-differences analysis to compare changes in missed primary care appointments over time across two groups: an affected group of patients who received medical care in Spanish, Portuguese, or Haitian Creole, and a comparison group of non-Hispanic, white patients who received medical care in English. We examined missed appointments for 13 months (February 1, 2017–February 28, 2018) following the immigration policy changes (post-inauguration) and contrasted it with the 13 months

(October 1, 2015–October 31, 2016) preceding the policy changes (pre-election).

RESULTS: At baseline (pre-period), the proportion of appointments missed was 19.4% among Spanish, Portuguese and Haitian-Creole speakers and 20.4% among non-Hispanic English speakers. After adjustment for patient age, sex, race, insurance, hospital system, and presence of chronic conditions, immigration policy changes were associated with an increase in the proportion of missed appointments by 0.74% (95% confidence interval: 0.34%, 1.15%) among Spanish, Portuguese and Haitian-Creole speakers, amounting to approximately 800 additional missed appointments (total appointments in post-period=108,020). Using data from our institutions on the average revenue per visit, we estimated that missed appointments due to immigration policy changes resulted in over \$185,000 of lost revenue over the 13-month post-period.

CONCLUSIONS: Increasing immigration enforcement is associated with a significant increase in missed appointments among patients who receive medical care in languages other than English. These findings suggest that immigrant patients are missing medical appointments, which can be detrimental to their health. The impact was likely mitigated by a supportive environment, with one hospital located in a sanctuary city and both hospitals taking measures to direct welcoming messaging at immigrant patients in response to policy changes. A larger impact may be detected in areas with larger immigrant populations in less supportive local environments. As data increasingly demonstrate that immigrants are at a disproportionate risk of infection and mortality from COVID19, policymakers should consider the impact of immigration policies on access to health care for immigrant communities and attendant repercussions on broader public health.

LEARNING OBJECTIVE #1: To describe recent changes in immigration policy and their impact on immigrants' use of health care.

LEARNING OBJECTIVE #2: To describe the impact of immigration policy changes and potential mitigating factors on healthcare utilization in two Massachusetts safety-net hospitals

IMPACT OF BEING A CAREGIVER OF CHILDREN ON EXPERIENCES IN THE DIABETES PREVENTION PROGRAM: EMERGING THEMES FROM IN-DEPTH INTERVIEWS OF PROGRAM PARTICIPANTS

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BACKGROUND: The experiences of adults in lifestyle intervention programs, such as the Diabetes Prevention Program (DPP), may be impacted by being caregivers of children. Little is known about how children may serve as barriers or facilitators for adults' lifestyle change efforts, and therefore how better to support caregivers in these programs. Via in-depth interviews of DPP participants conducted to inform the eventual development of a family-oriented version of the program, we explored emerging themes regarding the impact of children on participants' experiences.

METHODS: Former or current participants from DPP groups delivered via a community-academic partnership in Baltimore were recruited on a rolling basis to participate in a semi-structured, in-depth phone interview in 2020. Participants were eligible if they were the caregiver of a child less than 18 years. The interview guide topics included children's impact on caregivers' experiences in the DPP and how the DPP could better support caregivers in their lifestyle change efforts. Interviews were recorded, transcribed and double coded into central, emerging themes.

RESULTS: To date, 15 in-depth interviews have been analyzed. Participants were predominantly female (87%), African American (93%), and grandparents (67%). Children they cared for ranged from 2-17 years. Table 1 outlines common emerging themes. Caregivers described how children's diet preferences served as barriers to their own lifestyle change but also how children facilitated change, including by serving as a source of motivation to change.

Caregivers expressed that learning tips and skills to engage children in lifestyle change would be beneficial.

CONCLUSIONS: DPP participants expressed that caring for children posed some barriers to their lifestyle change efforts, such as introducing healthier food in the home, but that children also facilitated change either actively or passively by motivating caregivers. Lifestyle interventions could support participants who care for children by enhancing their skills in addressing these barriers. Future work should also explore how to leverage children's ability to motivate caregivers' lifestyle change.

LEARNING OBJECTIVE #1: To describe children's impacts on the experiences of adults engaged in a lifestyle intervention

LEARNING OBJECTIVE #2: To understand how to support lifestyle change efforts of caregivers of children

IMPACT OF COVID-19 ON SELF-MANAGEMENT AND ENGAGEMENT IN CARE FOR PATIENTS WITH TYPE 2 DIABETES FROM URBAN SAFETY-NET CLINICS: A QUALITATIVE STUDY

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BACKGROUND: The full impact of the COVID-19 pandemic on patients with type 2 diabetes mellitus (T2DM) is still emerging. Few studies have explored the pandemic's effect on patients' self-management, support systems, and engagement with routine care, but concerns have risen about it exacerbating existing disparities in patients with low socioeconomic status, with limited English proficiency, and racial minorities. The current study examines the perspective of patients with T2DM to understand how the pandemic has affected their self-management and engagement in care.

METHODS: Between August and November 2020, we conducted twenty semi-structured phone interviews of patients purposely sampled from six urban, safety-net primary care clinics. All respondents had T2DM and at least one additional chronic illness. Respondents were asked to reflect on their experiences with T2DM self-management, treatment burden, and barriers to engagement with care. Questions also focused on the impact of the COVID-19 pandemic on self-management and healthcare utilization. We used a thematic analysis approach using both deductive and inductive codes to analyze the data.

RESULTS: Of the 20 respondents, 17 were female and 3 were male. Eight were persons of color, 5 were white, and 7 responded "Other". Eight respondents were Spanish-speaking. On average, respondents were 55 years of age and reported living with T2DM for 13 years. When asked about the effect of the pandemic on engaging with their clinic, respondents reported decreased, delayed, or temporarily suspended primary care visits. When considering the effect on self-management, some reported significant impact on their ability to exercise. Others shared difficulty managing diet due to working from home creating more opportunity and proximity to food, while some described financial challenges and difficulty accessing healthy foods. Additional emerging themes included increased stress and fear, both directly related to COVID-19 disease or indirectly due to isolation, instability, and financial insecurity. In contrast, other respondents noted little to no changes to their routines.

CONCLUSIONS: The COVID-19 pandemic has had a variable impact on patients with T2DM. For some, little has changed, while others have had their engagement with usual healthcare services, mental health, and self-management routines negatively affected. Why certain patients have adapted to the pandemic while others face challenges requires further exploration. Overall, findings suggest that COVID-19 poses a direct health risk to patients with T2DM whether or not they are infected with the virus. Our results highlight the challenges our primary care systems are facing in engaging with and providing support for patients with T2DM, particularly socially vulnerable patients, during national crises.

LEARNING OBJECTIVE #1: Recognize the impact of COVID-19 on self-management in patients with T2DM.

LEARNING OBJECTIVE #2: Consider the implications that COVID-19 has on patients with T2DM engaging in clinical care.

IMPACT OF LOCAL FOOD ENVIRONMENTS ON LIFESTYLE CHANGE EFFORTS OF DIABETES PREVENTION PROGRAM PARTICIPANTS

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BACKGROUND: Successful community-based translation of lifestyle interventions, such as the Diabetes Prevention Program (DPP), requires understanding how the local food environment impacts participants' dietary change efforts. This is particularly important in low-income communities with restricted access to affordable healthy food options. Among participants from DPP groups held in an urban, low-income setting, we explored interactions with the local food environment and examined how the food environment impacted lifestyle change efforts.

METHODS: We conducted a phone-based survey as well as in-person focus groups with DPP participants in Baltimore City in 2018. Initial recruitment was via in-person outreach; participants were contacted by phone for final recruitment for the survey or focus groups. Survey topics included where participants shopped for food. The focus group guide explored food environment-related barriers and facilitators and suggestions for how to further support dietary change efforts; focus groups were recorded, transcribed and double-coded into emerging themes.

RESULTS: 27 DPP participants expressed initial interest in survey participation; 16 were reached and completed the survey. Respondents were majority female (87.5%), African American (93.8%), and had an annual income less than \$40,000 (63%). All respondents frequented at least one supermarket; 87.5% reported changing their shopping habits during the DPP to buy healthier items such as fresh vegetables. Table 1 outlines emerging themes from the 2 focus groups (with 6 and 4 participants each). Barriers included cost of healthy options, including related to fresh food wastage; participants felt more information about food preservation could address this. Facilitators included access to farmers' markets and restaurants with healthier menu options.

CONCLUSIONS: While urban DPP participants accessed supermarkets with healthier food choices, the higher cost of these items was a barrier to dietary change; providing information on food preservation in the program may be one way to address this issue. Building upon this formative work to further characterize food environment-related barriers and facilitators will be essential to inform how the program can best support lifestyle change efforts.

LEARNING OBJECTIVE #1: Understand food environment-related barriers and facilitators to DPP participants' dietary change

LEARNING OBJECTIVE #2: Understand ways the DPP could help address food environment-related barriers to dietary change

IMPLEMENTATION EVALUATION AND FIDELITY ASSESSMENT OF A DIABETES MANAGEMENT INTERVENTION DURING THE COVID-19 PANDEMIC: FINDINGS FROM THE DIABETES RESEARCH, EDUCATION, AND ACTION FOR MINORITIES (DREAM) INITIATIVE

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BACKGROUND: The COVID-19 pandemic has limited the ability of community health workers (CHWs) and other front-line health professionals to delivery in-person health education and coaching, necessitating the transition of evidence-based interventions to virtual formats. This study used a mixed-

methods approach to assess the impact of the COVID-19 pandemic on the implementation process and fidelity of the DREAM Initiative, a CHW-led diabetes management randomized-controlled trial among New York City South Asian adults.

METHODS: Of the 5 monthly group-based health education sessions held by CHWs with 147 study participants, four sessions were held virtually between March-June 2020 following city-wide stay-at-home orders. Fidelity checks, assessed by tracking and recording proportion of learning objectives covered in each session, were conducted by CHWs. Qualitative interviews were also conducted with 25 participants (6 providers and 4 staff members at participating primary care clinics, 7 community health workers (CHWs), 3 research staff members, and 5 representatives from front-line social service agencies that are members of the community advisory board (CAB) members) on the impact of the COVID-19 pandemic on intervention implementation.

RESULTS: Retention of participants ranged from 97.3% (Session 2) to 93.9% (Session 4 and 5). CHWs largely also reported covering session learning objectives “all or most” of the time, ranging from 99% (Session 1) to 87% (Session 5). Key themes that emerged from qualitative interviews included COVID-19 related personal barriers effecting perceived ability to meet intervention goals and concerns of new social, economic, and health challenges faced by study participants. CHWs’ and research staff identified challenges in effective patient engagement and data collection during COVID-19, due to primary care clinic closures and new telehealth adaptations to the intervention, but also identified social, material, and digital support among team members and study participants as significant facilitators in reducing obstacles. CAB members described various methods of pivoting front-line social service during the pandemic to better address social determinants of health. Primary care sites expressed concerns of greater diabetes burden due to new patient lifestyle barriers and obstacles in preventive screening and continuity in care.

CONCLUSIONS: Fidelity to the intervention and retention of participants during the pandemic was high, suggesting the acceptability and feasibility of the virtual intervention format in future CHW-led interventions. However, the COVID-19 pandemic had a dramatic impact on various components of intervention implementation; strategies identified to mitigate challenges can inform other efforts to adapt behavioral interventions during COVID-19 for underserved minority communities.

LEARNING OBJECTIVE #1: Medical Knowledge

LEARNING OBJECTIVE #2: Practice-Based Learning and Improvement

INCREASING CIVIC ENGAGEMENT AND HEALTH EQUITY THROUGH VOTER REGISTRATION IN FAMILY MEDICINE CLINICS—THE ACTION PROJECT

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BACKGROUND: Voter registration in the US is largely an individually-driven responsibility. In turn, the group of registrants is not representative of community demographics. Voting disparities in marginalized communities are correlated with health disparities. Sicker, uninsured, or under-insured citizens are more supportive of expanding governmental healthcare options but are less likely to vote due to barriers, such as registration.

Allied Community Engagement Together in Our Neighborhood (ACTION) is built on the notion that family medicine clinics are uniquely positioned within minority communities to serve as voter registration sites. The goal is to lessen disparities in civic engagement and increase downstream health equity through patient empowerment. ACTION is a non-partisan service project that provides the option to register to vote or apply for a mail-in ballot during health appointments.

METHODS: Training: Interested medical students completed mandatory training with the League Women Voters. During the training, students were familiarized with the state of Illinois’ online registration form and mail-in ballot application.

Intervention: ACTION was based out of Loyola Family Medicine Clinic in Maywood, Illinois. Volunteers were instructed to speak to all patients about their registration and mail-in ballot status. All patient interactions were conducted in the waiting room while patients waited for their appointment.

Evaluation: The intervention was evaluated on 3 outcomes—number of registrants and mail-in ballot applications, and survey results.

RESULTS: From July 15 to October 18 of 2020, students volunteered for 43 shifts on 25 days. During this time, volunteers registered 52 patients, 29% of which identified as first-time voters.

With the overlap between the 2020 Presidential Election and the COVID-19 pandemic, ACTION shifted focus to mail-in ballot applications. According to the survey results, 28% of patients did not have prior knowledge that the mail-in ballot application was a separate form. Volunteers submitted 78 mail-in ballot applications.

84.5% of survey respondents agreed that ACTION was a good idea and 78% agreed that they would like to see this service provided in more medical spaces. Lastly, 88% of respondents claimed they had the correct identification at their doctor’s appointment for online voter registration, overcoming a major identified barrier in voter registration.

CONCLUSIONS: The results of the study demonstrate the important role family medicine clinics can play in easing the civic engagement process for traditionally disenfranchised patients. Volunteers averaged 2.08 registered voters and 3.12 mail-in ballot applications per day, during a time of year where most people are already registered. For reasons of efficiency, proper documentation at the time of interaction, and number of newly registered first-time voters—health clinics prove to be a unique and efficacious location for voter registration.

LEARNING OBJECTIVE #1: Systems-Based Practice

LEARNING OBJECTIVE #2: Interpersonal and Communication Skills

INFLUENCE OF HEALTH LITERACY AND NUMERACY ON THE EFFECTIVENESS OF A BEHAVIORAL WORKPLACE INTERVENTION TO PREVENT WEIGHT GAIN AND IMPROVE DIET: A SUBGROUP ANALYSIS OF THE CHOOSEWELL 365 RANDOMIZED, CONTROLLED TRIAL

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BACKGROUND: Low health literacy and numeracy are associated with unhealthy food choices and poor health. Behavioral nudges may improve dietary intake and health among those with low health literacy and numeracy. We hypothesized that participants with lower health literacy and numeracy in the ChooseWell 365 (CW365) workplace RCT would have greater benefit from a behavioral intervention to prevent weight gain and improve dietary choices than those with high health literacy and numeracy.

METHODS: CW365 enrolled 602 hospital employees in an RCT to test the effectiveness of a 12-month automated, personalized behavioral intervention providing weekly dietary feedback on cafeteria purchases characterized by traffic-light labels (green=healthy, yellow=less healthy, red=unhealthy) and calories purchased/day, healthy lifestyle tips, monthly peer comparisons, and financial incentives. Cafeteria purchases were tracked using hospital identification badges. The Healthy Eating Index (HEI; range 1-100) was calculated from 24-hour dietary recalls to measure dietary quality. In the main trial, there was no significant intervention effect on weight/BMI or dietary quality, but there was a significant effect on increasing healthy purchases. For a preplanned analysis, a subgroup completed health literacy (Newest Vital Sign; NVS; range 1-6) and numeracy (General Numeracy Scale; GNS; range 0-3) measures at 12 months. We used linear mixed effects models to determine if the CW365 intervention effect on BMI, cafeteria purchases, and HEI differed by health literacy and numeracy levels.

RESULTS: The subgroup included 510 participants with mean age of 43.5 years (SD 12.3), 79% female, and 18% non-White; 63% had high health literacy (NVS=6), and 31% had high numeracy (GNS=3). The intervention effect did not differ by low (NVS≤5) vs. high health literacy on changes in BMI (0.0 vs. 0.1 kg/m²; p[interaction]=0.93) or increases in proportion of green-labeled cafeteria purchases (5.7 vs. 7.9 percentage points;

p[interaction]=0.26). The intervention improved HEI more in participants with low vs. high health literacy (5.4 vs. 0.1 points; p[interaction]=0.04). The effect of the intervention on changes in BMI, green-labeled purchases, and dietary quality did not differ by numeracy (all p[interaction]>0.05).

CONCLUSIONS: A workplace intervention using traffic-light labeling and other behavioral nudges increased healthy cafeteria purchases among employees of all health literacy and numeracy levels. Employees with low health literacy had larger and clinically meaningful improvements in dietary quality than employees with high health literacy, suggesting that the behavioral intervention may be particularly effective for improving nutrition knowledge in those with lower health literacy.

LEARNING OBJECTIVE #1: Describe the distribution of health literacy and numeracy levels among hospital employees.

LEARNING OBJECTIVE #2: Examine whether the effect of a behavioral intervention varies by employee health literacy and numeracy.

INTERVENTIONS TO ADDRESS FOOD INSECURITY AMONG ADULTS: A SYSTEMATIC REVIEW AND META-ANALYSIS

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BACKGROUND: Food insecurity is an important risk factor for worse health, but the effect of food insecurity interventions on food insecurity, health outcomes, and utilization is unclear. We performed a systematic review and meta-analysis to assess the evidence regarding the effect of food insecurity interventions on food insecurity status, clinically-relevant health outcomes, and utilization among adults.

METHODS: English-language searches of PubMed and Cochrane Trials databases from inception to January 2020 and searches of the Social Interventions Research and Evaluation Network (SIREN) database in December 2019 were performed. Studies of any design that assessed the effect of food insecurity interventions for adult participants on food insecurity, health outcomes (such as BMI or HbA1c), and health care utilization (including costs) were included. Interventions were categorized as home-delivered food, food offered at a secondary site, monetary assistance in the form of subsidies or income supplements, food desert interventions, and miscellaneous. Data extraction was done in triplicate. Study quality was assessed using the Cochrane Risk of Bias Tool, the Risk of Bias in Non-randomized Studies of Interventions tool (ROBINS-I), and a modified version of the National Institutes of Health's Quality Assessment Tool for Before-After (Pre-Post) Studies with No Control. The certainty of evidence was assessed using the GRADE (Grading of Recommendations Assessment, Development, and Evaluation) criteria. For outcomes within intervention categories that had at least 3 studies, random effects meta-analysis was performed.

RESULTS: 37 studies met inclusion criteria with 8 randomized trials and 29 observational studies. 14 studies provided high certainty evidence that providing food is associated with reduced food insecurity (pooled effect, adjusted OR 0.53 [95% CI 0.33, 0.67]). 10 studies provided moderate certainty evidence that providing monetary assistance is associated with reduced food insecurity (pooled effect, adjusted OR 0.64 [95% CI 0.49, 0.84]). Effects of interventions on health outcomes and utilization were less studied; there was low or very-low certainty of evidence that food insecurity interventions were associated with changes on either.

CONCLUSIONS: Providing food and monetary assistance is associated with improved measures of food insecurity, but whether this translates to better health outcomes or reduced health care utilization is less clear.

LEARNING OBJECTIVE #1: Identify categories of interventions within health care that are addressing food insecurity.

LEARNING OBJECTIVE #2: Summarize the evidence and its quality regarding the effectiveness of interventions addressing food insecurity.

IS THERE GENDER BIAS IN INTERNAL MEDICINE GRAND ROUNDS INTRODUCTION?

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BACKGROUND: Gender bias gives rise to gender disparity in academic medicine. Grand rounds is an important avenue for dissemination of scholarly achievements, and is linked to academic merit and promotion. Studies have shown discrepancies between the number of female and male speakers, and use of professional titles during introductions, which convey expertise and competence. The goal of this study is to assess prevalence and type of gender-specific differences in introductions for male and female speakers utilizing natural language processing techniques.

METHODS: A retrospective observational study of introductions used during internal medicine grand rounds at the University of Colorado, University of Michigan, and Indiana University was conducted utilizing the video archive. The following information was collected: name and gender of the speaker and introducer, length of introduction, and home institution. Natural Language Processing (NLP) techniques were used including keyword extraction to identify gendered language in unstructured text content, and sentiment analysis to categorize content as positive or negative and/or masculine or feminine. NLP was also used to analyze key gendered words and phrases utilized, gender of introducer, and gender of the presenter. A chi-square test for equal proportions was used to assess proportions of male and female speakers and introducers.

RESULTS: Four hundred and seventy one grand rounds were held from 12/2013 to 9/2020 at the three institutions reviewed. There were 319 male speakers and 164 female speakers (p < 0.0001). Most of the introducers were male (Male = 412, Female=52, p < 0.0001). Fifty-four women speakers were invited from outside institutions, in comparison to 131 men (p < 0.0001).

At the University of Colorado, professional titles were more likely to be used for male speakers than female (63% male vs 50% female, p=0.40). When males introduced female speakers, they were more likely to use the speaker's full name in comparison to males introducing male speakers (75% vs. 56%, p=0.03). Analysis of term and phrase frequency showed several significant differences between introductions of men versus women. For example, the word "outstanding" was used in the introductions to male speakers significantly more often than for women (16 men vs. 7 women, p=0.03).

CONCLUSIONS: Gender disparities existed in formal introductions at internal medicine grand rounds at the institutions included in our study. There were significantly more male speakers than female, and the majority of introducers were men. Several positive descriptive words were used more frequently for men than for women. Women were also more likely to be introduced by their full name when introduced by men at internal medicine grand rounds, compared to men introduced by men or women introduced by women.

LEARNING OBJECTIVE #1: To acknowledge that gender bias is present in academic medicine.

LEARNING OBJECTIVE #2: To reinforce that systematic examination of our practices is necessary to identify unintentional biases that may be present.

LOWER EHEALTH LITERACY ASSOCIATED WITH LESS PATIENT PORTAL USE AND MORE NEGATIVE PATIENT PORTAL ATTITUDES AMONG HOSPITALIZED PATIENTS

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BACKGROUND: Patient portals are important tools to empower patients and may play an important role in vaccine distribution during the COVID-19 pandemic. Therefore, it is vital to assess how existing disparities are impacted by the growing use of portals. eHealth literacy (eHL) measures patients' ability to find, comprehend, and evaluate health information from electronic sources.

This study aimed to characterize how age and eHL were associated with portal use and perceptions among the inpatient population at UChicago Medicine.

METHODS: A cross-sectional survey was administered in-person and virtually to adult, general medicine inpatients at UChicago Medicine between 1/14/2020 and 12/8/2020. The survey included the validated eHL eHEALS tool and items assessing portal awareness, use, and attitudes. STATA was used to complete univariable and multivariable logistic regression predicting portal use and attitudes.

RESULTS: Among 69 participants, the mean age was 56 (SD: 6.7). The majority of participants were African American (68%), and female (58%), and roughly a third (36%) had at-most a high school education. The majority of participants owned at least one technological device (93%) and had Wi-Fi access at home (80%). Roughly half (46%) had low eHL (min: 8, max: 40, mean eHeals score: 29 (SD: 8.8)). In a multivariable logistic regression adjusting for age (>65), gender, race, and education, lower eHL was associated with lower odds of having used a portal ever ($p=0.02$). Both older age and lower eHL were associated with lower odds of having used a portal in the past year (OA: $p=0.01$, eHL: $p=0.03$). Older age was associated with less frequent portal use (at least once a month, $p=0.02$) in adjusted analyses. Older age and lower eHL were associated with less confidence in one's own ability to utilize a portal (OA: $p=0.01$, eHL: $p=0.004$) and not planning to use a portal in the coming year (OA: $p=0.006$, eHL: $p=0.02$). After the COVID pandemic began, half as many participants were unaware of portals as prior (19% [11/58] vs. 36% [4/11], $p=NS$). The proportion of participants that had used a portal after the COVID pandemic was higher (71% [41/58] vs. 55% [6/11], $p=NS$).

CONCLUSIONS: Lower eHL and older age were associated with less engagement with and more negative attitudes about portals. Portal awareness and engagement likely increased after the COVID pandemic, but more data is needed to clarify pandemic effects on portal use. Reported factors that prevented portal use were lack of awareness, difficulty with set-up, and lack of belief in portal usefulness, not lack of technologic access. Interventions that target patients with lower eHL and well as older patients' lack of engagement with portals and confidence in their ability to use portals could help ensure greater equity in vaccine deployment, as well as patient empowerment beyond the COVID-19 pandemic.

LEARNING OBJECTIVE #1: Patient Care

LEARNING OBJECTIVE #2: Interpersonal and Communication Skills

MITIGATING SOCIAL DETERMINANTS OF HEALTH FOR DUAL-USE VETERANS: A FINAL REVIEW

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BACKGROUND: An estimated 40% of Veterans are eligible for community care due to the MISSION act. Veterans who access care in both the Veteran's Health Administration (VA) and non-VA hospitals (dual-users) are at increased risk for fragmented care and adverse outcomes. Dual-users often do not receive necessary follow-up care or linkage to resources addressing social determinants of health (SDOH) post non-VA emergency department (ED) visits. We designed a social worker-led Advanced Care Coordination (ACC) program to be implemented in Denver, Colorado and Omaha, Nebraska metro areas. Our objectives were to enhance care coordination and address SDOH for dual-users who access non-VA EDs by providing longitudinal case management.

METHODS: ACC collaborated with VA and non-VA providers through phone calls, emails and in-services to enhance care coordination and address dual-users SDOH. Non-VA ED providers asked patients if they were a Veteran and informed ACC of Veterans' non-VA ED visit. Post ED discharge, ACC social worker called the Veteran to complete a comprehensive assessment and identify SDOH needs. Veterans received an acuity score of 1-4, with 4 needing the most support. The ACC social worker provided patient-centered case management addressing SDOH needs up to 90 days post ED discharge. Case management was provided

through phone calls (acuity scores 1-2) or home/community visits and phone calls (acuity scores 3-4). During ACC enrollment shared decision making was promoted to enhance the Veteran's care plan and services provided. A few weeks prior to discharge from ACC, the ACC social worker notified the Veteran's VA primary care team and provided details on potential follow-up needs. Upon discharge, Veterans were reconnected to their VA primary care team through closed-loop electronic communication.

RESULTS: ACC connected Veterans to services addressing SDOH needs they may not have otherwise accessed due to lack of knowledge and resources. Using our program database to evaluate Veterans enrolled in ACC April 2018-September 2020 (N=223), we found they were connected to: 1) VA primary care appointments (86%), 2) VA benefits (30%), 3) home health care (18%), 4) mental health and substance use treatment (18%), 5) financial assistance (17%), 6) transportation (11%) and 7) homeless resources (6%).

CONCLUSIONS: Gaps in care will increase as more Veterans access non-VA care resulting in dual-users increasingly falling through the cracks after receiving non-VA care. ACC bridged these gaps by enhancing communication between VA and non-VA providers, connecting Veterans to resources addressing SDOH needs and linking Veterans back to their VA primary care teams. Programs like ACC should be implemented in healthcare systems to assist dual-users with SDOH needs and resource acquisition.

LEARNING OBJECTIVE #1: Identify strategies to provide patient-centered care that mitigates SDOH for dual-use Veterans

LEARNING OBJECTIVE #2: Propose values and benefits of enhancing care coordination to inform effective care coordination methods for dual-use Veterans

MY GOALS ARE OFTEN NOT THEIR GOALS: BARRIERS AND FACILITATORS INFLUENCING PRIMARY CARE PROVIDER DELIVERY OF PATIENT-CENTERED CARE FOR COMPLEX PATIENTS WITH MULTIMORBIDITY.

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BACKGROUND: Patient-centered care involves shared-decision making, recognizes a patient's psychosocial context, and reflects patient preferences, needs, and priorities. Patient-centeredness is especially important for complex patients with multiple chronic conditions (i.e. multimorbidity), given interactions between diseases, social factors, and treatment plans. It is not well-known what factors impact the ability of primary care providers (PCPs) to implement patient-centered care when caring for complex patients within the Veterans Health Administration (VHA), which delivers integrated care in a patient-centered medical home model. To address this evidence gap, we conducted qualitative interviews with PCPs across the VHA.

METHODS: We randomly sampled PCPs working at least 40% clinically in the VA, emailing 475 and recruiting 23 for 25 to 30-minute, semi-structured telephone interviews from May to July 2020. The interview guide was developed from the Scholl conceptual model of domains of patient-centeredness. Interviews were transcribed verbatim and analyzed with content analysis. A priori categories were developed for multilevel facilitators and barriers related to delivery of patient-centered care based on the ecologic model, which describes hierarchical influences on patient-PCP encounters at the intra- and interpersonal, institutional, and community levels. We applied further deductive codes among facilitators based on the Scholl model. Content was categorized and coded by team members individually, who then met to reach consensus.

RESULTS: Participating PCPs had been in practice on average 20.5 years; 14 (61%) were female. Both hospital- and community-affiliated clinics were represented across all regions of the U.S. Many PCPs described intra- and interpersonal facilitators of patient-centered care. Clinician-patient communication was a common facilitator, including seeking and prioritizing a patient's goals for care, adapting communication styles, and recognizing that patients want to feel "heard" as part of "buy-in" to care recommendations. PCPs felt that teamwork also facilitated a patient-centered ability to quickly meet patient needs. PCPs perceived several intra- and interpersonal barriers, such as differences in alignment on goals of care; lack of patient trust or engagement; and patient unwillingness to disclose information. PCPs described institutional barriers of time constraints, provider burnout, organizational complexity (such as cumbersome test ordering or delays in result reporting), and rarely, community or policy-level barriers.

CONCLUSIONS: PCPs within the VHA described a range of factors related to patient-centered care delivery, facilitated mainly by interpersonal clinician-patient communication and recognition of the patient's individuality. PCPs described barriers at multiple care levels. Interventions attempting to increase patient-centered care delivery should consider these factors.

LEARNING OBJECTIVE #1: Not provided by author.

LEARNING OBJECTIVE #2: Not provided by author.

NEGATIVE PATIENT DESCRIPTORS: DOCUMENTING RACIAL BIAS IN THE ELECTRONIC HEALTH RECORD

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BACKGROUND: There is robust evidence of racial bias in healthcare, but little is known about how healthcare providers communicate bias in the medical record. Prior studies have shown that stigmatizing language in clinical vignettes (i.e., medical record proxies) can influence providers' beliefs about hypothetical patients and providers' intended pain control treatment plans. This study utilizes real patient medical records to investigate the association between the use of negative patient descriptors by providers and patients' race.

METHODS: We analyzed a sample of 23,138 history and presentation (H&P) notes in the electronic health record (EHR) from 12,101 adult patients admitted to the University of Chicago Medical Center between January and October 2020. Negative descriptors (e.g., aggressive, combative, non-compliant, uncooperative, resistant) were generated from the literature and reviewed by SGIM's Health Equity Commission. A sample of sentences from H&P notes was split into training and testing sets, pre-processed with natural language processing techniques, and labeled for ternary sentiment classification. A linear machine learning model was trained and applied to all H&P notes to classify sentences with negative descriptors. We fit mixed effects logistic regression models to determine the adjusted odds of having a negative descriptor as a function of race, controlling for sociodemographic (sex, age, language, marital status, health insurance) and health (comorbidities, positive COVID-19 test) characteristics with notes clustered at the patient level. We adjusted for COVID-19 tests because data were collected during the COVID-19 pandemic.

RESULTS: The sentence classification model obtained the following macro average value metrics on the testing set: precision=0.939; recall=0.931; F1=0.935. More than half of patients were Black (57%) and female (59%). 3.3% of patients had at least one negative descriptor in the EHR. Black race was associated with 2.27 times higher adjusted odds (95% CI 1.62-3.18) of having a negative descriptor in the EHR. Patients with Medicare or Medicaid (AOR=2.37, 95% CI 1.72-3.25), one or more comorbidities (AOR=1.96, 95% CI 1.48-2.60), and unmarried patients (AOR=1.77, 95% CI 1.32-2.37) were associated with higher adjusted odds for a negative descriptor. Patients ages 65 and older were associated with lower adjusted odds, compared to ages 18-24 (AOR=0.516, 95% CI 0.324-0.822).

CONCLUSIONS: Black patients had more than two-fold higher odds than whites of having at least one negative descriptor in the EHR, even after adjusting for sociodemographic and health characteristics. Our findings raise deep concerns about provider bias and its potential impact on patient care and

health outcomes. Mitigating health disparities requires a multi-faceted approach, including addressing how providers view, document, and care for racialized minority patients.

LEARNING OBJECTIVE #1: Explore the use of negative patient descriptors in the EHR.

LEARNING OBJECTIVE #2: Examine racial differences in the use of negative descriptors.

OLDER ADULTS' ACCESS TO PRIMARY CARE DURING THE 1ST WAVE OF THE COVID-19 PANDEMIC: GENDER AND ETHNIC DISPARITIES IN TELEMEDICINE

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BACKGROUND: In the early days of the COVID-19 pandemic in the US, primary care practices had to rapidly adopt telemedicine as an alternative to in-person visits. Little is known about whether access to telemedicine versus in-person visits was equitable, especially among historically underserved patients, nor about potential health consequences of different modalities of primary care visits. Understanding disparities in access to telemedicine by older adults and potential health consequences can help inform health system practices and policies aiming to improve health equity.

METHODS: We conducted a retrospective analysis of 42,923 patients aged 50 or older treated at 32 primary care clinics affiliated with a large health system in the Mid-Atlantic from 3/1/2020 to 5/31/2020. Patients were classified in two groups – telemedicine vs. in-person – based on the first encounter during the study interval and followed for 14 days. We examined patient age, gender, race, ethnicity, and comorbidities using the Charlson Comorbidity Index. We assessed odds of hospitalization for ambulatory care sensitive conditions (ACSCs) and all-cause hospitalizations during the 14 days following the visit using multivariable logistic regression. The odds of hospitalization was adjusted for age, gender, race, ethnicity, comorbidity, and week of study period (to account for time trends).

RESULTS: Mean age was 67 years (SD=11), 61% were female, 62% white, 29% Black, and 3% Hispanic. Overall, 69% of patients were seen by telemedicine and 2% were hospitalized. Hispanic patients had lower odds of using telemedicine than Non-Hispanic patients (OR=0.77; 95% CI=0.64-0.91; p=0.03), and females had higher odds of using telemedicine than males (OR=1.19; 95% CI=1.13-1.26; p<0.01). Age and race were not significantly associated with visit type. Compared to patients in the in-person visit group, patients in the telemedicine group had lower odds of ACSC (OR=0.81; 95% CI=0.67-0.97; p=0.03) and all-cause hospitalization (OR=0.75; 95% CI=0.63-0.89; p<0.01) in the 14 days following the visit.

CONCLUSIONS: Among older adults, individuals who were Hispanic or male had lower odds of accessing primary care via telemedicine. Notably, rates of telemedicine use did not differ for the "oldest old" vs. younger subgroups of older patients, nor between white and Black patients. Patients seen via telemedicine had lower odds of hospitalization. This finding may be explained by unobserved differences in case mix between the two groups (e.g., patients and practices may triage higher-risk cases to be seen in-person) and should be explored in future studies. These findings support the use of telemedicine to expand primary care access for older adults.

LEARNING OBJECTIVE #1: To measure disparities in access to primary care via telemedicine by older adults.

LEARNING OBJECTIVE #2: To inform health system practices and policies aiming to improve health equity and expand primary care access for older adults.

OUTPATIENT UTILIZATION PATTERNS OF DUAL ELIGIBLE MEDICARE BENEFICIARIES

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BACKGROUND: Dual eligible Medicare beneficiaries who qualify for both Medicare and Medicaid (collectively known as “duals”) are more likely to be racial or ethnic minorities and of low socioeconomic status, putting them at greater risk for adverse health outcomes. While prior work has focused on inpatient utilization among duals, little is known about outpatient utilization patterns. There is also a dearth of information about which physicians and groups serve as a critical outpatient “safety-net” providers by caring for large proportions of duals. It is important for policymakers to address both knowledge gaps given numerous recent policy changes in outpatient care that could adversely impact duals or the physicians that care for them. In this study, we provide new evidence to characterize how duals use outpatient care and the characteristics of physicians providing care to large proportions of duals.

METHODS: Using a 20% sample of 2013 Medicare Part B files, we compared outpatient primary and specialty care utilization (number of visits, number of different outpatient physicians seen per patient, monthly outpatient expenditures) and sites of care (office-based, federally qualified health center, outpatient hospital visits, emergency department visits) between duals and non-duals. We then examined whether outpatient care for duals was concentrated among a small number of physicians or physician group practices. Finally, we compared physician and physician group practice characteristics (at the patient-, practice- and community-level) between those caring for high vs. low proportions of duals.

RESULTS: Our sample included 524,198 duals and 1,945,846 non-duals in 2013. On average, duals had 15.5 outpatient visits compared to 18.3 visits among non-duals ($p < 0.001$), and saw 6.5 different outpatient physicians per year compared to 7.7 among non-duals ($p < 0.001$). Both duals and non-duals received outpatient care most frequently in office-based settings. Nearly 80% of duals were cared for by 32% of physicians and physician group practices. Physicians or physician group practices caring for larger shares of duals were more likely to be located in communities with higher rates of poverty (12.1% vs. 10.8%, $p < 0.001$) and lower median household income (\$57,923 vs. \$58,109, $p < 0.001$).

CONCLUSIONS: In the first study to examine outpatient utilization for duals vs. non-duals, we found that duals used less outpatient care than non-duals. Their care was concentrated among a small number of physicians and physician group practices that were more likely to be in communities characterized by higher levels of poverty. These practices may comprise an outpatient system of “safety-net” providers that would benefit from tailored payment and policy approaches.

LEARNING OBJECTIVE #1: Describe the outpatient care patterns of dual eligible Medicare beneficiaries

LEARNING OBJECTIVE #2: Understand the types of physicians that care for the majority of dual eligible Medicare beneficiaries

PATIENT CHARACTERISTICS ASSOCIATED WITH TELEMEDICINE USE AT A LARGE ACADEMIC HEALTH SYSTEM BEFORE AND AFTER COVID-19

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BACKGROUND: The COVID-19 pandemic led to the rapid adoption of telemedicine in ambulatory care settings nationwide. The unprecedented shift to telemedicine raises important questions regarding equity in telemedicine access among vulnerable populations. In this study, we describe the increased adoption of telemedicine at a large academic health system since the onset of the COVID-19 pandemic and examine our hypothesis that this increased adoption is associated with widening racial, ethnic, and socioeconomic differences in care utilization.

METHODS: We studied all adult telemedicine (video, telephone) and in-person ambulatory encounters at the University of California, Los Angeles Health System that occurred between December 1, 2019 and June 30, 2020.

March 19th was defined as the start of the COVID-19 pandemic. We evaluated patient-level variables by encounter type, including age, sex, race, ethnicity, primary language, insurance status, zip code-associated median household income, clinic distance, and number of patient comorbidities. We constructed multilevel mixed effects logistic regression models before and after COVID-19, controlling for demographic and clinical covariates, to identify characteristics independently associated with having a telemedicine versus in-person encounter during each time period.

RESULTS: In total, 3,371 out of 644,630 visits (0.5%) were conducted via telemedicine from December 1-March 18 compared with 186,127 out of 451,577 visits (41.2%) from March 19-June 30. Most telemedicine encounters were video visits (pre-pandemic = 96.0%, post-pandemic = 98.2%), with remaining visits conducted via telephone. Both before and after COVID-19, patients aged 65 years or older, non-English speaking patients, male patients, and Medicare-insured and uninsured patients had lower adjusted odds of telemedicine use compared with patients under 65 years, English-speaking patients, female patients, and patients with commercial insurance, respectively ($p < 0.05$ for all comparisons). Additionally, after the pandemic onset, patients residing in low- and middle-income zip codes, Asian-American and multiracial patients, Latinx patients, and patients with Medicaid coverage had lower odds of having a telemedicine encounter than their respective reference groups ($p < 0.05$).

CONCLUSIONS: Our results show demographic differences in telemedicine utilization by age, primary language, and insurance status that pre-date the pandemic, as well as additional differences by race, ethnicity and zip code-based income since the pandemic onset. These differences extend the existing body of evidence that the pandemic has contributed to a growing “digital divide” in the uptake of virtual care. Future studies should identify the complex causes of the observed differences and evaluate whether these differences propagate disparities in health outcomes.

LEARNING OBJECTIVE #1: To shed light on observed demographic differences in telemedicine use

LEARNING OBJECTIVE #2: To allow for the development of targeted interventions to ensure equity in telemedicine use

PATIENT PERSPECTIVES OF HEALTH-RELATED SOCIAL NEEDS SCREENING IN PRIMARY CARE

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BACKGROUND: Unmet health-related social needs (HRSNs) may result in adverse health outcomes and increase healthcare utilization by patients. Yet, primary care assessment of patient HRSNs is not widespread in part due to questions of whether HRSN screening may significantly change clinical practice and whether healthcare systems have the capacity to screen and address HRSNs. As part of a needs assessment of HRSNs in an urban academic adult primary care practice, we sought patient perspectives on HRSN screening.

METHODS: We conducted a self-administered anonymous survey to a random convenience sample of English-, Chinese- or Spanish-speaking patients from clinic waiting rooms prior to clinic visits from February-October 2019. The survey included questions pertaining to seven domains of HRSNs from the Accountable Health Communities HRSN Screening Tool from Centers for Medicare and Medicaid Services, sociodemographic data, and an unstructured open answer space for patients to provide qualitative comments at the end of the survey. Qualitative comments provided by patients were recorded in REDCap. Content thematic analysis was conducted by two coders using an iterative process to identify common themes across qualitative comments.

RESULTS: 679 patients completed the survey. 57% of participants were female with a mean age of 58+18 (range 18-101); 5% completed the survey in Spanish and 10% completed the survey in Chinese. 93 (14%) respondents provided comments and feedback. Qualitative analysis of these comments revealed an overall positive response to HRSN screening. Participants included

expressions of concern for others and gratitude for their health status or socioeconomic situation. Several participants commented on how HRSN screening could improve patient care by providing an avenue for patients to seek help in addressing unmet HRSNs. One participant said “I hope this survey helps others who are in dire need and are too scared to ask for help.” The survey also elicited patient narratives and contextual considerations related to HRSN domains assessed in the survey. One participant’s narrative was in relation to housing instability: “I am couch surfing, as I am trying to recover from an on-the-job injury to my right shoulder, elbow and wrist. I was also rear ended at a stop light. I have lost my job due to injury and I am fighting for treatment and compensation to heal and return to work, but it’s really hard to do without stable income or place to live.” A few participants shared their stories of overcoming unmet HRSNs in the past. No comments directly conveyed concern or dissatisfaction with HRSN screening.

CONCLUSIONS: Social needs assessment and screening can both identify unmet HRSNs and be a powerful tool in eliciting patient narratives that can inform and provide context for patient-centered primary care.

LEARNING OBJECTIVE #1: To discuss patient perspectives of HRSN screening in primary care

LEARNING OBJECTIVE #2: To demonstrate the role of HRSN screening to communicate about patient-important contextual factors that influence health

PERSPECTIVES ON DIABETES DISTRESS, COPING, AND MINDFULNESS FROM ADULTS WITH TYPE 2 DIABETES: A QUALITATIVE STUDY

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BACKGROUND: Diabetes distress—the emotional burden of living with and managing diabetes—affects up to 36% of adults with type 2 diabetes and is associated with worse self-management and outcomes. In this qualitative study, we explored how adults with type 2 diabetes experience and cope with diabetes distress and queried their perspectives on mindfulness-based interventions.

METHODS: We recruited adults with type 2 diabetes (age 19-64 years), who receive care at a local safety-net healthcare system in Jefferson County, AL, to complete a semi-structured phone interview. We collected demographic and clinical information; during interviews, we asked about the influence of emotions and stress on diabetes self-management behaviors, coping mechanisms or other supportive strategies used by participants, prior experience with and acceptability of mindfulness-based interventions, and preferences for intervention structure and content. Interviews were recorded and transcribed verbatim. Two coders independently analyzed transcripts using a combined deductive, inductive approach.

RESULTS: Twenty-three adults with type 2 diabetes completed interviews between April and December 2020. Mean age was 56.0 years \pm 5.2; 18 were women and 96% Black. Mean duration of diabetes 11.6 years \pm 8.0, 48% used insulin, and mean diabetes distress score was in the moderate range (2.2 \pm 1.2). Briefly, themes that emerged from interviews included the following: bidirectional relationships of stress with diabetes self-management behaviors and blood glucose control; stress management or coping strategies used including physical activity, religious practices, and support from family/friends; maladaptive or avoidant strategies, including emotional eating, non-adherence to recommended diabetes self-management; and prior experience with mindfulness and acceptability of mindfulness-based approaches (“[mindfulness] helped because you tend to think about the fact that what’s going on at that moment is not that deep in. Don’t let it take over and control you”).

CONCLUSIONS: Our qualitative study provides important information on the coping and stress management strategies employed by low-income adults with type 2 diabetes; also, our study population reported mindfulness-based approaches to be acceptable. We have applied these findings to adapting a

mindfulness-based intervention that integrates Mindfulness-Based Stress Reduction with Diabetes Self-Management Education focused on reducing diabetes distress and improving self-management in low-income adults with type 2 diabetes and elevated diabetes distress.

LEARNING OBJECTIVE #1: To be aware of coping strategies used by adults with type 2 diabetes.

LEARNING OBJECTIVE #2: To be aware of acceptability of mindfulness-based approaches among adults with type 2 diabetes.

RACE, SOCIAL DETERMINANTS AND COVID-19 MORTALITY PATTERNS IN THE UNITED STATES.

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BACKGROUND: The objectives of our study were to uncover region-specific sociodemographic features and disease-risk prevalence correlated with COVID-19 mortality during the early accelerated phase of community spread. Multiple published reports called attention to the disproportionate impact of the pandemic on racial and ethnic minority communities, and the potential influence of social determinants on health outcomes. However, the influence of social risk factors was minimized in initial studies. We sought to further understand the influence of social factors for rapid community spread, focusing on prominent demographic and socioeconomic factors. We assessed two geographic boundary conditions: one based on 9 U.S. census divisions, and one based on counties algorithmically clustered according to sociodemographic similarities. We hypothesized that distribution of vulnerability and mortality risk from COVID-19 may vary based on underlying demographic and socioeconomic indicators.

METHODS: We used a machine learning clustering algorithm and analyzed mortality correlation with 34 individual sociodemographic and disease-risk variables for cases reported in the U.S. between 1/22/20-6/22/20. This algorithm utilizes an agglomerative hierarchical clustering method that starts with each county as an individual cluster and merges counties based on area sociodemographic similarities.

RESULTS: The hierarchical clustering method yielded 6 distinct clusters. Mortality in the highest two clusters, Cluster 4 ($\rho = -1.620033$; $P < 0.0001$; Southern Black Belt, Navajo nation) and Cluster 5 ($\rho = -1.790376$; $P < 0.0001$; New York, Spokane), was positively correlated with specific features. In Cluster 4, the 5 top features were proportion of black residents, HIV prevalence rate, unemployment rate, social vulnerability index and proportion in fair to poor health. In Cluster 5, the 5 top features were residential segregation (non-white, white), minority-status language, proportion of black residents, preventable hospitalization rate, and median household income. Cluster 6 (San Bernardino, Pima, Miami-Dade) had the most counties meeting CDC-hotspot criteria for more than one 7-day average from March through July 2020.

CONCLUSIONS: Comprehensive regional data are important to inform local or regional strategies and policies, enabling efforts to be focused where vulnerability is the greatest. Understanding community determinants associated with mortality can help predict and offer insights into potential hotspots where public health resources and communication strategies can be targeted. Given recent increases in COVID-19 in the U.S., public health interventions must be guided by available evidence to help mitigate the influence of regional social and economic determinants on adverse outcomes.

LEARNING OBJECTIVE #1: Distinguish the key sociodemographic factors that influenced mortality from COVID-19 in regions and counties across U.S.

LEARNING OBJECTIVE #2: Assess targeted social interventions at the local and regional levels to address COVID-19 related disparities.

RACIAL DISPARITIES IN POTENTIALLY AVOIDABLE HOSPITALIZATIONS DURING THE COVID-19 PANDEMIC

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BACKGROUND: Potentially avoidable hospitalizations are disproportionately experienced by racial and ethnic minorities and expose these groups to unnecessary iatrogenic harm (including risk of nosocomial COVID-19) and undue financial burden. Towards an overarching goal of eliminating racial and ethnic health disparities, it is important to understand whether and to what extent potentially avoidable hospitalizations have changed by race and ethnicity during the COVID-19 pandemic.

METHODS: This single-center pre-post study of 904 patients at UCLA included all patients admitted to an internal medicine service for an ambulatory care sensitive condition (ACSC) between March–August of 2020 (post) and March–August of 2019 (pre). We measured the change in number of potentially avoidable hospitalizations (defined per the Agency for Healthcare Research and Quality guidelines) stratified by race and ethnicity. We calculated 95% CIs for the number of potentially avoidable hospitalizations using a cluster bootstrap procedure, clustering at the level of patients. We inverted the bootstrap CIs to calculate p-values for overall changes within racial/ethnic groups as well as differential changes between groups. Patients with missing or unspecified racial/ethnic data were excluded (n=1,003; 7.8%).

RESULTS: Between March 1 and August 31, 2020, 347 out of 4,838 hospitalizations (7.2%) were potentially avoidable, compared to 557 out of 6,248 (8.9%) during the same 6-months of 2019.

Reductions in potentially avoidable hospitalizations among Non-Hispanic White (-50.3%; 95% CI, -60.9 - -41.2; p<0.001) and Latinx (-32.3%; 95% CI, -59.8 - -12.2%, p<0.001) patients were statistically significant, whereas reductions among African American (-8.0%; 95% CI, -39.9 - +16.2) and Asian (-16.1%; 95% CI, -75.7 - +20.4) patients were not statistically different from 0%. The relative differences in magnitudes of reduction were only statistically significant between non-Hispanic White and African American patients (-50.3% v. -8.0%; 95% CIs as above; p=0.015).

CONCLUSIONS: Racial disparities in potentially avoidable hospitalizations increased during the COVID-19 pandemic at this large urban health system. Given that pre-pandemic rates of potentially avoidable hospitalizations were already higher among racial and ethnic minorities, especially African Americans, this finding should raise alarm and lead to further exploration of the complex factors contributing to these disparities. Institutional and governmental health policy makers should focus on comprehensive reform that can minimize low-value healthcare without unintentionally widening racial/ethnic gaps in care.

LEARNING OBJECTIVE #1: Avoidable hospitalizations have decreased among Non-Hispanic Whites but not African Americans during the COVID-19 pandemic, which may be a marker of unequal access to quality care.

LEARNING OBJECTIVE #2: This disparity may represent a health systems-based flaw that should be examined by both institutional and governmental health policymakers.

RACIAL DISPARITIES IN PREVENTABLE ADVERSE EVENTS ATTRIBUTED TO POOR CARE COORDINATION: A NATIONAL STUDY OF OLDER ADULTS IN THE U.S

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BACKGROUND: Previous work has found that Black patients experience worse care coordination than White patients. Whether there are racial differences in adverse events attributable to poor care coordination is unknown. The

objective of the current study is to determine if there are racial disparities in self-reported adverse events that could have been prevented with better communication. Identifying racial disparities in self-reported outcomes is important, because it would suggest that some participants are especially vulnerable to poor communication among providers.

METHODS: We used data from a cross-sectional survey that was administered to participants in the Reasons for Geographic and Racial Differences in Stroke (REGARDS) study in 2017–2018. REGARDS is a national, population-based cohort study. We limited our sample to REGARDS participants aged 65+ years of age at the time of the survey who reported ≥ 2 ambulatory visits and ≥ 2 providers in the prior 12 months (thus at risk for gaps in care coordination). Our primary outcome was the occurrence of any repeat test, drug-drug interaction, or emergency department visit or hospitalization that respondents thought could have been prevented with better communication among their providers. We used modified Poisson models with robust standard error to determine if there were differences in rates of preventable events by race, adjusting for potential demographic and clinical confounders. Adjusted risk ratios (aRR) and 95% confidence intervals (95% CI) were calculated for all estimates.

RESULTS: Among the 7,568 REGARDS respondents included in our study, the mean age was 77 years (SD 6.7), 55.4% were female, and 33.6% were Black. Black participants were significantly more likely to report any of the selected preventable adverse events compared to White participants (aRR 1.64; 95% CI 1.42, 1.89). Specifically, Blacks were more likely than Whites to report a repeat test (aRR 1.77; 95% CI 1.38, 2.29), a drug-drug interaction (aRR 1.76; 95% CI 1.46, 2.12), and an emergency department visit or hospitalization (aRR 1.45; 95% CI 1.01, 2.08).

CONCLUSIONS: Black participants were significantly more likely to report preventable adverse events attributable to poor care coordination than Whites, independent of demographic and clinical characteristics. Future studies should seek to understand the mechanisms by which better communication could prevent adverse events. By gaining a deeper understanding of the ways that gaps in communication lead to preventable events among minority patients we can tailor existing communication strategies to address communication challenges, thus decreasing preventable adverse events and reducing racial disparities.

LEARNING OBJECTIVE #1: To determine if Blacks are more likely to experience adverse events that they felt could be prevented by better communication compared to Whites.

LEARNING OBJECTIVE #2: To understand that extent to which socio-demographic and clinical factors explain observed differences in self-reported adverse events between Black and White adults.

RISK FACTORS FOR 30-DAY READMISSION OF COVID-19 PATIENTS: A RETROSPECTIVE – PROSPECTIVE STUDY FROM THE CROSS (COVID-19 CHARACTERISTICS OF READMISSIONS AND OUTCOMES AND SOCIAL DETERMINANTS OF HEALTH STUDY) COLLABORATIVE

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BACKGROUND: The number of survivors of an initial COVID-19 disease hospitalization is growing and further data describing clinical and sociodemographic risk factors for hospital readmissions is needed. The CROSS Collaborative was developed in July 2020 and is a multidisciplinary, multi-hospital group dedicated to examining reasons for COVID-19 hospital readmissions, associated clinical outcomes, and exploration of social determinants of health that place patients at risk for readmission.

METHODS: In this retrospective/prospective study, data extraction via the clinical data warehouse and manual chart reviews was used to gather patient demographics, clinical characteristics and clinical outcomes of readmitted

COVID-19 patients to four Emory Healthcare hospitals. (Patient-level zip code data will be used in future analyses to explore the effects of social determinants of health on 30-day readmissions).

RESULTS: 2399 PCR-positive COVID-19 patients were hospitalized. 153 were readmitted within 30 days. 72% of the readmitted patients were Black or Hispanic. 30-day readmission rates varied from 1.9% to 4.7% across the four hospitals. Diabetes (P-value: 0.03) and end stage renal disease (P-value: 0.004) reached statistical significance for 30-day readmission (Table 1)

CONCLUSIONS: Black and Hispanic patients comprised the majority (72%) of readmitted COVID-19 patients. Diabetes and end stage renal disease were associated with increased risk for 30-day readmission in COVID-19 patients

LEARNING OBJECTIVE #1: Exploration of patient demographics, clinical characteristics and clinical outcomes of readmitted COVID-19 patients to four Emory Healthcare hospitals

LEARNING OBJECTIVE #2: Exploration of social determinants of health that place patients with Covid 19 at risk for readmission.

SHORT AND LONG-TERM EFFECTS OF DISCRIMINATION ON MENTAL HEALTH, SUBSTANCE USE, AND WELLBEING IN YOUNG ADULTS

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BACKGROUND: No studies have evaluated the impact of discrimination on behavioral health and wellbeing in the young adult population (ages 18-25) using nationally-representative data. Young adulthood is a pivotal time for behavioral health (including mental health and substance use) disorders and

evidence is needed on how different types of discrimination affect health and wellbeing in this age group over the short and long-term.

METHODS: We used data from six waves of the Transition to Adulthood supplement (2007-2017; 1,834 participants; 90% response rate) of the nationally-representative Panel Study of Income Dynamics. Outcome variables included self-reported health, drug use, binge drinking, mental illness diagnosis, Languishing and Flourishing score, and Kessler K6 psychological distress score. Self-reported discrimination frequency was measured by the Everyday Discrimination scale, and we created sub-categories based on the primary perceived reason as reported by participants, including race/ethnicity/ancestry, age, gender, and physical appearance. Cumulative high frequency discrimination was assessed as number of waves a participant reported high levels of discrimination. Longitudinal logistic regressions with cluster-robust variance estimation tested associations between discrimination frequency (overall and by different reason) and outcomes, controlling for sociodemographics.

RESULTS: Increased discrimination frequency was associated with higher odds of languishing, psychological distress, mental illness, and poor self-reported health concurrently and 2-6 years after exposure to discrimination. Similar associations were found with cumulative high frequency discrimination and with each discrimination sub-category in cross-sectional and longitudinal analyses. However, only racism was not associated with increased odds of mental illness cross-sectionally, and only racism and ageism were linked to drug use longitudinally.

CONCLUSIONS: In this nationally-representative longitudinal sample, current and past discrimination had pervasive adverse effects on behavioral health and wellbeing in young adults.

LEARNING OBJECTIVE #1: Describe increased risk of worse behavioral health and wellbeing in young adults associated with interpersonal discrimination in the short-term, long-term, and cumulatively.

LEARNING OBJECTIVE #2: Compare differences in behavioral health and wellbeing associated with various types of discrimination.

Table 1 - Pooled Cross-Sectional and Longitudinal Associations Between Frequency of Type of Discrimination Experienced and Mental, Behavioral, Emotional, and Overall Health Outcomes with Two-, Four-, and Six-Year Lags

Time lags (years)	Languishing OR (95% CI)				High risk psychological distress OR (95% CI)				Mental Illness OR (95% CI)				Drug Use OR (95% CI)				Binge Drinking OR (95% CI)				Poor Self-reported health OR (95% CI)			
	Zero	Two	Four	Six	Zero	Two	Four	Six	Zero	Two	Four	Six	Zero	Two	Four	Six	Zero	Two	Four	Six	Zero	Two	Four	Six
Frequency																								
Overall Discrimination	***1.5 (1.3, 1.6)	**1.2 (1.1, 1.4)	1.2 (1.0, 1.5)	1.2 (0.9, 2.5)	***2.1 (1.8, 2.5)	***1.6 (1.3, 2.0)	***1.8 (1.4, 2.4)	**1.8 (1.3, 2.6)	***1.3 (1.2, 1.5)	*1.3 (1.1, 1.7)	*1.3 (1.0, 1.6)	1.3 (1.0, 1.7)	***1.4 (1.3, 1.6)	1.2 (1.0, 1.4)	*1.2 (1.0, 1.5)	*1.3 (1.0, 1.7)	1.1 (1.0, 1.3)	1.1 (0.9, 1.4)	1.0 (0.7, 1.3)	0.9 (0.6, 1.3)	***1.3 (1.1, 1.5)	1.2 (1.0, 1.4)	**1.3 (1.1, 1.7)	*1.4 (1.0, 1.8)
Racism	***1.6 (1.3, 1.9)	**1.5 (1.2, 1.9)	1.1 (0.8, 1.6)	1.2 (0.8, 1.7)	***2.1 (1.6, 2.8)	**2.0 (1.3, 3.3)	1.7 (1.0, 2.8)	---	1.2 (0.9, 1.5)	0.9 (0.6, 1.3)	0.6 (0.4, 0.9)	1.6 (1.1, 2.7)	***1.5 (1.3, 1.7)	**1.4 (1.1, 1.8)	1.4 (0.9, 1.9)	*1.8 (1.2, 2.6)	1.0 (0.9, 1.3)	1.1 (0.7, 1.6)	0.6 (0.3, 1.0)	1.0 (0.4, 4.4)	1.0 (0.8, 1.3)	1.1 (0.7, 1.4)	1.2 (0.8, 1.8)	1.0 (0.5, 1.9)
Sexism	***1.6 (1.4, 1.9)	1.3 (1.1, 1.7)	1.0 (0.7, 1.4)	1.2 (0.8, 2.0)	***2.2 (1.6, 2.8)	***2.1 (1.5, 2.9)	***3.7 (2.6, 7.8)	*2.9 (1.1, 7.8)	***1.5 (1.2, 1.8)	1.3 (0.9, 1.8)	1.4 (0.9, 2.2)	1.3 (0.6, 2.7)	***1.5 (1.3, 1.8)	1.2 (0.9, 1.7)	1.0 (0.7, 1.5)	1.6 (1.1, 2.6)	1.2 (1.0, 1.5)	1.2 (0.8, 1.8)	1.0 (0.7, 1.7)	0.9 (0.5, 1.7)	1.2 (1.0, 1.5)	1.2 (0.9, 1.7)	0.9 (0.7, 1.2)	1.0 (0.7, 2.7)
Ageism	***1.5 (1.3, 1.8)	**1.3 (1.1, 1.6)	1.1 (0.9, 1.4)	*1.6 (1.1, 2.3)	***2.7 (2.0, 3.7)	**1.5 (1.2, 2.0)	***2.2 (1.5, 3.2)	*1.8 (1.1, 3.0)	*1.3 (1.0, 1.6)	1.2 (0.9, 1.7)	1.2 (0.8, 1.7)	*1.9 (1.1, 3.1)	***1.4 (1.3, 1.6)	*1.3 (1.1, 1.7)	*1.6 (1.1, 2.2)	*1.1 (0.9, 1.4)	1.3 (1.0, 1.9)	1.3 (0.9, 1.4)	0.9 (0.6, 1.8)	1.0 (0.5, 1.8)	1.2 (1.0, 1.4)	1.1 (0.9, 1.4)	1.1 (0.7, 1.4)	1.4 (1.1, 2.2)
Physical Appearance Discrimination	***1.6 (1.4, 1.9)	**1.3 (1.1, 1.6)	1.2 (1.0, 1.6)	1.2 (0.9, 1.7)	***2.4 (1.9, 3.1)	***2.2 (1.5, 3.4)	**1.9 (1.3, 2.9)	1.5 (0.8, 2.9)	**1.4 (1.2, 1.7)	1.3 (1.0, 2.0)	*1.4 (1.0, 2.0)	1.3 (0.8, 2.0)	***1.5 (1.3, 1.7)	1.1 (0.9, 1.4)	1.3 (1.0, 2.4)	*1.6 (1.1, 2.4)	1.1 (0.9, 1.5)	1.1 (0.8, 1.5)	1.0 (0.6, 1.4)	0.9 (0.5, 1.4)	***1.4 (1.1, 1.6)	*1.3 (1.0, 1.4)	**1.4 (1.1, 1.8)	*1.7 (1.1, 2.7)
Other Discrimination	**1.2 (1.1, 1.4)	**1.4 (1.1, 1.7)	*1.3 (1.0, 1.6)	1.3 (0.9, 1.9)	***1.6 (1.3, 2.0)	*1.6 (1.1, 2.3)	**1.7 (1.2, 2.4)	***4.0 (2.0, 7.8)	**1.4 (1.1, 1.7)	*1.5 (1.1, 2.0)	**1.6 (1.1, 2.3)	1.6 (0.8, 3.0)	***1.5 (1.3, 1.7)	1.2 (0.9, 1.6)	1.3 (0.9, 1.8)	1.5 (1.1, 2.6)	1.1 (0.8, 1.4)	0.8 (0.5, 1.4)	0.8 (0.5, 1.3)	0.6 (0.2, 1.7)	*1.3 (1.0, 1.6)	1.1 (0.9, 1.4)	*1.5 (1.1, 2.0)	*1.8 (1.2, 2.9)

OR=Odds Ratio; 95% CI = 95% Confidence Interval.
 Models adjusted for age, sex, race, family income, marital status, educational attainment, parental educational attainment, health insurance status, and annual doctor checkup
 Other Discrimination category includes discrimination on the basis of sexual orientation, disability, religion, occupation, etc.
 Not enough data for ancestry or race discrimination in six-year lagged model
 *p<0.05; **p<0.01; ***p<0.001

SITE-LEVEL FACTORS ASSOCIATED WITH SUPERIOR BLOOD PRESSURE CONTROL AMONG NON-HISPANIC BLACK ADULTS IN AMBULATORY HEALTHCARE SETTINGS

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BACKGROUND: Non-Hispanic Black (NHB) adults bear a disproportionate burden of uncontrolled hypertension (HTN) in the US.

METHODS: BP Track conducts surveillance of blood pressure (BP) control and BP-related process metrics from electronic health record (EHR) data collected by PCORnet, the National Patient-Centered Clinical Research Network. We used this data to identify and analyze site-level BP control metrics

for NHB adults from 2017 through mid-2020. We analyzed 43 clinical sites with >100 hypertensive NHB adults, representing approximately 40,000 NHB adults. BP control was defined, for 1-year periods on a rolling quarterly basis from 2017 to mid-2020, as the percent of hypertensive adults with a most recent BP measurement of <140/90 mmHg. We identified sites achieving “Gold Status”, defined as mean BP control $\geq 70\%$ across measurements per AHA/AMA’s Target: BP initiative. Generalized estimating equations were used to analyze site-level predictors of % BP control (continuous outcome) among NHB adults.

RESULTS: BP control for NHB adults ranged from 37% to 77%, with a mean (weighted by number of NHB adults) of 60% (SD 9.7%) across sites. Two sites averaged BP control $\geq 70\%$ among NHB adults (71% and 77%) over the study period. Compared to other sites, these sites treated fewer adults with HTN overall (mean \pm SD=368 \pm 94 vs. 6251 \pm 14320), more of whom were ≥ 65 years old (56% vs 40%), Non-Hispanic White (63% vs 49%), taking ≥ 1 BP medication (87% vs 71%), and fewer of whom were female (51% vs 57%) and had coronary artery disease (CAD) (9% vs 17%), type 2 diabetes (14% vs 33%), congestive heart failure (CHF) (5% vs 10%) and depression (9% vs 16%). In fully adjusted models, higher BP control among NHB adults was inversely associated with proportions of patients with HTN that were Hispanic (-0.4% per 1%, 95% CI -0.7 to -0.1, $p=0.004$) or had CAD (-0.4% per 1%; -0.8 to -0.01, $p=0.04$), and directly associated with proportions of patients prescribed any medications (0.6% per 1%; 0.2 to 1.0, $p=0.004$) or had CHF (0.5% per 1%, 0.1 to 0.9, $p=0.008$). EHR-derived BP-related process metrics were not significantly associated with BP control among NHB adults, including medication intensification, confirmatory BP measurement, proportion returning for a repeat visit within 4 weeks after a visit with elevated BP, or use of fixed dose combo therapy, a CCB or Thiazide or Thiazide-like diuretics.

CONCLUSIONS: Only two sites demonstrated consistently high ($\geq 70\%$) BP control in NHB adults; high performing clinics were smaller and served a different patient mix – with seemingly fewer co-morbidities. EHR-derived BP-related process metrics measured in BP Track were not associated with site-level BP control in NHB adults. An exploration of contextual factors may be required to elucidate drivers of high performance and clarify how clinics might improve BP control in NHB patients.

LEARNING OBJECTIVE #1: Identify existing race/ethnic disparities in hypertension.

LEARNING OBJECTIVE #2: Identify factors associated with clinic-level blood pressure control among Black adults.

SOCIAL CHARACTERISTICS AND STRUCTURAL VULNERABILITIES UNDERLINED BY COVID-19 AT A SAFETY-NET - HOSPITAL IN AUSTIN, TEXAS

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BACKGROUND: The COVID-19 pandemic has highlighted the disproportionate burden of disease on our most vulnerable communities, particularly in communities of color. Even so, it is rare for health care systems to collect more than surface level social data on the communities they serve. For health systems and governments to enact policies to care for the communities most affected by the social and economic consequences of the present pandemic and allocate resources appropriately, it is imperative to understand the social and structural inequities affecting our patients.

METHODS: All patients with laboratory-confirmed COVID-19 admitted at Dell Seton Medical Center, an urban hospital in Austin, Texas from 3/29/2020 to 6/22/2020 were included in analysis. We collected demographic information, health-related social needs, and discharge conditions through chart review of the electronic health record. When available, we utilized the validated

survey tool, Protocol for Responding to and Assessing Patients’ Assets, Risks, and Experiences (PRAPARE) to assess health-related social needs.¹ We analyzed data using descriptive statistics and geographic mapping.

RESULTS: We completed chart review for 275 consecutive laboratory-confirmed COVID-19 patients; after excluding readmissions, we analyzed 262 individual patients. Our cohort was majority Latinx (78%) and primarily Spanish-speaking (57%). More than 35% of patients had not seen a Primary Care Provider in the previous year. Most were unfunded (43%) or publicly funded (41%) with high social needs (38% endorsed housing instability, 30% food insecurity, 23% transportation insecurity, 34% utilities insecurity and 44% endorsed inability to afford medications/healthcare services in the past year). Among those currently or recently employed, 36% worked in construction, 29% in service industries (hotel, food and housekeeping services), 18% in other manual labor (mechanic, plumbing, landscaping) and 9% in healthcare services. Geolocalization of cases revealed clustering of cases in historically underserved healthcare areas of Austin with higher proportions of Black and Latinx residents.

CONCLUSIONS: We found that people of color, primarily Latinx and primarily Spanish-speaking patients were disproportionately affected by COVID-19 in our cohort. Our data reveals significant social needs and continuity of care gaps faced by this population. This information can inform policy and institutional change necessary to address harmful social and structural determinants of health.

¹ National Association of Community Health Centers. (2019) PRAPARE: Protocol for Responding to and Assessing Patients’ Assets, Risks, and Experiences. Implementation and Action Toolkit.

LEARNING OBJECTIVE #1: Identify social & structural inequities affecting vulnerable populations in the COVID-19 pandemic.

LEARNING OBJECTIVE #2: Demonstrate a need for healthcare systems to address social and structural health inequities.

SPILLOVER IMPACT OF CAREGIVER PARTICIPATION IN THE NATIONAL DIABETES PREVENTION PROGRAM LIFESTYLE INTERVENTION ON CHILDREN’S HEALTH BEHAVIORS: EMERGING THEMES FROM IN-DEPTH INTERVIEWS OF PROGRAM PARTICIPANTS

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BACKGROUND: Adult participation in the National Diabetes Prevention Program (DPP) lifestyle intervention could impact dietary and physical activity habits of household members, including children. Children and grandchildren of adults who are eligible for the DPP (due to weight status and diabetes risk) may themselves be overweight or obese and at risk for chronic health conditions. Thus, the DPP presents a platform through which to reach high-risk children. Characterizing spillover impacts is an important first step in understanding how to leverage the platform to promote health behavior change for high-risk children. Via in-depth interviews of DPP participants conducted to inform the development of a family-oriented DPP, we explored emerging themes regarding the impact of caregiver participation on children’s lifestyles with regards to nutrition and physical activity.

METHODS: Former or current DPP participants from groups delivered through a community- academic partnership were recruited on a rolling basis to participate in a semi-structured, in-depth phone interview in 2020. Participants were eligible if they were the parent or caregiver of a child under 18. The interview guides covered topics including spillover and mechanisms of spillover on children’s lifestyles. In-depth interviews were recorded, transcribed and double-coded into central, emerging themes.

RESULTS: To date, 15 interviews have been analyzed. Participants were predominantly female (87%) and African American (93%). 10 respondents were grandmothers. Children they cared for ranged from 2-17 years. Table 1 outlines the common emerging themes regarding spillover impacts and

mechanisms. Participants described positive spillover impacts on children's diet and physical activity, resulting from changes in the caregiver's own dietary behaviors, activity levels or awareness of healthier lifestyle principles.

CONCLUSIONS: Caregivers described improvements in the diet and activity levels of children in their household resulting from their participation in the DPP. Next steps include quantifying spillover impacts on children's health behaviors and outcomes, and exploring how to augment the program to enhance unintentional and intentional beneficial impacts on high-risk children.

LEARNING OBJECTIVE #1: To describe spillover impacts of caregiver DPP participation on children's lifestyle

LEARNING OBJECTIVE #2: To understand mechanisms of spillover impacts of caregiver DPP participation on children's lifestyle

STRUCTURAL RACIAL DISPARITIES IN THE ALLOCATION OF MEDICARE AND MEDICAID DISPROPORTIONATE SHARE HOSPITAL PAYMENTS

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BACKGROUND: The Medicare and Medicaid Disproportionate Share Hospital (DSH) payment programs are designed to subsidize hospital care for low-income patients in the United States (US). DSH allocations are based largely on health care utilization. However, because racial and ethnic minority populations in the US face significant, documented barriers to care, they typically use less health care than non-minority populations with the same level of need. We hypothesized that DSH allocation formulas, by relying on utilization as a proxy for need, introduce substantial racial disparities in the targeting of subsidies for US hospitals.

METHODS: We obtained data on Medicare and Medicaid DSH payments from the Centers for Medicare and Medicaid Services Healthcare Cost Report Information System and State-Plan-Rate-Year files for 2015 (the most recent year available), respectively. We linked these files to information on hospital characteristics from the American Hospital Association's Annual Survey and information on area-level characteristics from the American Community Survey. We used descriptive statistics to compare the community-level needs of hospitals receiving similar levels of DSH payments and serving areas with a high proportion of Black individuals and those with a low proportion of Black individuals.

RESULTS: On average, counties with the highest proportions of Black individuals, relative to those with the fewest Black individuals but in the same decile of DSH payments per hospital bed, had higher rates of premature age-adjusted mortality (455.9 vs. 367.0 per 100k, difference 88.9 per 100k), self-reported poor or fair health (20.3% vs. 16.5%, difference 3.8%), adult obesity (33.8% vs. 29.9%, difference 3.9%), diabetes (12.8% vs. 10.4%, difference 2.4%), poverty (20.6% vs. 14.8%, difference 5.8%), and uninsurance (24.1% vs. 21.4%, difference 2.6%).

CONCLUSIONS: Among counties receiving the same level of DSH payments, disproportionately Black counties consistently demonstrated higher levels of need across a range of measures. These findings suggest that DSH payments, by relying on measures of utilization as proxies for health care need, may structurally disadvantage minority communities.

LEARNING OBJECTIVE #1: Understand how Medicare and Medicaid DSH payments are allocated to US hospitals.

LEARNING OBJECTIVE #2: Describe racial disparities that result from DSH allocation formulas, in which health care utilization is used as a proxy for health care need.

THE ASSOCIATION BETWEEN BUNDLED PAYMENT PARTICIPATION AND CHANGES IN MEDICAL EPISODE OUTCOMES AMONG HIGH-RISK PATIENTS

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BACKGROUND: The Bundled Payments for Care Improvement (BPCI) program has been associated with stable quality for medical condition episodes and savings driven by shorter length of stay at skilled nursing facilities (SNFs). However, these results may mask disparities for individuals that are susceptible to poor outcomes due to high-risk clinical or social factors. Indiscriminate use of certain strategies (e.g., reducing SNF length of stay) that do not meet the needs of high-risk patients could also create harm (e.g., increased readmissions).

METHODS: We used 2011-2016 Medicare claims to conduct a difference-in-differences analysis among patients admitted to propensity-matched BPCI and Non-BPCI hospitals for acute myocardial infarction, congestive heart failure, pneumonia, and chronic obstructive pulmonary disease. Condition-specific propensity matching mitigated differences between BPCI and Non-BPCI Hospitals (post-matching standardized mean differences <0.10). We defined 5 clinical high-risk patient groups (advanced age, high case-mix severity, frail, disabled, prior utilization of SNFs/inpatient rehabilitation facilities [IRFs]) and 2 social high-risk groups (Black race, Medicare/Medicaid dual eligibility). We examined whether patients in these groups had differential changes at BPCI vs. Non-BPCI hospitals for the primary outcomes of SNF length of stay (reflecting care redesign driven by BPCI) and 90-day unplanned readmissions (reflecting unintended harms of redesign). Secondary outcomes included mortality, total episode spending, and other utilization measures.

RESULTS: We analyzed 471,421 patients hospitalized at 226 BPCI and 700 Non-BPCI Hospitals. BPCI participation was associated with differentially lower SNF length of stay among frail patients (adjusted difference-in-differences [aDID] -0.4 days, 95% CI -0.8 to -0.1 days, p=0.01), patients with advanced age (aDID -0.8 days, 95% CI -1.2 to -0.3 days, p=0.001), and patients with prior SNF/IRF utilization (aDID -1.1 days, 95% CI -1.6 to -0.6 days, p<0.001), but not for other high-risk groups. BPCI participation was not associated with differential changes in readmissions in any high-risk group. BPCI participation was also associated with differentially lower episode spending for several groups (frail patients, dual-eligible, prior SNF/IRF utilization); lower mortality for disabled patients; and higher discharge to SNF/IRF for frail patients.

CONCLUSIONS: By demonstrating reduced SNF length of stay without increased readmissions, as well as savings and mortality reductions for some groups, our findings allay concerns about worsened disparities in medical condition bundles. Higher SNF/IRF discharge among frail patients also suggests that strategies were not applied indiscriminately to high-risk patients.

LEARNING OBJECTIVE #1: Describe how clinically and socially high-risk patients fare under medical condition bundles

LEARNING OBJECTIVE #2: List two insights that allay concerns about disparities under medical condition bundles

THE ASSOCIATION OF CENSUS TRACT-LEVEL INCARCERATION RATE AND LIFE EXPECTANCY IN NEW YORK STATE

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BACKGROUND: Higher jail incarceration rates are associated with a small but statistically significant increase in mortality at the county level. Incarceration varies within counties, and neighborhood-level incarceration rates are associated with health outcomes. This study quantifies the association between census tract-level incarceration rate and life expectancy after controlling for tract-level poverty, racial makeup, population density, and violent crime rate, and explores the moderating effect of tract-level poverty, racial makeup, and population density on that association.

METHODS: Cross-sectional analysis of census tract-level state imprisonment rates in New York State (2010) and life expectancy data from the United States Small-area Life Expectancy Estimates Project (2010-2015), and controlled for confounders from the American Community Survey (2010-2014), and violent crime data from the New York City Police Department (2010).

RESULTS: Life expectancy at the highest quintile of incarceration was 5.8 years lower than in the lowest quintile. After adjustment for covariates, a difference of nearly 4 years remained. Census tract-level poverty, racial makeup, and population density all moderated the association of incarceration and life expectancy.

CONCLUSIONS: Incarceration is an independent predictor of life expectancy at the census tract level, and may contribute to health disparities. Alternatives to incarceration, and decarceration, may help to decrease disparities in life expectancy at the neighborhood level.

LEARNING OBJECTIVE #1: Describe the association of neighborhood-level incarceration rate and life expectancy, and understand that living in a neighborhood with high rates of incarceration may be associated with worse health (Patient Care; Practice-Based Learning and Improvement)

LEARNING OBJECTIVE #2: Understand that decarceration and alternatives to incarceration may contribute to decreased health disparities. (Systems-Based Practice)

THE EFFECT OF SOCIAL DISTANCING MEASURES ON COVID-19 RELATED HOSPITALIZATION IN NEW YORK: AN EVENT STUDY EXAMINING THE ROLE OF OVERCROWDED HOUSING

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BACKGROUND: COVID-19 health outcomes have been shown to differ by socioeconomic status. In New York City (NYC), Black and Hispanic individuals are more likely to be hospitalized, have more severe disease and are more likely to die from COVID-19 than non-Hispanic white patients. Existing well-described disparities in health status, access to healthcare and other social determinants may account for these differences. Over-crowded housing may pose a special risk with COVID-19 infections, putting vulnerable individuals at increased risk of contracting more severe disease at home due to multiple exposures and higher inoculum resulting from reduced personal space. Social distancing measures such as school closures that increase house-bound populations may inadvertently worsen the risk of COVID-19 contraction in this setting. This study sought to examine whether New York State's mandatory school closures on March 16 2020 led to a disproportionately increased suspected COVID-19 cases in patients residing in over-crowded zip codes compared with less crowded zip codes in NYC.

METHODS: In this zip code tabulated area (ZCTA)-level analysis, we used NYC Department of Health disease surveillance data in March 2020 merged with data from the Centers of Disease Control and American Community Survey to model suspected COVID-19 case rates by zip code over-crowdedness. We defined suspected COVID-19 cases as emergency department reported cases of pneumonia and influenza-like illness, and over-crowdedness as households with greater than 1 occupant per room, in quartiles. Our model employed an event study methodology using a multivariate Poisson regression model with an interaction term between over-crowding and the time period after March 16, and controls for known COVID-19 clinical risk (prevalence of obesity, coronary artery disease, and smoking), related socioeconomic risk factors (percentage below federal poverty line, median income by zip-code, percentage White, and proportion of multigenerational households).

RESULTS: Our analysis examined 39,923 suspected COVID-19 cases across 173 ZCTAs in NYC between March 1 and March 30 2020. We found that, after adjusted analysis, for every quartile increase in defined over-crowdedness, case rates increased by 19.8% after the introduction of mandatory school closure (95% CI: 10.8% to 28.8%, $P < 0.001$). However, after the school closure order, rates of COVID-19 cases across all zip codes declined by 4.7% (95% CI: 3.4% to 4.0%, $P < 0.001$).

CONCLUSIONS: Social distancing policies may have worsened spread of COVID-19 in over-crowded zip codes after implementation, but worked to

decrease COVID-19 case rates overall. Unintentional, deleterious impacts of public health policies on vulnerable neighborhoods should be carefully considered before implementation.

LEARNING OBJECTIVE #1: Understand how public health policies may have unintended impacts on vulnerable patients during the COVID-19 pandemic

LEARNING OBJECTIVE #2: Understand how housing conditions may relate to racial/ethnic disparities in COVID-19 case rates

THE HEALTHY DEMOCRACY CAMPAIGN: A NATIONAL, MEDICAL STUDENT-LED VOTER REGISTRATION COMPETITION PRECEDING THE NOVEMBER 2020 US ELECTIONS

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BACKGROUND: Voting affords citizens direct say in issues that affect their health and increased voting access has been linked to improved health outcomes. Healthcare trainees are uniquely positioned to increase voting access due to their relationships with multiple actors at their schools. We implemented the *Vot-ER Healthy Democracy Campaign (HDC)*, a national, nonpartisan medical student-led voter registration competition, ahead of the November 2020 US elections. We provided students with organizing resources to prepare their communities to vote. In spurring cross-institutional participation, we hoped to encourage long-term inclusion of civic health in medical education and practice.

METHODS: The HDC took place from July 20-October 9, 2020. 80 medical schools from 31 states and DC participated. 128 medical student captains recruited classmates to form teams that prepared colleagues, patients, and others to vote, irrespective of demographics or political affiliations. Teams used resources such as badge backers, posters, and discharge paperwork with school-specific QR and text message codes that linked to an online platform for registering to vote, checking registration status, or requesting a mail-in ballot. To encourage healthy competition, we created a virtual leaderboard with school rankings. Teams earned a point for every page visit to their school-specific voter registration or mail-in ballot request links. Post-competition, we surveyed captains about motivations, experiences, barriers, and skills and knowledge gained.

RESULTS: The HDC helped 15 692 people prepare to vote (6 190 started the voter registration process and 9 502 started the mail-in ballot request process). The 80 schools helped a median of 70.5 (IQR 10.5-262.0) people, and the top 10 medical schools helped a median of 472 (IQR 436.5-836.2) people. Eighty two (64.1%) captains responded to the survey, representing 56 (70.0%) of the competing schools. The top ranked motivation for participating was social and racial inequities, 37 (45.1%). Captains reported developing skills and gaining knowledge in several areas, including community organizing, 67 (81.7%), communication, 60 (73.2%), vertical networking, 50 (61.0%), voting rights, 63 (76.8%), voter suppression, 49 (59.8%), and civic health, 43 (52.4%). The majority of respondents agreed or strongly agreed that civic health should be included in medical education, 78 (95.1%), and planned to incorporate voter registration into their future practices, 76 (92.7%).

CONCLUSIONS: Increased voting access has been linked to better health outcomes. Beyond helping >15 000 citizens prepare to vote, the HDC established a cultural norm of initiating conversations about civic health in healthcare spaces.

LEARNING OBJECTIVE #1: Interpersonal and Communication Skills: Mobilize medical students to prepare others to vote and develop skills for communicating about civic health.

LEARNING OBJECTIVE #2: Systems-Based Practice: Establish a cultural norm of initiating conversations about civic health in healthcare spaces to increase voting access.

THE IMPACT OF COVID-19 ON HOME HEALTH AIDES IN NEW YORK: A CROSS-SECTIONAL SURVEY

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BACKGROUND: During the COVID-19 pandemic, home health aides (HHAs) have provided daily medical and personal care to community-dwelling older adults and those with chronic conditions. Prior qualitative studies have found that providing care during COVID-19 has left them susceptible to physical, financial, and emotional risks. However, limited quantitative data exist. The objective of this study was to assess the impact of COVID-19 on HHAs and to understand the challenges and opportunities for pandemic planning.

METHODS: A cross-sectional survey of HHAs was conducted between August and November 2020 with the 1199SEIU, the largest healthcare union in the US. The survey was administered by telephone in English, French Creole, Chinese, Spanish, and Russian. To be eligible, HHAs had to be 1199SEIU members, work for a licensed or certified home care agency during COVID-19, and care for patients in the downstate New York region (New York City, Long Island, Lower Hudson Valley). The survey included 40 questions and focused on COVID-19 exposure, mental and physical health, financial hardship, and workplace resources and training.

RESULTS: A total of 256 HHAs, employed by 49 unique home care agencies, participated (22% response rate). 73% of participants were between 50-69 years old, 99% were women, most were people of color (50% Black, 27% Latinx), and 70% had more than 10 years of experience. With respect to COVID-19 Exposure, 49% of participants reported being tested since the beginning of the pandemic, with 23% testing positive. A total of 63% reported being “very concerned” about exposing themselves to COVID-19 because of their job and similar proportions were “very concerned” about exposing family members (66%) and patients (58%). With respect to Mental Health, 70% said COVID-19 made it harder to take care of themselves, and 51% regularly felt emotionally drained. As to Economic Security, 27% reported taking time off because of COVID-19 and 63% said it had become harder to afford food, housing, and other basics. As to Workplace Resources, 75% reported having enough PPE during the study period, but 78% provided their own PPE at some point during the pandemic. With respect to Training, 75% of participants wanted additional training on COVID-19 safety, health, and stress management. Many participants also reported that financial assistance for transportation to work (78%), food (78%), housing (53%), and coping with stress (42%) would be “very useful.”

CONCLUSIONS: HHAs experienced a myriad of physical, financial, and emotional challenges during COVID-19. To better support this workforce, action by public health officials and policymakers is warranted, particularly with respect to workplace protections and safety, mental health, compensation, and access to basic resources.

LEARNING OBJECTIVE #1: To understand the experience of HHAs caring for patients at home during COVID-19.

LEARNING OBJECTIVE #2: To determine the impact of the COVID-19 pandemic on HHA's physical, emotional, and financial well-being.

THE IMPACT OF LANGUAGE BARRIERS AND INTERPRETATION SERVICES TRAINING ON CONTACT TRACING EFFORTS DURING THE COVID-19 PANDEMIC

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BACKGROUND: The CDC recommends large-scale contact tracing programs to reduce COVID-19 population spread. From March to September 2020, Penn State College of Medicine (PSUCOM) students, along with the Pennsylvania Department of Health, reached over 1400 community members through their Contact Tracing Task Force.

COVID-19 has been shown to disproportionately affect minorities, especially those in Non-English Speaking (NES) communities. In Dauphin County, where PSUCOM is located, over 12% of the population does not speak English. Language barriers can result in decreased outreach and education, leading to misunderstandings among patients. In order to effectively reach NES patients, our Contact Tracing Task Force implemented telephone-based interpretation services in April 2020, with optional formal training available for tracers. This study identifies barriers tracers faced when contacting NES patients and assesses the impact of formal interpretation services training.

METHODS: Following IRB approval, 128 tracers on the PSUCOM Task Force were anonymously surveyed about multilingual status, barriers faced when calling NES patients, comfort calling NES patients, and number of calls made to NES patients. The outcomes measured include (1) barriers faced when calling NES patients and (2) comfort level calling NES patients with and without formal interpretation services training. All responses were self-reported. Poisson regression was used to evaluate multilingual status, formal training, and reported barriers as predictors of the number of calls made to NES patients. All analyses were completed using SAS 9.4.

RESULTS: A total of 72 tracers (56%) completed the survey. The most common barriers reported were “lack of formal training” and “extra time required”. Of the 72 survey responders, 23 (32%) received formal training, with 100% indicating that they felt more comfortable calling NES patients after training. A total of 23% of respondents reported being multilingual. In a multivariable Poisson model including multilingual status, formal training, and reported barriers, training significantly predicted the number of NES calls made. Tracer multilingual status did not significantly predict NES calls.

CONCLUSIONS: Tracers reported encountering multiple barriers when calling NES patients, such as lack of formal training with interpretation services. Tracers who received optional training reported improved comfort level, as training may have reduced their anxiety when calling NES patients.

In areas with diverse populations, multilingual individuals are not always readily available to participate in contact tracing programs. This study indicates training is a significant predictor of making calls to NES patients, while multilingual status is not. Therefore, in order to mitigate challenges in communication with NES patients, we propose training contact tracers on using telephone-based interpretation services, rather than relying on multilingual tracers.

LEARNING OBJECTIVE #1: Patient Care

LEARNING OBJECTIVE #2: Interpersonal and Communication Skills

THE RELATIONSHIP BETWEEN AFFORDABLE HOUSING AND INDUSTRIAL AIR POLLUTION

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BACKGROUND: Housing is a key social determinant of health. Programs which create affordable housing may unintentionally concentrate low-income households in neighborhoods with high rates of outdoor air pollution. Exposure to outdoor air pollution has been associated with chronic diseases including asthma, heart disease, and cancer. We examine whether units built with the Low Income Housing Tax Credit (LIHTC), the nation's largest source of affordable housing, are located in neighborhoods with high outdoor air pollution.

METHODS: The location of LIHTC properties built from 1988-2018 in 50 states and Washington DC were obtained from the Department of Housing and Urban Development. Census tracts were coded as containing LIHTC or not and the number of LIHTC properties and units were

summed. Tract characteristics were obtained from the 2014-18 American Community Survey, including percent of households in poverty, percent Black residents, percent living in urban areas, and metropolitan or non-metropolitan status. Air pollution was measured with the 2018 Risk-Screening Environmental Indicators score which models exposure to industrial air pollutants. Regressions were used to assess the association between the presence of LIHTC in a tract and air pollution, adjusting for tract characteristics with state fixed effects. Among tracts with at least one LIHTC property, the association between number of properties or units and air pollution was assessed.

RESULTS: This analysis includes 42,282 LIHTC properties with nearly 2.9 million units across 21,413 census tracts. More than 29% of tracts have at least 1 LIHTC property. Tracts with LIHTC had more Black residents (20% vs 11%, $p < 0.001$) and more households living in poverty (20% vs 13%, $p < 0.001$) than tracts without LIHTC. Tracts with LIHTC had marginally higher air pollution than tracts without LIHTC (beta = 0.04, 95% confidence interval (CI) [-0.003, 0.08], $p = 0.07$). However, in adjusted analyses, tracts with LIHTC properties had significantly less air pollution than tracts without LIHTC (beta = -0.16, 95% CI [-0.28, -0.049], $p < 0.001$). Among tracts with LIHTC, there was a negative association between the number of properties and air pollution (beta = -0.035, 95% CI [-0.068, -0.001], $p = 0.042$) and no association between the number of individual units and air pollution (beta = 0.0021, 95% CI [-0.003, 0.007], $p = 0.43$) in adjusted analyses.

CONCLUSIONS: While LIHTC properties are built in census tracts with more industrial air pollution on average, they are built in less polluted tracts when holding tract characteristics constant. LIHTC residents may be exposed to less pollution than households living in similar neighborhoods without LIHTC. Efforts to increase the supply of affordable housing should ensure that these properties are located in safe and healthy neighborhoods in order to maximize their impact on health.

LEARNING OBJECTIVE #1: Recognize that air pollution is a social determinant of health.

LEARNING OBJECTIVE #2: Describe neighborhoods in which Low Income Housing Tax Credit properties are built.

TRENDS IN USAGE OF TELEMEDICINE DURING AND POST COVID PANDEMIC SURGE IN NYC 2020

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BACKGROUND: The COVID-19 pandemic has thrust telemedicine to center stage in the U.S. healthcare landscape. Telemedicine, video and voice visits, has maintained access to medical care at a safe distance. In addition, its use has opened new avenues of application in continuity of chronic care. The way telemedicine is utilized in an urban, underserved population is not well-defined.

METHODS: This project takes place at a Federally Qualified Health Center located in Central Harlem in Manhattan that serves as a training site for internal medicine residents. Demographically, 45% of the patients identify as African American, 31% Latino and 58% live below 100% of the Federal Poverty Level (FPL). With this cross-sectional study, we attempt to identify trends in the adoption and use of telemedicine services during and post COVID-19 pandemic spring 2020 surge in NYC and its potential correlation to health disparities in our patient population.

RESULTS: We analyzed results based on age, zip code, and preferred language. During our study period of March to August 2020, 51% (n=2898) of all visits were televisits. From March to May (COVID-19 spring surge), 64% of visits were televisits. The elderly (>65 years) had 360 televisits of which 11% were video visits, lowest of all three groups. The highest utilization (43%) was seen in the 45-64 years age group. From June-August (post-surge), there was a 36% decrease in televisits with the steepest decline seen in the elderly. Analysis of Central Harlem zip code data for the surge reveals that out of 816 televisits, 22% were video. Post surge, there was an overall decrease in the number of visits but an increase in video (n=594 with 33% video). Sixteen zip codes with the highest FPL (>30%) had 17% televisits with 25% video.

Again, post surge there was a drop in televisits but an increase in video by 35%. Primary language was English in 84% (74% voice and 26% video) of visits and Spanish in 12% (80% voice and 20% video) of televisits. Post surge, English was the preferred language in 89% of visits (65% voice, 35% video) with Spanish in 9% (87% voice and 13% video).

CONCLUSIONS: The data reveals that despite a willingness to adopt telemedicine services and continue usage post surge, there are potential barriers to optimum utilization of video visits. Older age, technology awareness, and the need for interpreter services are all limiting factors. Further investigation into patient related factors is needed. From these trends, we hope to propose solutions to overcoming these barriers to healthcare access for chronic disease management well beyond the pandemic.

LEARNING OBJECTIVE #1: Recognize the impact of health disparities on telemedicine adoption and usage

LEARNING OBJECTIVE #2: Recognize the importance of telemedicine in continuity of care

UNDERSTANDING THE ROLE OF CASEWORKER CULTURAL MEDIATORS IN ADDRESSING HEALTH INEQUITIES FOR PATIENTS WITH LIMITED-ENGLISH PROFICIENCY: A QUALITATIVE STUDY

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BACKGROUND: Interventions that go beyond providing access to language services are necessary to address the well-documented health inequities experienced by patients with limited-English proficiency (LEP). While patient navigator interventions have been used in diverse populations, high variability exists in the terminology, roles, and contexts of navigators limiting conclusions about efficacy. In our hospital, we employ caseworker cultural mediators (CCMs) for Amharic, Cambodian, Somali, Spanish, and Vietnamese-speaking patients. We sought to understand factors that enable CCMs to overcome barriers to equitable care from the perspectives of patients, CCMs, and clinicians. We hypothesized that these data would provide important insights into the critical elements for effective navigator interventions for LEP populations.

METHODS: Semi-structured interviews were conducted with a purposive sample of clinicians (across inpatient/outpatient sites) who had referred patients to the CCM program and patients and/or family members receiving CCM services in 2018-2019. All six CCMs were interviewed. Interviews with patients and family members were conducted using a professional medical interpreter. Interviews were audiotaped, transcribed, and coded by three investigators using a constant comparative approach. We identified key themes related to the six elements ("tasks") of the CCM role (advocacy, care coordination, navigation, interpretation, education, and mediation).

RESULTS: Nine clinicians, six CCMs, seven patients and one family member completed interviews. Patients, CCMs, and clinicians described several key themes for each task (Table). Participants also described several themes that cut across multiple tasks and were instrumental in improving patient care: bicultural-bilingual concordance which facilitated relationship building with patients/families; knowledge of cultural issues and Western healthcare practices which enabled CCMs to bridge the healthcare team, patient/family, and the community; and anticipating and proactively addressing cross-cultural barriers to equitable care.

CONCLUSIONS: Bicultural-bilingual CCMs utilized their knowledge of their culture and Western healthcare practices to complete multiple tasks that facilitated equitable care across inpatient and outpatient settings. Health systems should consider such innovative programs that go beyond interpretation services to address the complex cultural and language barriers that drive inequities for patients with LEP.

LEARNING OBJECTIVE #1: Describe six tasks associated with the role of caseworker cultural mediators.

LEARNING OBJECTIVE #2: Identify themes associated with each of the caseworker cultural mediator tasks.

VARIATION IN SAFETY-NET HOSPITAL STATUS OVER TIME AND CHARACTERISTICS ASSOCIATED WITH CONSISTENT SAFETY-NET STATUS

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BACKGROUND: Safety-net hospitals provide essential care for low-income, uninsured, and underinsured patients. Despite their critical importance in health care delivery, there is no universally accepted definition for safety-net hospitals in the United States (US). Because most proposed definitions rely on a combination of patient characteristics or hospital finances, safety-net status for hospitals may fluctuate from year-to-year as patient mix and financial performance change. Such volatility in safety-net status may make it difficult to characterize the challenges facing safety-net hospitals and to inform policies designed to bolster care for low-income and other structurally marginalized populations. It remains unknown, however, to what degree safety-net status for hospitals changes over time. In this study, we examine how assignment of safety-net status to US hospitals varies from year-to-year and the characteristics of hospitals with consistent safety-net status.

METHODS: Using Medicare cost reports and the American Hospital Association's annual survey, we classified hospitals as "safety-net" according to three different definitions that have been used in the literature: top quartile in a state based on proportion of Medicaid patients, Medicare disproportionate share hospital (DSH) index, and provision of uncompensated care. In each year from 2012-2018, we determined which hospitals would be assigned safety-net status according to each definition, and then examined how many of these hospitals maintained their safety-net status over subsequent years across each definition. We also used descriptive statistics to identify the characteristics of hospitals with consistent and inconsistent safety-net status over the study period.

RESULTS: Among hospitals with safety-net status based on the Medicare DSH index in 2012 (n=1,012), 83.8% maintained that status through 2018. The proportion with consistent safety-net status over the 7-year period was lower using definitions based on Medicaid patient share (n=942, with 72.8% maintaining safety-net status over time) and uncompensated care costs (n=832, with 53.6% maintaining safety-net status over time). Hospitals with consistent safety-net status were more likely to be part of a health system, larger in size, and offer an array of specific safety-net services, including inpatient psychiatric, trauma, burn, obstetrics, and neonatal intensive care.

CONCLUSIONS: Safety-net hospital status varies from year-to-year depending on the criteria used to define "safety-net". Hospitals with more stable safety-net status are more likely to provide typical safety-net services. Policymakers may consider examining hospital characteristics over time when establishing safety-net status in the allocation of state or federal funding designed to bolster health care delivery systems for vulnerable populations.

LEARNING OBJECTIVE #1: Describe how hospital safety-net status fluctuates over time.

LEARNING OBJECTIVE #2: Identify the characteristics of hospitals with consistent safety-net status.

Scientific Abstract - Health Policy, Economics, and Finance

CAN COVID-RELATED DECREASES IN CHILDHOOD PNEUMOCOCCAL VACCINATION MAKE VACCINATING SENIORS MORE COST-EFFECTIVE?

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BACKGROUND: The COVID-19 pandemic caused declines in childhood immunization rates, which can indirectly affect adult illness rates. We

examined potential COVID-19-related changes in pediatric 13-valent pneumococcal conjugate vaccine (PCV13) uptake and how those changes might affect the impact and economic favorability of PCV13 use in immunocompetent adults aged ≥ 65 years.

METHODS: A Markov model estimated pediatric pneumococcal disease epidemiology resulting from decreased PCV13 uptake in children aged < 5 years; absolute uptake decreases from 10-50% for 1-2 years duration were examined, assuming no catch-up vaccination. We assumed that decreased pediatric PCV13 uptake led to proportionate increases in pediatric PCV13 serotype illness, with subsequent increases in PCV13 serotype illness rates in seniors. Historically, after conjugate vaccine introduction in children, every 1 case/100,000 change in PCV13 serotype invasive pneumococcal disease (IPD) rates in < 5 -year-olds led to a $-0.5/100,000$ change in ≥ 65 -year-old rates (i.e., a 1:0.5 ratio). Integrating pediatric model output into a Markov cohort model examining 65-year-olds, we estimated cost effectiveness of pneumococcal vaccination strategies while accounting for potential epidemiologic changes from decreased pediatric PCV13 uptake.

RESULTS: At baseline, 1 year of 10-50% absolute decreases in PCV13 uptake in < 5 -year-olds increased pneumococcal disease rates by an estimated 4-19% in seniors; 2 years of decreased uptake increased rates by 8-38%. In seniors, a $> 53\%$ increase in pneumococcal disease rates was required to favor PCV13 use in immunocompetent seniors at a \$200,000/QALY gained threshold compared to no PCV13 use. This change in disease rates in seniors corresponded to absolute decreases in pediatric PCV13 uptake of $> 50\%$ over a 2-year period. If a 1:1 pediatric to senior PCV13 serotype change ratio is used, rather than 1:0.5, absolute decreases in pediatric PCV13 uptake would need to be $> 50\%$ over 1 year or $> 30\%$ over a two-year duration for senior PCV13 use to be favored.

CONCLUSIONS: COVID-related decreases in pediatric PCV13 uptake would need to be large and of extended duration to make PCV13 use in immunocompetent seniors economically favorable. COVID-19-related disruptions to childhood care can have implications in other age groups, but are unlikely to require reconsideration of PCV13 recommendations in immunocompetent seniors.

LEARNING OBJECTIVE #1: Medical Knowledge: Established and evolving biomedical, clinical, and cognate (e.g. epidemiological and social-behavioral) sciences and the application of knowledge to patient care.

LEARNING OBJECTIVE #2: Practice-Based Learning and Improvement: Involves investigation and evaluation of one's own patient care, appraisal and assimilation of scientific evidence, and improvements in patient care. Additional documentation is required to be awarded AMA PRA Category 1 Credit™ for this ACGME core competency

CAN US PHYSICIANS ACCURATELY ESTIMATE OUT-OF-POCKET COSTS? A NATIONAL SURVEY

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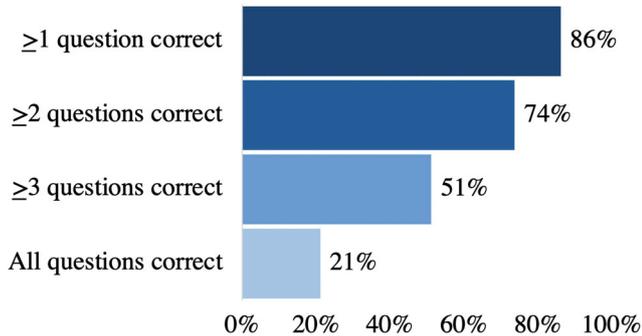
BACKGROUND: A third of Americans have trouble paying their medical bills. They often turn to their physicians for help navigating costs and insurance coverage. But it is unknown whether physicians are familiar enough with how insurance coverage works to accurately estimate their patients' out-of-pocket costs. We aimed to determine whether physicians can correctly predict out-of-pocket expenses when they are given all of the necessary information about a drug's price and a patient's insurance plan.

METHODS: We administered a national survey to 900 outpatient physicians (300 each of primary care, gastroenterology, and rheumatology). In a hypothetical vignette, a patient was prescribed a new drug costing \$1000/month without insurance. A brief summary of the patient's private insurance information was provided. Physicians were then asked to estimate the drug's out-of-pocket cost at four time points throughout the year to assess their understanding of four types of cost-sharing: (1)

deductibles, (2) coinsurance, (3) copays, and (4) out-of-pocket maximums.

RESULTS: Of 371 respondents who met inclusion criteria, 30% were primary care physicians, 35% were gastroenterologists, and 35% were rheumatologists. Fifty-two percent showed understanding of deductibles, 62% showed understanding of coinsurance, 61% showed understanding of copays, and 57% showed understanding of out-of-pocket maximums. Only 21% answered all four questions correctly (Figure). In multivariable linear regression, ability to estimate costs was not associated with specialty, attitudes toward cost conversations, demographics, or clinical characteristics.

Number of insurance coverage questions answered correctly



CONCLUSIONS: Many US physicians have difficulty estimating out-of-pocket costs, even when they have adequate information about their patients' insurance plans. If physicians are expected to discuss costs with their patients, they should not have to calculate those costs themselves. Integration of individualized insurance information and drug costs in the electronic health record could facilitate access to accurate out-of-pocket cost information at the point-of-prescribing.

LEARNING OBJECTIVE #1: Show that many physicians struggle to understand insurance cost-sharing mechanisms.

LEARNING OBJECTIVE #2: Show that physicians' difficulties with estimating out-of-pocket costs are not tied to their clinics' characteristics or their views on cost conversations.

CHANGES IN QUALITY UNDER THE MEDICARE ADVANTAGE QUALITY BONUS PROGRAM

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BACKGROUND: Enrollment in Medicare Advantage (MA) – private plans for Medicare beneficiaries – has grown remarkably, increasing from 11.1 million in 2010 (24% of beneficiaries) to 24.1 million in 2020 (36%). Fueled by generous Medicare payments, MA offers attractive benefits and modest cost-sharing. Yet policymakers have argued that MA plans are overpaid and questioned its value. In response, the Affordable Care Act cut MA payments in 2012 while simultaneously creating the Quality Bonus Program (QBP). The QBP awards bonuses to plans that achieve high star ratings (ranging from 1 to 5, 5 being highest) based on clinical processes, health outcomes, consumer satisfaction, and drug plan quality. Despite investing \$6 billion in 2019 alone (2.3% of aggregate payments), evidence of the program's effectiveness is limited.

METHODS: We analyzed insurance claims for MA beneficiaries and commercial insurance enrollees ages 50-74 from 2009 through 2018 from the largest commercial MA database in the United States. Study outcomes included 9 quality measures consistently included in the QBP that were claims-based and applicable to ages 56-74: breast cancer screening, 4 diabetes measures (hemoglobin A1c monitoring, low-

density lipoprotein [LDL] testing, retinopathy testing, nephropathy management), 3 medication adherence measures (statins, diabetes medications, renin-angiotensin system [RAS] antagonists), and a rheumatoid arthritis management measure. We used a difference-in-differences [DID] design to compare quality for MA beneficiaries and commercial enrollees, before and after the 2012 start of the QBP. We estimated linear models that adjusted for beneficiary characteristics and performance measure fixed effects. To account further for compositional changes, we created a balanced panel of continuously enrolled insurance plans (n=2,174,688 beneficiaries).

RESULTS: Beneficiaries contributed 15,587,685 measure-beneficiary-years. In the pre-QBP period, quality measures were achieved for 67.0% of MA beneficiaries and 66.3% of commercial enrollees. The QBP was associated with a 3.5 percentage point (pp) increase in quality performance (95% CI, 2.8, 4.1), representing a 5% relative improvement from baseline. The QBP was associated with significant improvement for 5 of 9 performance measures, with absolute increases greatest for the 3 adherence measures: statins (8.1pp, 95% CI, 7.4, 8.8), RAS antagonists (6.8pp, 95% CI, 6.1, 7.4), and diabetes medications (5.1pp, 95% CI, 4.5, 5.8). The QBP was associated with significant decreases in diabetic A1c monitoring (-5.2pp, 95% CI, -6.6, -3.7) and diabetic LDL testing (-4.6pp, 95% CI -6.1, -3.1).

CONCLUSIONS: The QBP was associated with clinically meaningful improvement in overall quality performance for MA beneficiaries. There was substantial variation across performance measures, with the greatest absolute increases for medication adherence measures and greatest absolute decreases for diabetes measures.

LEARNING OBJECTIVE #1: Describe QBP incentives.

LEARNING OBJECTIVE #2: Demonstrate changes in quality under the QBP.

CHARACTERIZING THE EVIDENCE SUPPORTING SUPPLEMENTAL INDICATION APPROVALS FOR DRUGS AND BIOLOGICS BY THE FDA, 2017 TO 2019

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BACKGROUND: Following FDA approval for a new drug, sponsors can submit additional clinical data in order to obtain supplemental approval for use in new indications. The evidentiary standard for supplemental new indication approvals is not well known. We sought to characterize the pivotal trials supporting supplemental indication approvals by FDA of drugs and biologics from 2017 to 2019 and compare them to the pivotal trials supporting the original indications for corresponding therapeutics

METHODS: This was a cross-sectional study characterizing the pivotal trials supporting supplemental indication approvals by the FDA between 2017 and 2019, as well as pivotal trials that supported the original indication approvals for these therapeutics. Number and design of pivotal trials supporting both original and supplemental indications, including use of randomization, blinding, and comparator, primary end point, number of treated patients, and trial duration, both individually and aggregated by each indication approval were determined.

RESULTS: From 2017 to 2019, the FDA approved 146 supplemental indications for 107 therapeutics on the basis of 181 pivotal efficacy trials. The median number of pivotal efficacy trials per supplemental indication was 1 (IQR, 1-1). Most trials were randomized (n=141; 99.3%), double blinded (n=106; 74.5%) and used either placebo (n=77; 42.5%) or active comparators (n=75; 35.9%); 80 (44.2%) used clinical outcomes as the primary efficacy endpoint. The median number of trials supporting supplemental indication approvals in oncology was 1 (IQR, 1-1) compared to all other therapeutic areas 1 (IQR, 1-1), respectively (p=0.09). Trials supporting oncology indications were significantly less likely to be randomized (98.3 v 100%, p=0.0002),

less likely to be double blinded (51.0 v 92.3%, $p < 0.0001$), less likely to employ either a placebo or active comparator arm (64.8 v 86.7%, $p = 0.0009$), less likely to employ clinical outcomes as their primary efficacy endpoint (27.5 v 61.1%, $p < 0.0001$), but were significantly longer in duration (median: 17 [IQR, 6-48] versus 95 weeks [IQR, 39-146]), $p < 0.0001$) than trials supporting supplemental indications in all other therapeutic areas. Original FDA approvals were more likely to be based on at least 2 pivotal trials than supplemental indication approvals (44.0 v 15.8%, $p < 0.0001$), but these approvals were less likely to be supported by at least 1 trial that had a duration of at least 6 months (51.5 v 68.5%, $p = 0.01$) and 12 months (26.5 v 54.8%, $p < 0.0001$).

CONCLUSIONS: The number and design of the pivotal trials supporting supplemental indication approvals by the FDA varied based on therapeutic area, with the strength of evidence for cancer indications weaker than for other indications. There was little difference in the characteristics of the pivotal trials supporting FDA supplemental compared to the approval for the original indication.

LEARNING OBJECTIVE #1: Systems-Based Practice

LEARNING OBJECTIVE #2: Patient Care

COVID-19 AMONG STAFF IN US NURSING HOMES

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BACKGROUND: COVID-19 pandemic severely affected US nursing homes (NHs). Longstanding structural deficiencies contributed to the crisis resulting in extreme strain on NH staff. However, quantifying the toll of COVID-19 on NH staff has been difficult because reliable reporting on NH staff cases was previously lacking. Our objectives were to (1) measure the prevalence of COVID-19 among NH staff during the first wave of the pandemic in the US using a national dataset collected by the CDC, and (2) identify facility- and community-level factors associated with COVID-19 cases among NH staff. Understanding these relationships is necessary to inform the development of policies and practices to ensure NH staff safety and address staffing shortages to improve care quality of the vulnerable NH patient population.

METHODS: This retrospective cross-sectional study used the CDC COVID-19 database for US NHs between March and August 2020, linked to (1) NH facility characteristics derived from Medicare claims and the NH Minimum Data Set, (2) county demographics and socioeconomic characteristics, and (3) county COVID-19 prevalence data from USAfacts.org. COVID-19 cases among NH staff included all confirmed cases among nursing staff, aides, other clinicians and other facility personnel, measured per 100 beds to account for facility size. We measured the associations between NH characteristics, local infection rates, and other regional characteristics and COVID-19 cases among NH staff per 100 beds using linear regression. We used hospital referral regions as fixed effects to account for local infection control practices and other unobserved characteristics. Standard errors were adjusted for clustering of NHs within regions.

RESULTS: Of the 11,858 NHs in our sample, 78.6% reported at least one staff case of COVID-19. After accounting for local COVID-19 prevalence, NHs in the highest quartile of confirmed resident cases (>41% of residents infected) reported 18.9 more staff cases per 100 beds compared to NHs that had no resident cases (95% CI: 17.6-20.1; $p < 0.001$). Higher occupancy and more direct care hours per day were associated with more staff cases (0.4 more cases per 100 beds for a 10% increase in occupancy; 95% CI: 0.2-0.5; $p < 0.001$; and 0.7 more cases per 100 beds for an increase in direct care staffing of 1 hour per resident day; 95% CI: 0.5-0.9; $p < 0.001$, respectively). Large NHs (150 or more beds) reported 2.6 fewer staff cases per 100 beds compared to small NHs (<50 beds) (95% CI: -3.6 to -1.7; $p < 0.001$). Estimates associated with NH resident demographics, payer mix or county socioeconomic factors were not statistically significant.

CONCLUSIONS: These findings support mandates to reduce resident density, along with efforts to reduce spread in the community and emergency resources to protect and support NH staff, to help stem NH outbreaks.

LEARNING OBJECTIVE #1: To measure COVID-19 prevalence among staff in US NHs.

LEARNING OBJECTIVE #2: To identify facility- and community-level factors associated with COVID-19 cases among NH staff.

DOUBLE-BONUSES TO MEDICARE ADVANTAGE PLANS DO NOT INCREASE ENROLLMENT, ENHANCE QUALITY OR PROMOTE EQUITY

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BACKGROUND: In 2012, Medicare introduced the Quality Bonus Program linking financial bonuses to Medicare Advantage (MA) plan performance. An unusual feature of the program is the delineation of “double-bonus” counties – larger population areas with high MA enrollment and low fee-for-service spending – where higher quality plans receive bonuses that are twice as large as plans with equivalent quality in non-double-bonus counties. Bonuses are large, totaling \$2.3 billion in 2019. However, little is known about their impact on MA enrollment, quality, and equity.

METHODS: We used national data to test the association of double bonuses on MA with enrollment, quality, and equity from 2008 through 2018. First, using difference-in-differences (DID) analysis of enrollment in MA vs traditional Medicare in the Medicare Beneficiary Summary File (n=544,356,215 beneficiary-years), we compared MA enrollment in double-bonus and non-double-bonus counties, before and after double bonus eligibility. DID models used an intention-to-treat framework to define county entry and exit to and from double bonus eligibility in 2012-2018. Second, using DID analysis of quality in Optum MA insurance claims data (n=27,249,714 measure-beneficiary-years), we compared performance for 9 measures of quality consistently included in the Quality Bonus Program: breast cancer screening, 4 diabetes measures (e.g., A1c testing), 3 medication adherence measures (e.g., statins), and 1 rheumatoid arthritis management measure. Finally, we tested whether double bonuses were allocated equitably, comparing the probability of residing in a double-bonus county among Black versus White Medicare beneficiaries. **RESULTS:** In the pre-period (2008-2011), MA enrollment was 36% and 18% in double-bonus versus non-double-bonus counties, respectively. In DID models, double bonuses were not associated with changes in MA enrollment (DID, -1.9 percentage point [pp], 95% confidence interval [CI], -4.1, 0.3). In the pre-period, quality measures were achieved for 67.7% and 68.2% of MA beneficiaries in double-bonus versus non-double-bonus counties, respectively. In DID models, double bonuses were not associated with changes in MA quality (DID, +2.2 pp, 95% CI, -1.6 to 6.1). Black beneficiaries were 5.8 pp (95% confidence interval [CI], -9.3, -2.3) less likely than White beneficiaries to reside in double-bonus counties, a relative difference of 24%.

CONCLUSIONS: In this national study of the MA double bonus policy, we report three main findings. First, double bonuses were not significantly associated with MA enrollment. Second, double bonuses were not significantly associated with MA quality performance. Finally, double bonuses were offered much less frequently to plans serving Black than White populations. These findings suggest that double bonuses are not an efficient or equitable mechanism for promoting enrollment or quality in MA.

LEARNING OBJECTIVE #1: Understand the policy landscape of quality incentives in Medicare Advantage.

LEARNING OBJECTIVE #2: Determine the effect of double-bonuses on quality.

DOWNSTREAM CASCADES FOLLOWING INTRODUCTION OF HIGH-SENSITIVITY TROPONIN TESTING IN THE EMERGENCY DEPARTMENT SETTING

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BACKGROUND: Patients presenting to the emergency department with chest pain are often evaluated for acute myocardial infarction (MI) through troponin testing, which may prompt downstream services of uncertain value. It is unclear how widespread adoption of high-sensitivity cardiac troponin (hs-cTn) testing affects such cascades. We sought to determine the association of hs-cTn introduction with downstream cascade events.

METHODS: We performed an observational cohort study using electronic health record and billing data of patient-visits to five emergency departments in a large integrated health system, April 1, 2017 - April 1, 2019. We used difference-in-differences analysis to compare patient-visits for chest pain to patient-visits for other symptoms before and after introduction of the hs-cTn assay, accounting for patient sociodemographic and clinical factors, site and day of week fixed effects, and physician random effects. The primary outcome was presence of any cascade event defined as laboratory tests, cardiac studies, cardiac procedures, medications, cardiology service involvement, hospital admissions, or new diagnoses potentially associated with an initial hs-cTn test. Secondary outcomes were individual cascade events, length of stay, and spending on cardiac services.

RESULTS: We examined 107,979 patient-visits, including 7,564 (7.0%) for chest pain and 100,415 (93.0%) for other symptoms (mean patient age (SD) 55.4 (20.0); 59.1% female). Troponin testing rates declined slightly pre- to post-introduction of hs-cTn (87.7% to 86.7% among those with chest pain, 22.8% to 20.0% among those with other symptoms). Following hs-cTn introduction, patients with chest pain had a 2.8% (95% CI 0.72, 4.9) net increase in experiencing any cascade event. They were more likely to have multiple troponin tests (10.5%, 95% CI 9.0, 12.0), electrocardiograms (7.1 per 100 patient-visits, 95% CI 1.8, 12.4), and new diagnoses (1.8%, 95% CI 0.92, 2.7). Yet they received fewer computed tomography scans (-1.5 per 100 patient-visits, 95% CI -1.8, -1.1), stress tests (-5.9 per 100 patient-visits, 95% CI -6.5, -5.3), and cardiac catheterizations (-0.65 per 100 patient-visits, 95% CI -0.73, -0.16) and were less likely to receive cardiac medications, undergo cardiology evaluation (-3.5%, 95% CI -4.5, 2.6), or be hospitalized (-5.8%, 95% CI -7.7, -3.8). Chest pain patients had lower net mean length of stay (-0.24 days, 95% CI -0.32, -0.16) but no net change in spending.

CONCLUSIONS: Hs-cTn introduction was associated with more upfront tests yet fewer stress tests, catheterizations, cardiology evaluations, and hospital admissions among chest pain patients. These results demonstrate how technological advances may contribute to or mitigate cascades of medical services.

LEARNING OBJECTIVE #1: To understand diagnostic and treatment cascades of uncertain value that follow troponin testing.

LEARNING OBJECTIVE #2: To quantify how cascades changed following adoption of a high sensitivity troponin assay using difference in differences analysis.

EARLY TRENDS IN U.S. AMBULATORY CARE PATTERNS DURING THE COVID-19 PANDEMIC

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BACKGROUND: The COVID-19 pandemic has seriously disrupted access to U.S. ambulatory care, endangering population health—particularly among socioeconomically disadvantaged groups. Understanding care patterns can inform policymakers by spotlighting inequities and priority areas for improving access to care.

METHODS: Using the MedInsight research claims database including Medicaid, commercial, dual eligible, Medicare Advantage (MA), and Medicare

fee-for-service (FFS) insurance members aged ≥ 18 years across all 50 U.S. states from Jan 1, 2019-Aug 31, 2020, we combined demographic enrollment and beneficiary claims data to study ambulatory care patterns. We included 20 monthly cohorts, each including members continuously enrolled for 12 months prior to the study month. Across all 20 study months, we measured outpatient visit rates per 100 members for seven visit types: emergency, urgent care, home/office, physical exams, preventive, alcohol/drug, and psychiatric.

Using a difference-in-differences design, we compared changes in visit rates since Jan-Feb with Mar-Apr, May-Jun, and Jul-Aug 2020 time periods, and then compared each of these changes with corresponding changes in 2019. After verifying similar parallel trends Jan-Aug 2018 and 2019, we assumed that visit rates in Jan-Aug 2020 would have resembled seasonal patterns in Jan-Aug 2019 (i.e., "expected levels") had the pandemic not occurred. We summarized the pandemic's effects on visit rates in each time segment using ratios-of-rate ratios, where >100 indicated higher than expected and <100 indicated lower than expected levels. We used Poisson regression of the monthly visit counts, offsetting for the total number of members per month, and stratified results by virtual vs in-person and insurance type.

RESULTS: We identified 14.6 million members; mean age 50.0 and 54.7% female in 2019-2020. Compared with changes in visit rates since Jan-Feb to Mar-Apr 2019, visit rates during the same periods in 2020 declined to 68.9% [95% CI 68.8-69.0%] of expected levels. By May-Jun 2020, visits rebounded to 82.6% [82.5-82.7%] of expected levels, and this rebound was associated with a 52-fold [51-54] higher than expected use of virtual visits. By Jul-Aug 2020, visits across all members rebounded further to 87.7% [87.6-87.8%] of expected levels but with variation by insurance type: Medicare FFS 94.0% [93.7-94.2%], commercial 88.9% [88.8-89.1%], MA 86.3% [86.0-86.6%], dual eligible 83.6% [83.1-84.1%], and Medicaid members 78.0% [77.8-78.2%].

CONCLUSIONS: U.S. ambulatory care utilization declined sharply early in the pandemic. Rises in virtual care incompletely compensated for declines in in-person visits, particularly among dual-eligible and Medicaid members. As the COVID-19 pandemic persists, further efforts will be needed in order to ensure timely and equitable access to medical care.

LEARNING OBJECTIVE #1: Understand U.S. ambulatory care patterns during the early COVID-19 pandemic.

LEARNING OBJECTIVE #2: Understand how care patterns differed across cohorts, particularly Medicaid and dual eligible members.

FROM EVIDENCE OF NEED TO EVIDENCE OF ACTION: ASSESSING CONCORDANCE ACROSS NONPROFIT HOSPITALS' PUBLIC REPORTING ON HOUSING AS A COMMUNITY HEALTH NEED

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BACKGROUND: To justify nonprofit hospital organizations' tax exemption, the Affordable Care Act (ACA) requires these organizations to report on efforts to identify and invest in local health needs via Community Health Needs Assessments (CHNAs), Implementation Strategies (ISs), and Schedule H (990H) tax forms. However, there is no requirement that 990H spending aligns with topics raised on CHNAs or ISs, and recent reports have questioned whether 990H reporting categories adequately measure investments in social determinants of health. To assess the utility of ACA-mandated reporting for tracking spending on social health needs, this cross-sectional study aimed to describe how often a need identified in CHNAs is reflected in plans noted in ISs and in spending reported in 990Hs. Using housing as an example of a social

health need, we focused on communities with the most homelessness to study organizations most likely to address housing.

METHODS: We identified nonprofit hospital organizations with facilities in the 5 metropolitan areas with highest per-capita homelessness using Department of Housing & Urban Development data and the Community Benefit Insight (CBI) database. We reviewed organizations' public reporting documents, obtained via internet search and from CBI, to determine whether they ever addressed housing on CHNAs, ISs, and 990Hs from 2015-2017. We excluded 3 organizations for which we could not obtain all 3 documents.

RESULTS: Of 47 organizations sampled (representing 57 facilities in Washington, DC; Santa Cruz County; Boston; New York City; and San Francisco), housing was noted in 55% (n=26) of CHNAs, 36% (n=17) of ISs, and 26% (n=12) of 990Hs. Among the 26 organizations that recognized housing needs in CHNAs, 10 noted housing-related plans in ISs, and 7 reported spending on housing in 990Hs.

CONCLUSIONS: Although many nonprofit hospital organizations in areas with high homelessness recognize housing as a health need, public reporting documents provide limited evidence that an identified community need for housing was translated into related plans and spending. Further investigation should explore whether discrepancies among documented needs, strategies, and spending reflect inadequacy of the 990H for capturing housing-related spending versus hospitals' uncertainty in whether or how to invest in housing after identifying it as a health need. Regulatory reform to increase guidance for social investments and require greater concordance among CHNAs, ISs, and 990Hs could promote accountability and transparency in organizations' efforts to address housing and other health-related social needs.

LEARNING OBJECTIVE #1: Quantify use of public reporting documents by nonprofit hospitals in communities with high rates of homelessness to show how they identify and invest in housing as a community health need (Patient Care)

LEARNING OBJECTIVE #2: Appraise policy opportunities to enhance Affordable Care Act-mandated reporting requirements to hold nonprofit hospital organizations accountable to improving community health (Systems-Based Practice)

IMPACT OF 2009 ARRA HEALTH CENTER GRANTS ON LOCAL ECONOMIES AFTER RECESSION

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BACKGROUND: The 2009 American Recovery and Reinvestment Act (ARRA) provided \$2 billion in direct funding to U.S. federally-qualified health centers (FQHCs) in response to the Great Recession. As these health centers are located in some of the nation's most disadvantaged communities, ARRA funding provided a unique economic stimulus to local economies that were most severely affected by recession. The purpose of this study was to examine the effect of the 2009 ARRA Capital Development funding program on local jobs recovery in FQHC communities.

METHODS: We used a quasi-experimental longitudinal panel design (2008-2012) to compare changes in the rate of job growth between FQHC communities that received ARRA funding and a propensity-score matched control group. ARRA funding and FQHC data were provided by HRSA and geocoded to the census tract level. Job growth data were obtained from the Longitudinal Employer-Household Dynamics survey and calculated as a rate per 1000 population per year. Longitudinal panel analyses were specified using fixed effects regression at the census tract level and propensity score weights that incorporated all 15 variables in the CDC's Social Vulnerability Index (SVI). Total jobs were modeled as a function of the interaction between ARRA funding status (treatment vs. control) and year, estimating the average treatment effect on the treated.

RESULTS: Of the 50,619 census tracts included in the analysis, 2,223 contained at least one FQHC that received ARRA funding. On average across census tracts, jobs grew at a rate of 3.3 jobs per 1,000 population per year (95% CI: 0.8, 5.8) over the study period, with the bulk of job growth occurring amongst higher-wage (rate: 4.9 jobs; 95% CI: 3.9, 6.0) rather than lower-wage jobs (rate: -1.6 jobs; 95% CI: -3.2, 0). In unweighted comparative analyses, job growth in census tracts of ARRA-funded FQHCs were statistically no different than remaining census tracts in the same county. In propensity-score weighted analyses, jobs grew at a rate of 7.2 jobs (95% CI: 0.6, 13.8) in census tracts of ARRA-funded FQHCs compared to those without funding but with similar SVI; relative job growth occurred more evenly across lower wage (rate: 4.0 jobs; 95% CI: 0.2, 7.7) and higher wage (rate: 3.3 jobs; 95% CI: 0.3-6.2) job categories.

CONCLUSIONS: Although local economies of ARRA-funded FQHCs did not fare better than other communities in their county with respect to jobs recovery, they did fare significantly better than a matched cohort with similar social vulnerability. We observed an over twofold relative rate of job growth in these local economies compared to the overall rate. Our results suggest direct funding to FQHCs may be an effective strategy to support communities that are especially vulnerable to difficult recovery after economic recession.

LEARNING OBJECTIVE #1: Understand investments made under ARRA to FQHCs after the 2008 Recession.

LEARNING OBJECTIVE #2: Examine the impact of ARRA funding on the local economies of FQHCs.

INCIDENCE OF PRIMARY NONADHERENCE TO SODIUM-GLUCOSE COTRANSPORTER-2 INHIBITORS (SGLT2I) AND GLUCAGON-LIKE PEPTIDE-1 (GLP-1) AGONISTS IN AN INTEGRATED HEALTHCARE SYSTEM.

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BACKGROUND: Prior studies have demonstrated a relationship between poor adherence to glucose lowering drugs and worse clinical outcomes for patients with type 2 diabetes. The incidence and predictors of primary nonadherence (when a medication is prescribed but not dispensed) for newer glucose lowering medications including SGLT2i and GLP-1 agonists is not known.

METHODS: Using a database that links electronic health records with commercial claims from a large integrated healthcare system based in Western PA (UPMC), we identified patients with type 2 diabetes newly prescribed an SGLT2i or GLP-1 agonist from 2011 to 2019. We then measured the incidence of 30-day primary nonadherence to these 2 classes of medications both overall and by individual drug using claims data. We used multivariable logistic regression to examine patient and provider factors associated with primary nonadherence to these classes of medications.

RESULTS: Our cohort included 5,505 commercially insured adults (mean age 50[SD 11]) with type 2 diabetes newly prescribed an SGLT2i (n=2,844) or GLP-1 agonist (n=2,661). Overall, 1,867 (34%) patients did not fill their first prescription. Among the most commonly prescribed drugs, the incidence of primary nonadherence was lowest for dulaglutide (425/1,439(30%)) and highest for canagliflozin (372/855(44%)). In a multivariable adjusted model, age>65 (OR 1.3, 95% CI: 1.06 to 1.61), hypertension (OR 1.18, 95% CI: 1.02 to 1.35), and number of hospitalizations (OR 1.39, 95% CI: 1.16 to 1.65) was associated with an increased odds of primary nonadherence. Female sex (OR 0.88, 95% CI: 0.77 to 0.99), peripheral artery disease (OR 0.73, 95% CI: 0.57 to 0.93), having a baseline HbA1c value (OR 0.76, 95% CI: 0.64 to 0.89), having a baseline creatinine value (OR 0.82, 95% CI: 0.71 to 0.94), and having an endocrinologist vs PCP prescribe the index drug (OR 0.77, 95% CI: 0.65 to 0.91) were associated with decreased odds of primary nonadherence.

CONCLUSIONS: In this cohort of commercially insured patients with type 2 diabetes from a single integrated health system, one out of three patients prescribed a SGLT2i and GLP-1 agonist did not fill their prescription in the next 30 days. Older age and increasing morbidity predicted higher odds of

primary nonadherence while more active engagement and follow-up with providers, including diabetes specialists, was associated with reduced odds of primary nonadherence.

LEARNING OBJECTIVE #1: Identify characteristics that predict primary nonadherence to SGLT2i and GLP-1 agonists (ACGME core competency #1).

LEARNING OBJECTIVE #2: Demonstrate awareness of the incidence of primary nonadherence to SGLT2i and GLP-1 agonists for patients covered by commercial health plans (ACGME core competency #6).

NATIONAL TRENDS IN UTILIZATION AND SPENDING ON ORAL ANTICOAGULANTS FROM 2011 TO 2019: CAN MEDICARE SUSTAIN THEIR RISING PRICES?

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BACKGROUND: Direct oral anticoagulants (DOACs) were introduced in 2010 and are associated with lower bleeding risks and decreased monitoring compared to warfarin, but also higher costs. It is unknown how the introduction of competing DOACs has impacted Medicare spending. Thus, we sought to investigate national trends in spending and utilization on oral anticoagulants since the introduction of DOACs.

METHODS: We examined the Medicare Part D Prescription Drug Event data set, an 100% sample of Medicare Part D beneficiaries that includes Medicare Advantage and stand-alone Part D plans, from 2011 to 2019. We used descriptive statistics to examine the number of Medicare Part D beneficiaries, total spending, and spending per beneficiary annually for each medication and for DOACs (dabigatran, rivaroxaban, apixaban, and edoxaban) and warfarin (generic and branded formulations) in aggregate.

RESULTS: Between 2011 and 2019, the number of Medicare Part D beneficiaries taking oral anticoagulants increased from 2.68 million to 5.24 million (9% to 12% of beneficiaries). Of beneficiaries taking oral anticoagulants, the proportion using DOACs increased from 7% in 2011 to 67% in 2019, with an increase in annual DOAC users from 0.20 million to 3.50 million and a decrease in warfarin users from 2.48 million to 1.74 million. Medicare Part D spending on oral anticoagulants between 2011 and 2019 increased from \$0.45 billion to \$11.72 billion. In 2019, DOACs accounted for 99% of spending on oral anticoagulants (\$11.81 billion), while warfarin's 1% of spending totaled \$0.16 billion. Per beneficiary spending increased for all DOACs during the study period, despite the entry of 4 competing DOACs, and average per beneficiary spending across drugs became more concentrated. In 2019, the three most utilized formulations were apixaban (41% of oral anticoagulant use, 60% of spending), rivaroxaban (21% of use and 33% of spending), and generic warfarin (30% of use, 1% of spending).

CONCLUSIONS: Since 2011, Medicare Part D spending on oral anticoagulants has increased twenty- seven-fold to over \$11 billion annually, reflecting rising enrollment, a large shift from warfarin to DOACs, and a consistent increase in spending per beneficiary on DOACs. Increased competition in the branded DOAC marketplace has failed to lower prices, suggesting that novel policies, such as proposed legislation allowing Medicare price negotiation, are needed to restrain unsustainable spending.

LEARNING OBJECTIVE #1: Describe the trends in Medicare Part D spending on oral anticoagulants, and in the number of Part D beneficiaries who use anticoagulants, over the past decade.

LEARNING OBJECTIVE #2: Compare and contrast recent trends in spending on direct oral anticoagulants and warfarin, and identify the role of branded and generic competition in driving those differences.

PHYSICIAN PERSPECTIVES: HOW THE MERIT-BASED INCENTIVE PAYMENT SYSTEM IMPROVES VALUE

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BACKGROUND: Implemented in 2017, the Medicare Merit-based Incentive Payment System (MIPS) represents the largest pay-for-performance program to date in the United States. Understanding physician perspectives about how MIPS domain activities improve value (e.g., through improvements in quality, patient experience, or cost-efficiency) can help policymakers better engage physicians in MIPS.

METHODS: National web-based survey of 1,431 internal medicine physicians. Those who believed MIPS domain activities would improve value were asked about mechanisms – quality (structural quality, process quality, or outcome quality), patient experience, and/or cost – they believed would drive those improvements. Survey responses were described using percentages. Chi-square tests and t-tests were used to compare categorical and continuous variables, respectively.

RESULTS: Among 1,431 physicians, 51% responded. Respondents were 51% male with a median age of 48 years and 71% were general internists (primary care, geriatrics, or hospital medicine). Most believed value would be improved by activities in the 4 MIPS domains of quality (55%), improvement activities (70%), promoting interoperability (54%), and cost (71%). Process quality was the most frequently selected mechanism in the quality (77%), improvement activities (70%), and promoting interoperability (70%) domains. Costs of care was the most frequently selected mechanism (86%) in the cost domain. As mechanisms, patient experience and structural quality were selected by less than half of respondents across the 4 domains.

Within the quality domain, 62% and 77% of physicians believed that patient outcomes and process quality drove value, respectively. Similarly, 67% and 70% physicians believed that patient outcomes and process quality drove quality in the improvement activities domain. In the promoting interoperability domain, 70% physicians responded that process quality drove value, while only 54% believed that patient outcomes did so. In the cost domain, approximately half of physicians thought that patient outcomes and process quality drove value.

CONCLUSIONS: Among physicians who believed that MIPS activities would improve value, most believed that would occur predominantly through process improvement activities. In all 4 domains, more respondents believed that value would increase more through activities in process quality than patient outcomes – a possible signal that clinicians may feel a greater sense of control over processes versus outcomes. One potential implication is that retaining emphasis on process improvement alongside clinical outcomes may be important for supporting physician engagement in MIPS.

LEARNING OBJECTIVE #1: Describe physician perspectives about drivers of value within the 4 domains – quality, improvement activities, promoting interoperability, and cost – of the Merit-based Incentive Payment System (MIPS) program

LEARNING OBJECTIVE #2: Understand how physician perspectives regarding drivers of value in MIPS can inform future policy development

THE ASSOCIATION BETWEEN CHRONIC DISEASE IN CHILDREN AND FOREGONE HEALTHCARE AMONG HOUSEHOLD ADULTS: FINDINGS FROM THE NATIONAL HEALTH INTERVIEW SURVEY

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BACKGROUND: Children with chronic illnesses may go without needed healthcare due to costs. Whether adults living with such children forego their own care is unclear.

METHODS: We analyzed data from the 2009-18 National Health Interview Survey (NHIS), which includes responses from one adult and

one child in each household. Our population included all such adult-child dyads in the NHIS. For each dyad, we determined whether the child had asthma or diabetes, and the presence of several indicators of family financial strain and six indicators of cost-related healthcare access problems for the adult. We performed logistic regressions examining the association between each child illness (asthma or diabetes) and healthcare access problems faced by the adults they lived with, adjusted for: adult and child age, sex, and insurance status; family size, income, and homeownership; adult's health status, number of chronic diseases, employment, education, and marital status.

RESULTS: Our population included 93,264 adults; of these, 8,499 lived with a child with asthma and 179 with a child with diabetes. Adults living with asthmatic children were more often non-white, and had lower incomes and worse health than those living with a child without asthma. Adults in families with diabetic children were similar in income to those where the child did not have diabetes, and were younger, more often white and had worse health. Families with children with either illness had higher out-of-pocket medical spending, more difficulty paying medical bills and more food insecurity. In the adjusted models (Table), adults living with asthmatic children were more likely than adults living with a non-asthmatic child to forego or delay their own medical care (OR 1.27; 95% CI 1.16-1.39), and to forego medications, and specialist, mental health, dental and follow-up care. All access problems were also more frequent among adults living with a diabetic child, but only one, foregoing medical care (OR 1.76, 95% CI 1.18-2.64), was statistically significant.

Association Between Child Chronic Illness and Household Adult Foregone Care

Foregone care of adult	Child Asthma			Child Diabetes		
	Without (%) n=84,765	With (%) n=8,499	Adjusted OR (95% CI)	Without (%) n=93,085	With (%) n=179	Adjusted OR (95% CI)
Medical care*	10.2	14.7	1.27 (1.16,1.39)	10.6	19.2	1.76 (1.18,2.64)
Medications	7.7	13.5	1.41 (1.28,1.56)	8.2	15.3	1.43 (0.83,2.48)
Specialist	4.4	7.1	1.25 (1.09,1.44)	4.6	9.4	1.77 (0.70,4.49)
Mental health care	2.2	3.7	1.20 (1.02,1.41)	2.3	5.6	1.63 (0.64,4.15)
Dental care	13.4	17.8	1.16 (1.07,1.26)	13.8	18.0	1.02 (0.66,1.58)
Follow-up	4.0	6.5	1.25 (1.06,1.47)	4.2	8.7	1.60 (0.58,4.40)

CONCLUSIONS: A child's illness may lead adult family members to sacrifice their own medical care due to cost. Reforms to improve the adequacy of insurance coverage for both children and adults are needed. **LEARNING OBJECTIVE #1:** To elucidate the connection between childhood chronic illness and foregone healthcare among household adults.

LEARNING OBJECTIVE #2: To understand the role of financial strain in this association.

THE ASSOCIATION BETWEEN PHYSICIAN GROUP PARTICIPATION IN BUNDLED PAYMENTS AND CHANGES IN EPISODE OUTCOMES

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BACKGROUND: Bundled payments have garnered widespread participation from physician group practices (PGPs) and hospitals. However, while hospital participation has been well-studied and shown to achieve savings with stable quality, there are no peer-reviewed studies assessing PGP participation. This knowledge gap is notable given that PGP participation in other payment models, such as accountable care organizations, has been associated with stronger effects than hospital participation. Therefore, we compared PGP and hospital BPCI participation and their relationship with episode outcomes.

METHODS: We used 2010-2017 Medicare claims and generalized linear models to conduct a difference-in-differences analysis of patients receiving care under BPCI via propensity-matched BPCI vs Non-BPCI physicians and BPCI vs Non-BPCI hospitals for the 10 highest volume episodes (5 surgical, 5 medical). This quasi-experimental analysis mirrored a 2x2 factorial randomized trial in which patients received care from either PGPs in BPCI, Hospitals in BPCI, both (i.e., receiving care at BPCI hospitals from BPCI PGP physicians), or neither. The primary outcome was 90-day total episode spending. Secondary outcomes were 90-day readmissions and 90-day mortality. We confirmed parallel trends in the pre-BPCI time period.

RESULTS: The matched sample included 600,803 patients receiving care from 2,582 physicians in BPCI PGPs, 644,627 patients receiving care from 384 BPCI Hospitals, 74,858 patients receiving care from both BPCI PGPs and Hospitals, and 1,268,933 patients receiving care outside of BPCI (SMD<0.1 for all PGP and hospital characteristics). Compared to patients receiving care outside of BPCI, episode spending was differentially lower for those receiving care under BPCI PGPs (adjusted difference-in-differences [aDID] -\$520, 95% CI -\$615 to -\$424, p<0.001) and hospitals (aDID -\$1073, 95% CI -\$1164 to -\$982, p<0.001). Savings were larger for BPCI Hospitals than PGPs (p<0.001) and receiving care under both PGPs and Hospitals was not associated with additional differential changes in episode spending (aDID \$225, 95% CI -\$29 to \$479, p=0.08). Compared to patients receiving care outside of BPCI, mortality was differentially lower for patients receiving care from BPCI PGPs (aDID -0.6%, 95% CI -0.7% to -0.4%, p<0.001) and BPCI Hospitals (aDID -0.6%, 95% CI -0.8% to -0.5%, p<0.001). Readmissions were differentially lower among patients cared for by BPCI Hospitals but not those cared for by BPCI PGPs.

CONCLUSIONS: PGP participation in bundled payments was associated with episode savings and lower mortality. Savings were smaller than hospital-associated savings, while mortality was comparable. Unlike in other payment models, hospitals may have advantages compared to PGPs in bundled payments.

LEARNING OBJECTIVE #1: List comparative effects of physician versus hospital participation in bundled payments

LEARNING OBJECTIVE #2: Describe advantages of participating hospitals over physicians

THE FIRST THREE YEARS OF THE ACA: QUALITY, COST, UTILIZATION, AND PATIENT EXPERIENCE

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BACKGROUND: The Affordable Care Act (ACA) of 2010 expanded Medicaid eligibility at the discretion of states to Americans earning up to 138% of the federal poverty level (FPL) and subsidized private insurance for Americans less than 400% of the FPL. Several studies have examined the immediate impact of the ACA on access and utilization, but few have examined the longer-term association with quality, patient experience, and cost.

METHODS: We analyzed data from the 2011 to 2016 Medical Expenditure Panel Survey (annual response rate: 46%-56%), a nationally representative annual survey of Americans and their respective clinicians, hospitals, pharmacies, and employers. We compared changes in quality, patient experience, utilization, and cost between adults (18-65 years old; total sample: 119,788) with income below and above 400% of the FPL before (2011 to 2013) and after (2014 to 2016) ACA implementation using a difference-in-differences (DiD) approach with adjustment for 25 sociodemographic covariates. For quality and experience outcomes, we examined previously published composites based on 45 individual measures: 5 "high-value" care composites (eg preventive testing); 4 "low-value" care composites (eg inappropriate imaging); an overall patient experience rating; a physician communication composite; and an access to care composite. For cost, we examined overall and out-of-pocket expenditures for office visits, inpatient admissions, and prescriptions. For utilization

outcomes, we examined outpatient, emergency, and inpatient encounters and prescribed medicines.

RESULTS: In the three years after ACA implementation, adults with income less than 400% of the FPL received more high-value care in 1 composite (diagnostic and preventive testing: 70% to 72% vs 84% to 84%; adjusted DiD +1.2%; $p=0.02$) and no significant DiD in 4 other high-value composites. We found no significant DiD in all 4 low-value care composites. Those with income less than 400% of the FPL had larger improvements in experience and access in all 3 composites (eg, 50% to 54% vs 59% to 60%; adjusted DiD +2.7%; $p=0.047$). We found no DiD in utilization, total cost of care, or cost for prescriptions, office visits, and inpatient encounters. However, after ACA implementation, total out of pocket expenditures decreased from \$503 to \$441 for Americans with income below 400% of the FPL compared to an increase from \$757 to \$769 (-\$100.43, adjusted DiD; $p<0.01$), primarily driven by a decrease in out-of-pocket expenditures for office visits (-\$44.77, adjusted DiD; $p<0.01$).

CONCLUSIONS: In its first three years, the ACA was associated with increased high-value diagnostic and preventive testing, improved patient experience and access, and decreased out-of-pocket expenditures for lower income Americans. The ACA otherwise did not appear to impact high-value care, low-value care, utilization, or the total cost of care.

LEARNING OBJECTIVE #1: Describe the association of the ACA with quality and patient experience.

LEARNING OBJECTIVE #2: Describe the association of the ACA with cost and utilization.

THE ROLE OF INDUSTRY AND NIH/ACADEMIA IN THE CLINICAL DEVELOPMENT OF GLP-1 AGONIST AND SGLT2 INHIBITORS

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BACKGROUND: Given their cardiovascular benefits, GLP-1 agonists and SGLT2 inhibitors are increasingly prescribed as second line agents for type 2 diabetes. However, costs for these drugs are high and increasing. Pharmaceutical manufacturers often cite high development costs as a justification for high prices. Thus, we sought to characterize the role of NIH and academia in the development of these drugs.

METHODS: We searched clinicaltrials.gov and characterized active or completed US clinical trials of GLP-1 agonists and SGLT2i by drug, sponsor, and lead investigator (defined as first or last author on trial publication). We used NIH Reporter to determine if lead investigators received diabetes or cardiovascular NIH grants as a measure of indirect NIH support.

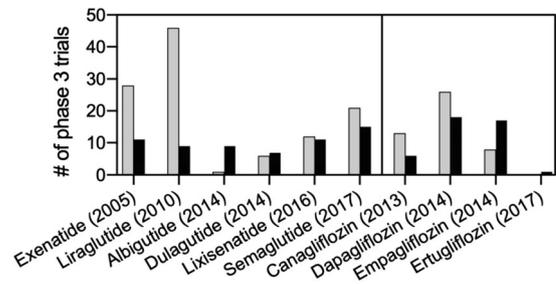
RESULTS: We examined 200 GLP-1 agonist and 104 SGLT2i phase 3 clinical trials. For GLP-1 agonists, 179(90%) were sponsored by industry and 21(10%) were sponsored by NIH/academia. For SGLT2i, 93(89%) and 11(11%) were sponsored by industry and NIH/academia, respectively. Of the 179 phase 3 industry GLP-1 agonist trials, 52% were led by NIH-supported physicians, 22% were led by non-academic physicians, and 26% had no identifiable lead author. For the 93 phase 3 industry SGLT2i trials, 42%, 28%, and 30% were led by NIH-supported physicians, non-academic physicians, or had no identifiable lead author, respectively. When sponsorship was analyzed by drug, we found exenatide and canagliflozin, the first FDA approved drugs of each class, received more public support than other drugs in the same class. Of 39 phase 3 trials for exenatide, 72% were sponsored by NIH/academia or industry sponsored and led by NIH-supported physicians, and 28% were industry sponsored and led by non-academic physicians or had no identifiable study lead. For the 19 canagliflozin phase 3 trials, 68% were industry sponsored and led by NIH-supported physicians, and 32% were industry sponsored and led by non-academic physicians or had no identifiable study lead.

CONCLUSIONS: Our findings suggest that public support by direct NIH sponsorship or intellectual leadership by NIH-supported physicians was substantial in the development of GLP-1 agonists and SGLT2 inhibitors, while industry contributed more towards developing the remaining “follow-on” drugs of each class.

LEARNING OBJECTIVE #1: Recognize trial funding

LEARNING OBJECTIVE #2: Appreciate drug development

Fig. Phase 3 clinical trials of GLP-1 agonists and SGLT2 inhibitors. Grey bars are trials sponsored by academia/NIH or industry-sponsored with an NIH-funded investigator. Black bars are industry sponsored with a non-NIH funded investigator or those with no identifiable investigator.



TRENDS AND COST ANALYSIS OF AMMONIA TESTING IN HEPATIC ENCEPHALOPATHY

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BACKGROUND: Hepatic encephalopathy (HE) is a reversible neuropsychiatric complication of chronic liver disease (CLD) which manifests as a broad spectrum of neurological or psychiatric abnormalities ranging from subclinical alterations to coma. Ammonia is implicated as the culprit in HE. The sensitivity and specificity of venous ammonia level >55 $\mu\text{mol/L}$ to diagnose HE is 47.2% and 78.3% respectively. The positive predictive value and negative predictive value of ammonia are 77.3% and 48.6% with an overall diagnostic accuracy of 59.3%. Studies have shown that the normalization of ammonia levels lag behind the resolution of neurological symptoms by 48 hours while some patients had higher ammonia levels even after the symptomatic resolution. The AASLD guidelines state that the high blood ammonia levels do not add any diagnostic, staging or prognostic value in HE patients with CLD. Repeat testing of ammonia in hospitalized patients during the same encounter is also questionable. The purpose of this study was to evaluate the trends of ordering ammonia levels and estimate the cost burden at the University of Mississippi Medical Center (UMMC).

METHODS: We performed a retrospective observational study of all patients who received the ammonia test at UMMC from January 3, 2013 to December 31, 2019. Patient Cohort Explorer was used to obtain de-identified patient data from EPIC. We obtained the number of encounters and patients on whom the ammonia test was performed. Coding and billing offices provided the cost per ammonia test.

RESULTS: The ammonia test was ordered 14,748 times on 7,725 patients with age > 18 years during 7,957 encounters between 2013 and 2019. 4,533(30.73%) ammonia test results were >60 $\mu\text{mol/L}$, the upper normal limit at UMMC. 1326, 1652, 2020, 2221, 2224, 2057, 2208 tests were ordered respectively from 2013 to 2019. Of the 14,748 tests, 8,734 were ordered one time during the admission while the other 6,014 were ordered as repeat tests during the same encounter. 1030, 327, 167, 91 hospital patient encounters had the test ordered twice, thrice, four and five times respectively. 205 encounters had the test ordered more than 5 times with the highest being 30 times during one hospital stay. At the estimated self-pay cost of \$188 per each ammonia test, the total cost was \$2,772,624 for all ammonia tests between 2013 and 2019 and \$1,130,632 was spent on repeat ammonia tests during the study period.

CONCLUSIONS: HE is a diagnosis of exclusion and is made on clinical grounds. The serum ammonia levels do not aid in the diagnosis, assessing the severity or determining the resolution of HE. Based on our study, we recommend following the current AASLD guidelines and not order the test and also avoid repeat testing in efforts to reduce diagnostic costs.

LEARNING OBJECTIVE #1: To emphasize that Hepatic Encephalopathy is a clinical diagnosis and not a lab diagnosis.

LEARNING OBJECTIVE #2: To avoid unnecessary Ammonia testing in HE in CLD patients and decrease cost burden on healthcare

US COST-EFFECTIVENESS OF FIRST-LINE GLUCAGON-LIKE PEPTIDE-1 RECEPTOR AGONISTS (GLP1RA) AND SODIUM-GLUCOSE COTRANSPORTER-2 INHIBITORS (SGLT2I) FOR PATIENTS WITH TYPE 2 DIABETES

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BACKGROUND: In 2020 ADA/EASD guidelines recommended GLP1RAs and SGLT2Is as second-line therapy for patients with type 2 diabetes (T2D) and with, or having a high risk for, atherosclerotic cardiovascular disease, chronic kidney disease, or heart failure. Furthermore, because of their effectiveness at reducing cardiovascular and microvascular events and mortality vs. placebo, there have been additional calls to use these drugs more broadly in patients with T2D. While very promising, these drugs are very expensive. Because of the tradeoffs between the clinical benefits and high costs, we sought to evaluate the cost-effectiveness of GLP1RAs and SGLT2Is, respectively, as first-line therapy for the US T2D population overall, as compared to first-line metformin.

METHODS: An individual -level Monte Carlo-based Markov model was used to simulate lifetime incidence and prevalence of major T2D-related complications, mortality, and costs for a US- representative population with T2D from the National Health and Nutrition Examination Survey 2013-2016. We compared treatment protocols using either a GLP1RA or SGLT2I as first-line treatment instead of metformin for drug-naïve patients with T2D. Model outcomes included average life expectancy, quality adjusted life years (QALYs), lifetime costs, and incremental cost-effectiveness ratios (ICER).

RESULTS: Mean life expectancy and QALYs for first-line metformin, GLP1RAs, and SGLT2Is were 24.33, 24.61, and 24.58 years and 12.75, 12.69, and 12.84 years, respectively. The mean lifetime cost for the first-line metformin treatment strategy was \$100,000 compared to \$115,000 and \$140,000 for the first-line GLP1RA and SGLT2I treatment strategies. The ICER of the SGLT2I treatment strategy was \$450,000 per additional QALY gained, compared with metformin; the GLP1RA strategy was dominated.

CONCLUSIONS: Our model results suggest that first-line GLP1RAs and SGLT2Is are potentially effective first-line agents to improve T2D morbidity and mortality, but are not cost-effective for the US population with T2D due to the high cost of these medications.

LEARNING OBJECTIVE #1: patient care - identify, respect, and care about patients' differences, values, preferences, and expressed needs; listen to, clearly inform, communicate with and educate patients; share decision-making and management; and continuously advocate disease prevention, wellness, and promotion of healthy lifestyles, including a focus on population health

LEARNING OBJECTIVE #2: systems-based practice - actions that demonstrate an awareness of and responsiveness to the larger context and system of healthcare and the ability to effectively call on system resources to provide care that is of optimal value

UTILIZATION AND THE COST BURDEN ANALYSIS OF AMYLASE TESTING IN ACUTE PANCREATITIS

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BACKGROUND: Amylase was one of the earliest tests used for identifying acute pancreatitis. Since then, lipase has been introduced and is more sensitive and specific as compared to amylase for acute pancreatitis. The amylase is routinely ordered with co-ordering of amylase and lipase seen in 90% of the cases secondary to the belief that co-ordering provides greater accuracy than either test alone. At a diagnostic threshold of 208 U/L for lipase and 114 U/L for amylase, lipase had a superior sensitivity (90.3% vs 78.7%), specificity (93.0% vs 92.6%), positive likelihood ratio (14.1 vs 10.6), and a similar negative likelihood ratio (0.1 vs 0.1). The lipase remains elevated longer than

amylase and is useful in delayed presentations of acute pancreatitis. Neither of these tests correlates with severity or clinical resolution of pancreatitis and are not included in any of the severity tools, like Ranson's criteria, APACHE II or CT severity index. The 2013 ACG guidelines recommend ordering lipase alone, stating serum amylase alone cannot be used reliably and that serum lipase is preferred.

METHODS: We performed a retrospective observational study of all patients who received the amylase test at UMMC from January 3, 2013 to December 31, 2019. Patient Cohort Explorer was used to obtain de-identified patient data from EPIC. We obtained the number of encounters and patients on whom the amylase test was performed. Coding and billing offices provided the cost per test (CPT code 82150) at \$ 63 in 2020.

RESULTS: Amylase test was ordered 26,448 times on 15,864 patients between 2013 and 2019. 4167, 4127, 4175, 3946, 3533, 3081, 2952 tests were done respectively from 2013 to 2019. Majority (22,287) tests were ordered only once per encounter and 4,161 tests are done as repeat tests during the same encounter. The median age of the patient was 43 years. More tests were done in females (58%) than males (42%). The majority tests were in African Americans (56.6%) followed by Caucasians (41.1%) and 2.3% in others. Of the 26,448 tests, 6,128 (23%) were >100, the upper limit of normal and 1,018 (3.8%) were >300, three times the upper limit. With \$63 per test a total of \$1,666,224 was spent on amylase testing between years 2013 to 2019, with an average expenditure of 238,032 each year. The total cost of repeat tests during the same encounter was \$262,143.

CONCLUSIONS: In the evaluation of acute pancreatitis, amylase, when compared to lipase, has inferior sensitivity and specificity, adds no additional diagnostic information when co-ordered, and does not provide additional prognostic information. The guidelines recommend ordering lipase alone rather than either amylase alone or co-ordering amylase and lipase, and also against the daily monitoring of pancreatic enzymes as it do not help assess clinical progress or severity of illness.

LEARNING OBJECTIVE #1: To recognize the futility of ordering Amylase in suspected case of acute pancreatitis

LEARNING OBJECTIVE #2: To avoid unnecessary amylase testing in pancreatitis and reduce cost burden on healthcare system

VARIATION IN NETWORK ADEQUACY STANDARDS FOR MENTAL HEALTH IN MEDICAID MANAGED CARE

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BACKGROUND: Inadequate provider networks may translate into access to care barriers for Medicaid enrollees, who are generally limited to contracted providers and lack cost-sharing options for going "out-of-network" for non-emergent mental health care. Under 2016 Medicaid managed care final rules, states are required to establish time and distance standards for key types of providers, but have flexibility in the specific standards that are set. Evidence suggests that provider networks tend to be narrower for mental health than for other specialties, but it is unknown what metrics Medicaid programs use to monitor network adequacy for mental health services.

METHODS: For each state with services provided through comprehensive managed care organizations and/or Primary Care Case Management, we queried Google using both state name and branded Medicaid name as applicable, with combinations of the following terms: "network adequacy", "network standard", "network access", "timely access", "provider network", "access to care", "appointment availability." We reviewed Medicaid provider network reports; timely access standards; managed care plan contracts; access monitoring review plans; Medicaid services manuals; quality strategy reviews; and state statutes and regulations, and extracted data on quantitative network adequacy standards, variation in standards by type of provider, timely access standards, non- quantitative network access standards, and monitoring or enforcement plans. We identified network adequacy standards for 43 of 47 states and D.C. with Medicaid managed care arrangements.

RESULTS: Overall, 37 states reported time and distance standards, and 26 states (60.5%) had network adequacy standards that explicitly targeted mental health services. Among these states, 61.5% stratified time and distance

standards by geography or population density (for instance, rural vs. urban or large vs. small county). Of 20 states with timely access standards for mental health care, the maximum wait time for a routine outpatient appointment varied from 7 to 30 days; only one state had explicit timely access standards for telemental health. Just four states currently use other quantitative network adequacy metrics, such as provider to enrollee ratios, for mental health.

CONCLUSIONS: Network adequacy has been a growing focus of policy efforts to ensure timely and appropriate access to care in Medicaid, one of the U.S.'s largest payers for mental health care. Our results suggest that there remains significant variation across states in both the types of network adequacy metrics and the actual standards used. Given that CMS updated its 2020 Medicaid managed care final rule to allow states further flexibility in defining network adequacy, policymakers will need to balance greater flexibility with maintaining accountability where it is needed.

LEARNING OBJECTIVE #1: Understand how network adequacy standards relate to access to care for behavioral health services

LEARNING OBJECTIVE #2: Describe how network adequacy standards are applied by state Medicaid programs

VOLUNTARY PAYMENT INCENTIVES AND TARGETING: EVIDENCE FROM BUNDLED PAYMENTS IN MEDICARE

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BACKGROUND: Private and public payers are increasingly adopting payment reforms to shift financial risk onto providers and incentivize more efficient care. Most initiatives are voluntary, making them challenging to study due to selection concerns related to provider participation. This paper addresses these concerns using a novel instrumental variable approach. The approach recovers causal treatment effects for a policy-relevant complier group—providers induced to participate due to the contract design, which is the main lever controlled by policymakers. We apply our approach to Medicare's Bundled Payments for Care Improvement (BPCI) program, under which different providers are paid a set amount for an episode of care. We focus on hip and knee replacement, which is the largest single procedure category in BPCI. Unlike prior studies, we account for voluntary hospital participation in evaluating the effects of BPCI on spending, utilization, and complications.

METHODS: We exploit idiosyncratic incentives in CMS' payment formula and develop instruments for participation in BPCI, predicted using baseline hospital attributes. The instruments capture the importance of the hospital's orthopedics service line and usage of expensive post-acute care (PAC), which determine the gain from participation. These instruments are valid under the exclusion restriction that baseline hospital attributes affect future outcomes only through the hospital's participation in BPCI. We use event study methods to test for differential pre-trends in outcomes at high propensity hospitals. We then apply this instrument to examine 90-day outcomes. We use 100% samples of Medicare inpatient and PAC claims over 2007–16, and our main analyses cover 2.4 million joint replacement episodes.

RESULTS: Reassuringly, we find no evidence of pre-trends associated with the instrument. The IV estimates suggest that complier hospitals reduced episode spending by about 10% due to BPCI, nearly double the reduction implied by OLS. These reductions were effectuated by avoiding the use of PAC: the probability of avoiding PAC increased by 13.7 percentage points. We find no evidence to suggest that changes in patient volume or mix contributed to this reduction. However, we find a nearly 50% increase in revision surgeries (off a low base) at complier hospitals suggesting that some patients were made worse off (in contrast to null effects in OLS estimates and prior studies).

CONCLUSIONS: Using national Medicare data, we find large reductions in episode spending but increased revision surgeries in BPCI. Our IV strategy helps address selection and identify policy-relevant treatment effects. Such voluntary incentives are found in various health care settings, and this approach has wide applicability to other voluntary programs.

LEARNING OBJECTIVE #1: Voluntary bundled payment programs can lower spending on joint replacement but may increase subsequent revision surgery.

LEARNING OBJECTIVE #2: Measuring impacts on those induced to participate may be necessary to understand voluntary payment reforms.

WHAT IS THE ATTITUDE OF PHYSICIANS-IN-TRAINING ON HEALTH ADVOCACY? A PHYSICIAN LED VOTER REGISTRATION INITIATIVE AND HEALTH ADVOCACY SURVEY.

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BACKGROUND: Although physicians are in a unique position to directly see how government policy impacts health, prior studies have shown that they are less likely to vote and are less engaged in civic participation than the general population. In the context of an initiative designed to increase voter registration among patients, this study sought to understand attitudes of physicians helping patients register to vote as well as physician roles in health advocacy.

METHODS: In September of 2020, badges with the QR codes for the Maryland online voter registration website were distributed to medical students, and house staff. After online voter registration ended, prior to the presidential election, a survey was e-mailed to all medical students, resident, and fellows. The survey, developed using iterative pilot testing, assessed perceptions of the voter registration initiative, perceived roles of physician advocacy, and obtained demographic information including age, political affiliation and specialty. Data was collected and stored in Qualtrics and statistical analysis was done using Stata version 16.2 and group differences were analyzed using Chi square analysis.

RESULTS: The QR code for the voter registration initiative was scanned 130 times by patients. From the 1,719 medical students, residents and fellows, 366 (21.3%) responded to the survey. Among respondents, 47.4% were aged 26 to 30, 18.9% were medical students while 30.5% were residents or fellows from an internal medicine subspecialty. 76.1% were Democrats while 23.9% reported belonging to another party or had no party affiliation. Prior to this initiative, only 11.4% of respondents had asked a patient whether they were registered to vote. Since the initiative, 20.9% had asked a patient about their voter registration status. The most commonly cited barriers were discomfort asking the patient, time and workflow constraints. Overall, 44% agreed or strongly agreed that physicians have a role registering patients to vote (50.5% among Democrats vs 30% among non-Democrats, $p < 0.001$).

In regard to physician advocacy, 259 (86%) respondents agreed with the statement that physicians have an obligation to address health advocacy (92% among Democrats vs. 68% among non-Democrats, $p < 0.001$). Further, 64% agreed or strongly agreed with the statement "COVID-19 has changed my perception of my role in society" (67% among Democrats vs. 54% among non-Democrats, $p = 0.051$). In contrast, 45% agreed that physicians should focus on clinical care rather than health advocacy (16% among Democrats vs. 42% among non-Democrats, $p < 0.001$).

CONCLUSIONS: While a large majority of physicians in training agreed that physicians have an obligation to address health advocacy, there was divergent opinion on implementing this through voter registration at the bedside and divergence of opinions based on political affiliation.

LEARNING OBJECTIVE #1: Determine the success and barriers of a QR code voter registration initiative

LEARNING OBJECTIVE #2: Determine the attitudes on health advocacy of physicians in training

Scientific Abstract - Hospital-Based Medicine

CASE MANAGEMENT DURING A PANDEMIC: A SINGLE SITE ANALYSIS OF DISCHARGE DISPOSITION AND LENGTH OF STAY DURING A COVID-19 SURGE

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BACKGROUND: During the initial surge of coronavirus disease 2019 (COVID-19), hospital systems experienced dramatic changes in utilization. Access to post-acute care (PAC) facilities and services for patients with COVID-19 in the Boston area was extremely limited. To address these shortages, PAC sites for COVID-19 patients were created, including the Boston Hope Field Hospital as well as dedicated units at Massachusetts Eye and Ear Infirmary (MEED), Spaulding Cambridge Hospital and skilled-nursing facilities in the community. Here we describe the disposition and length of stay (LOS) for all patients discharged from a single academic medical center with COVID-19 infection during the Spring 2020 COVID-19 surge.

METHODS: This is an observational retrospective study utilizing data from the Massachusetts General Hospital COVID-19 Patient Data Registry and Mass General Brigham 4Next, a web-based case management application. All hospitalized patients with COVID-19 discharged from Massachusetts General Hospital during the COVID-19 surge in the Spring of 2020 (3/15/20 -6/27/20) were included in the analysis.

RESULTS: 1202 patients were discharged during the study period. 56% were discharged home and 14% were discharged home with home health agency (HHA) services. 30% of patients were discharged to PAC facilities. 13% of patients were discharged as deceased. The mean LOS was 12 days with a median LOS of 7 days. The median weekly LOS declined over the course of the surge from 8 days to 6 days. In the initial 6 weeks, few patients were discharged to PAC facilities or home with home health agency (HHA) services (28%). This increased in concert with the opening of dedicated COVID-19 PAC sites and increased availability of HHA, to greater than 60% over the remainder of the surge. In the final weeks of the surge, when fewer patients with COVID-19 were being admitted, nearly 80% of patients were discharged to PAC facilities reflecting, in part, the high care needs of patients remaining in the hospital. Barriers to PAC services included lack of accepting agencies and facilities and patient reluctance to accept PAC placement.

CONCLUSIONS: Patients hospitalized with COVID-19 demonstrated a significant need for PAC resources. Despite this need, few patients accessed PAC facilities and services early in the surge. PAC access improved over time as PAC facilities re-opened and alternative care sites were created. COVID-19 remains a significant public health threat for patient populations that traditionally rely on PAC resources including the elderly and patients with multiple comorbidities. Access to PAC may be limited early in COVID-19 surges, and healthcare systems may need to provide additional support for PAC services and facilities which have been heavily impacted by the pandemic.

LEARNING OBJECTIVE #1: Describe the discharge disposition and length of stay for patients with COVID-19 during a COVID-19 surge.

LEARNING OBJECTIVE #2: Identify PAC resource availability as an important factor in length of stay and hospital utilization during a COVID-19 surge.

CHANGING THE WAY WE DO THINGS: AN EXPLORATION OF CULTURE CHANGE IN ACADEMIC HOSPITAL-BASED CLINICAL CARE AND EDUCATION IN PORTLAND OREGON PRE-COVID-19

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BACKGROUND: Understanding current culture through exploring preferred culture helps identify the core values of individuals working and training in academic health centers. Culture change in clinical and educational realms could enhance innovation, safety, and satisfaction of patients and health care teams. To better understand what type of culture change is needed in hospital medicine, we conducted a survey-based qualitative study at our urban academic hospital.

METHODS: From December 2019 to March 2020, the authors distributed an email survey to OHSU health care team members and trainees. We asked 8 open-ended questions regarding where culture change is needed in care delivery and education. Survey responses were analyzed using the 6-step Braun and

Clarke method of thematic analysis. Data familiarization and code generation were completed individually by three coders who reached consensus on codes and code definitions. The code book was used to identify, revise, and define larger themes in the responses. This study was exempted from OHSU IRB.

RESULTS: The 380 respondents included individuals across multiple professions and levels of training. When asked where culture change is needed in care delivery, the following themes emerged: (1) Teamwork (communication, respect, understanding team member roles); (2) Efficiency (rounding, paging etiquette, care transitions); and (3) Patient-centered care (education, communication, patient goals). When asked where culture change is needed in education, the following themes emerged: (1) Valuing learners and learning (autonomy, fair evaluation, growth mindset); (2) Changes in curriculum (content, structure, multi-modal approaches); and (3) Professional development (time, incentives, support). Areas needing culture change in both care delivery and education included: (1) Diversity, equity, and inclusion (leadership and workforce diversity, stigma and bias reduction); (2) Well-being and safety (workload, compassion fatigue, safe reporting of harassment); and (3) Inter-professional and interdisciplinary collaboration.

CONCLUSIONS: Our survey garnered multidisciplinary perspectives on culture change in a complex health care delivery and educational system. Our heterogeneous study population expressed distinct challenges and suggestions for improvement; yet also shared values and themes. Understanding these viewpoints drives impactful and universally beneficial change in education and care delivery. Future studies should explore other care and educational settings to assess for generalizability.

LEARNING OBJECTIVE #1: Understand multi-disciplinary perspectives on current and ideal culture in clinical care in an academic hospital setting

LEARNING OBJECTIVE #2: Explore diverse viewpoints around the current and ideal culture of education in an academic hospital setting

ENGAGEMENT IN DEPRESCRIBING RESEARCH: IDENTIFYING BARRIERS TO RECRUITMENT OF HOSPITALIZED OLDER ADULTS FOR TWO CLINICAL INTERVENTION TRIALS

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BACKGROUND: Prior studies cite several challenges to engaging older adults in research including: poor health status, accessibility issues, social and cultural barriers, decision-making capacity, and lack of family support or agreement, which can be intensified by a hospitalization. This descriptive study provides insight into these challenges by examining the recruitment strategy and reasons for declining participation in two deprescribing intervention trials.

METHODS: Two randomized controlled deprescribing trials, Shed-MEDS and VA DROP, enroll hospitalized older adults at an academic medical center and a Veteran's Affairs hospital, respectively. The target population for both studies is adults aged 50 or older with more than five medications prior to hospitalization who are discharging to a skilled nursing facility. Additionally, for eligible patients who decline participation, study personnel prompt patients to disclose their reason(s), which were analyzed inductively to develop themes. We report descriptive statistics for themes that emerged across both studies and conduct comparisons using Chi-square analyses.

RESULTS: Of 9,892 hospitalized older adults screened for eligibility, 1,684 patients (17%) met all study inclusion criteria, and 1,148 patients were approached for consent with 451 enrolled (39%) across both studies. Of the patients who declined enrollment, 760 provided at least one reason. In both studies, patients who declined participation expressed feelings of being overwhelmed by current life events (31%) and/or a general disinterest in research participation (29%). Related to the deprescribing focus of the studies, patients also declined due to feeling comfortable with their current medications (11%) or only wanting their doctor to manage their medications (5%). Additionally, both studies had a subset of participants (6%) who declined due to the time commitment required for the study assessments. With non-Veterans, there was a greater proportion who expressed being overwhelmed as a barrier for enrollment (34% vs 23%, $p < 0.01$); whereas, with Veterans there was a greater

proportion (46% vs 24%, $p < 0.01$) who expressed a general lack of interest in participating in research. Notably, a greater proportion of non-Veterans remained undecided about participation at the time of hospital discharge (21% vs 10%, $p < 0.01$).

CONCLUSIONS: This study highlights challenges to engaging hospitalized older adults in research which can inform clinical investigators planning to recruit older adults. The similarities between the reasons for declining participation among both the Veteran and non-Veteran study populations suggest the need for strategies to enhance understanding of research while also reducing the burden of participation.

LEARNING OBJECTIVE #1: To identify reasons why hospitalized older adults choose not to enroll in deprescribing research.

LEARNING OBJECTIVE #2: To appraise differences in enrollment barriers in order to improve research participation of older adults

ENGAGING COMMUNITY STAKEHOLDERS TO DEVELOP A PEER-LED CARE TRANSITIONS INTERVENTION FOR HOSPITALIZED PATIENTS EXPERIENCING HOMELESSNESS

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BACKGROUND: There are significant disparities in hospital care, length of stay, readmission and mortality between housed and unhoused adults. Peer support has been demonstrated to positively impact health and psychosocial outcomes in homeless populations but there is limited research describing implementation of peer support interventions to improve health outcomes in hospitalized patients experiencing homelessness.

METHODS: We created an interdisciplinary project team comprising academic researchers, healthcare and community service providers and people with lived experience of homelessness. We utilized a community-based participatory approach and a collaborative intervention planning framework through a series of monthly meetings to develop a conceptual model for a peer-led care transitions intervention to provide tailored support for hospitalized adult patients experiencing homelessness. We conducted interviews with a variety of stakeholders to enhance intervention development. Stakeholder interviews were audio-recorded and transcribed. De-identified transcripts were coded in Atlas.ti utilizing codes derived a priori from theory and inductively through identifying emerging themes. Member checking and triangulation with participants and with the project team.

RESULTS: A total of 11 individuals (including 4 with lived experience of homelessness) were recruited for the academic-community project team and participated in intervention development utilizing the collaborative planning framework (Figure 1). Interviews with interdisciplinary stakeholders identified a number of themes important to development of the peer support model including perspectives regarding: 1) the optimal characteristics, structure and timing of the intervention; 2) barriers/facilitators to implementation, and 3) which patients would be most likely to benefit from the intervention

Figure 1. Collaborative Intervention Planning Process



CONCLUSIONS: Engaging community stakeholders, including those with lived experience, is critical to develop a meaningful and feasible peer-led support intervention for hospitalized patients experiencing homelessness.

LEARNING OBJECTIVE #1: Understand how to engage community stakeholders through in intervention development utilizing a collaborative intervention planning process

LEARNING OBJECTIVE #2: Understand community perspectives regarding peer support for patients experiencing homelessness.

FORGOTTEN FRONTLINE WORKERS: ENVIRONMENTAL HEALTH SERVICE EMPLOYEES' PERSPECTIVES ON WORKING DURING THE COVID-19 PANDEMIC

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BACKGROUND: Environmental Health Service employees (EVS), responsible for cleaning and decontaminating hospitals, are some of the most vulnerable frontline healthcare responders. Before the COVID-19 pandemic, two thirds of EVS staff reported working under chronically understaffed conditions, and over 80% worry that this impedes high-quality work; now during the pandemic response, EVS are often last on the list of employees to receive resources like adequate PPE during a national shortage. Despite being key hospital personnel, little is known about their perspectives in caring for patients, especially during a pandemic. We aimed to understand the experiences and perspective of EVS working during COVID-19.

METHODS: We conducted a qualitative descriptive study of 16 semi-structured telephone interviews with EVS in Colorado about their experiences with their work during the COVID-19 response. Interviews were recorded, transcribed, and analyzed inductively using thematic analysis. 69% of participants were female. 56% were Black, 31% Hispanic, 6% Asian, and 6% white. 50% had immigrated to the US and one interview was conducted in Spanish using an interpreter.

RESULTS: EVS highlighted key issues: 1. Concerns working during the pandemic including bringing the virus home to family where they care for other high risk family members or are single parents, 2. The desire to receive additional education about COVID-19 spread and safety as well as concerns regarding lack of education in their native language, 3. Emotional challenges of experiencing patient deaths and being distanced from the bedside where they are unable to develop meaningful connections with patients through praying, singing, or building rapport as they did pre-COVID-19, 4. Lack of recognition in mainstream media and in their interactions with colleagues at the hospital, where they felt like 'the forgotten frontline workers' who were unacknowledged in commercials thanking healthcare workers or unseen by colleagues on the floor, and 5. Barriers to safe and effective work including PPE shortages, being short-staffed with coverage across COVID-19 units, and lack of hazard pay and benefits like paid time off through their employer, a contracted vendor with the hospital.

CONCLUSIONS: As the surge of COVID-19 cases continues to overwhelm hospitals, healthcare systems and EVS companies should recognize resource, emotional, and staffing strain for EVS. Strategies can focus on fostering inclusiveness and recognition for EVS through emotional support, native language education, intentional appreciation programs, providing adequate PPE resources, and supporting EVS through improved benefits and pay.

LEARNING OBJECTIVE #1: Understand EVS perspectives of their roles and current constraints within the healthcare system during the COVID-19 response.

LEARNING OBJECTIVE #2: Identify opportunities to improve the experiences of EVS as essential frontline workers during the COVID-19 pandemic.

FREQUENCY OF INPATIENT DETECTION OF ACQUIRED HEMOPHAGOCYTIC SYNDROME BY HOSPITAL TYPE: RESULTS FROM THE NATIONAL INPATIENT SAMPLE.

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BACKGROUND: Acquired hemophagocytic lymphohistiocytosis (HLH) is an uncommon hyperinflammatory disorder variably characterized by fever,

hepatosplenomegaly, lymphadenopathy, rash, multi-organ failure, cytopenias, hyperferritinemia, hypertriglyceridemia, hypofibrinogenemia, hepatic function test abnormalities, soluble IL-2 receptor elevation, and hemophagocytosis on tissue biopsies. Usually associated with underlying autoimmune/rheumatologic disease, malignancy, or infection, HLH is believed to be underdiagnosed in adult inpatients. This disorder is detected by calculation of an H- score, a 90% sensitive and 79% specific clinical decision tool. Outcomes in adult HLH are improved by early recognition and prompt initiation of treatment protocols incorporating etoposide chemotherapy, corticosteroids, and other immunomodulatory medications.

METHODS: The 2016 National Inpatient Sample (NIS) was used to identify cohorts of patients with inpatient diagnoses of HLH and potential underlying malignant and inflammatory medical conditions as defined by ICD-10 diagnosis codes. Inflammatory diseases included systemic connective tissue disorders, autoinflammatory syndromes, and inflammatory polyarthropathies or spondylopathies.

Associations between adult HLH, hospital type, and potential confounding variables were measured by χ^2 testing and logistic regression with calculation of odds ratios (OR) and 95% confidence intervals (CI).

RESULTS: Adult inpatients with HLH were identified and subsequently segregated by hospital type (urban teaching, urban non-teaching, rural). Diagnosed HLH was more common in teaching than in non-teaching facilities (OR 2.99, 95% CI 2.29-3.89, $p < 0.01$ by χ^2). Assessment for confounding bias revealed preserved increased detection of HLH in teaching facilities with adjustment for unequal distribution of known HLH risk factors (malignancies, rheumatologic/inflammatory conditions) by hospital type (OR 3.02, 95% CI 1.75-5.21, $p < 0.01$ by χ^2) and for variable severity of illness by hospital type (OR 3.24, 95% CI 1.87-5.62, $p < 0.01$ by χ^2). The differing rates of HLH detection were minimally affected by patient transfers from non-teaching to teaching facilities; less than 3% of teaching hospital HLH inpatients were transferred from an outside facility.

CONCLUSIONS: This analysis supports prior retrospective studies reporting underdetection of HLH in adult inpatients, at least in certain (non-teaching) hospital settings. With the availability of a sensitive and specific clinical diagnostic tool and improved clinical outcomes with early institution of specific immunosuppressive therapy for HLH, our findings argue for increased efforts to heighten clinical awareness of HLH in internal medicine, hospital medicine, and critical care training programs.

LEARNING OBJECTIVE #1: Review the constellation of clinical findings suggestive of HLH in ill hospitalized patients

LEARNING OBJECTIVE #2: Recognize the availability of a clinical decision tool for HLH detection and the importance of prompt initiation of immunosuppressive management in this disorder

HOSPITAL-BASED INTERPROFESSIONAL TEAMS DURING COVID-19: WHAT DO THEY LOOK LIKE AND WHAT DO THEY NEED?

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BACKGROUND: The COVID-19 pandemic brought large, frequent changes to healthcare systems and exposed frontline healthcare workers (HCW) to rapidly evolving procedures and standards of care. The pandemic and its response have had profound effects on HCW wellness and engagement. Interprofessional partnerships are a key factor in effective responses to past healthcare crises. In this study, we explored the experiences of inpatient interprofessional HCW's during the initial COVID-19 response in order to understand how teams evolved during this time and how this impacted HCW's and patients.

METHODS: We conducted a qualitative descriptive study to examine perspectives and experiences of interprofessional HCW's on acute care inpatient units at the Eastern Colorado VA Medical Center (VAMC) during the initial

COVID-19 response. We conducted semi-structured telephone interviews with HCW's March through June of 2020 about their experiences with teamwork, communication, leadership, and staff engagement. We conducted interviews until data saturation was reached. We performed thematic analysis to identify key themes.

RESULTS: We interviewed 18 bedside nurses, pharmacists, and care coordinators. We discovered 4 key themes: 1) Changes to interprofessional teamwork during COVID-19, 2) Communication strategies during COVID-19, 3) Experiences with patient care during COVID-19, and 4) Organizational response during COVID-19. Bedside nurses described improved teamwork and collective support from interprofessional teammates, whereas care coordinators and pharmacists, who were distanced from the bedside due to personal protective equipment (PPE) shortages, described how their roles as team members diminished. Communication from leadership often 'trickled down' and updates on fast-changing protocols were hard to navigate. Daily frontline interprofessional team huddles were an effective way to communicate concerns and get on the same page. Changes to interprofessional bedside rounds and new contact precautions made it harder to interact with patients and to contribute meaningfully to care plans. The most appreciated aspects of the organizational response were emotional support and in-person visits from leadership. Overall, HCW's wanted a larger role in organizational decision-making, where they felt their practical skillsets would be helpful. Timely, reliable, and transparent communication was also considered important.

CONCLUSIONS: We found that during the COVID-19 response, teamwork improved for those that remained at the bedside, but became more difficult for team members that were distanced from patients. HCW named several leadership strategies that could facilitate HCW wellness and engagement throughout the pandemic: timely and transparent communication, a share in organizational decision-making, and emotional support.

LEARNING OBJECTIVE #1: Describe how inpatient interprofessional teams changed during the COVID-19 pandemic

LEARNING OBJECTIVE #2: Understand frontline healthcare workers experiences with communication and teamwork during the COVID-19 pandemic

IDENTIFYING CURRENT ANTIBIOTIC PRESCRIBING PATTERNS FOR PATIENTS WITH PENICILLIN ALLERGIES AT AN URBAN ACADEMIC TERTIARY CENTER TO INFORM A QUALITY IMPROVEMENT INTERVENTION

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BACKGROUND: 15% of hospitalized patients have a documented penicillin (PCN) allergy. However, fewer than 1% of those patients have a true IgE-mediated reaction that necessitates avoidance of beta lactam antibiotics. Labeling a patient with a PCN allergy is associated with prescribing non beta lactam (NBL) broad spectrum antibiotics and increased adverse outcomes. Patients with a documented PCN allergy have 23% more Clostridium difficile infections, and a documented PCN allergy costs \$600 more per inpatient infection. Education-only interventions to address overuse of NBLs have rarely resulted in sustained change. Literature identifying reasons for overuse of NBLs for non-IgE mediated PCN allergies is lacking. We conducted a project led and executed by medical and nursing students as part of a High-Value Care curriculum to explore this gap.

METHODS: To identify current state prescribing patterns for the general medicine service in an urban academic tertiary care center, we analyzed electronic medical record (EMR) antibiotic prescription data from Jan 2020-Dec 2020 and conducted standardized interviews with 9 internal medicine residents. EMR data assessed the number of PCN allergies recorded, the type of allergy, and the antibiotics prescribed to these patients (including aminoglycosides, carbapenems, and monobactams).

RESULTS: There were 5,432 instances of antibiotic administration within the general medicine service, and 11.0% were for patients with PCN allergies. For patients with a PCN allergy who received antibiotics, 42.3% received NBLs including quinolones (14.4%), aminoglycosides (12.8%). Aminoglycosides were 1.83 times more likely to be used for patients with a documented PCN allergy compared to patients without ($X^2 = 27.3$, $p < 0.0001$). Even after removing patients with a documented anaphylaxis reaction, aminoglycosides are still 1.58 times more likely to be used ($X^2 = 12.3$, $p = 0.0004$). For patients with documented PCN allergies, 30.0% had “other” or “unknown” in the reaction type field. The thematic analysis interview data highlighted that insufficient data in allergy history led to more frequent use of NBLs and that NBLs are perceived by residents as the safer option. Additionally, few residents manually search if patients received a beta lactam in the past due to time constraints.

CONCLUSIONS: Our study shows that patients with non IgE-mediated PCN allergies are more likely to receive NBLs, and that nonspecific allergy history may drive this behavior. At our center, “other” and “unknown” are frequently noted for PCN allergy reaction type and residents do not commonly search for past beta lactam usage. This study will inform our strategy for a quality improvement intervention to reduce NBL prescribing in patients with low-risk PCN allergies.

LEARNING OBJECTIVE #1: Identify common pitfalls in antibiotic prescribing for patients with non- IgE mediated PCN allergies at an urban academic tertiary care center

LEARNING OBJECTIVE #2: Describe the importance of reducing overuse of NBLs for patients with non-IgE mediated PCN allergies

IMPROVING ADHERENCE TO RISK STRATIFICATION GUIDELINES REGARDING VENOUS THROMBOEMBOLISM PROPHYLAXIS.

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BACKGROUND: Venous thromboembolism (VTE) accounts for a significant share of preventable deaths in hospitalized patients. Pharmacologic prophylaxis with enoxaparin or heparin remains the standard of care and sequential compression devices (SCDs) should be reserved for cases of excessive bleeding risk. The Joint Commission VTE-6 measure pertaining to inpatients requires the use of the Padua, Caprini, or IMPROVE risk stratification tools.

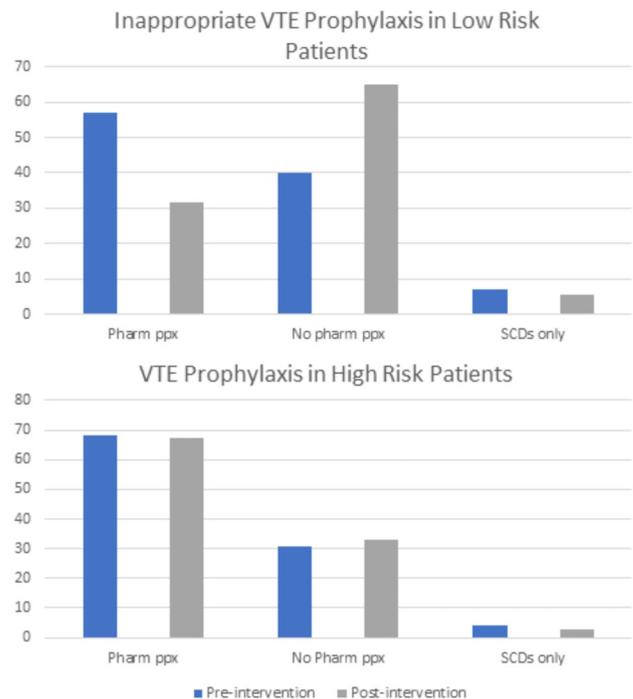
METHODS: A templated housestaff admission note was amended to include the Padua prediction score and a VTE prophylaxis orderset was created. We audited medical ward admissions for three months pre and post- interventions at a single center 191-bed acute care hospital. Padua scores were calculated for each patient if not documented, and we determined whether pharmacologic prophylaxis or SCDs were ordered within 24 hours of admission. Bleeding complications, and 30-day VTE rates were also recorded.

RESULTS: Our evaluation included 126 patients in the pre-intervention group and 228 in the post-intervention group. A total of 86 patients on therapeutic anticoagulation were excluded, leaving 268 patients in our analyses. Pharmacologic prophylaxis rates for high risk patients remained similar (68% pre and 67.1% post, $p=0.94$). However, inappropriate pharmacologic prophylaxis for low risk patients decreased significantly from 57% to 31.5% ($p < 0.01$). 30-day VTE rates were zero in both groups. No increased major or minor bleeding with prophylaxis was seen.

CONCLUSIONS: Addition of the Padua VTE risk stratification tool to a templated admission note significantly reduced rates of inappropriate pharmacologic prophylaxis in low risk patients. However, underutilization of prophylaxis in high-risk patients and overutilization of prophylaxis in low-risk patients still occurred both before and after our intervention. Further work is needed to determine optimal methods for encouraging appropriate VTE prophylaxis in hospitalized patients.

LEARNING OBJECTIVE #1: Learn about VTE risk stratification.

LEARNING OBJECTIVE #2: Learn about simple interventions which can improve appropriate VTE prophylaxis.



INSTITUTING A NOVEL PROSPECTIVE SCREENING PROGRAM TO IDENTIFY PATIENTS WITH OPIOID USE DISORDER WITH HOUSING INSECURITY

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BACKGROUND: Over 47,000 deaths from opioid overdoses occur annually in the US. People with housing insecurities are disproportionately affected by opioid use disorder (OUD) and face challenges with accessing and maintaining medications for opioid use disorder (MOUD). Ideally, electronic health records (EHRs) would accurately identify these conditions, however, both OUD and housing status are often underreported or difficult to ascertain from EHRs. Our goal was to develop and test the validity of automated EHR screens to identify patients with OUD and housing insecurity with a goal of referring patients to addiction clinicians for appropriate MOUD.

METHODS: This study was based in a 600-bed urban tertiary care hospital. We developed two parallel screening methods to identify patients with OUD and housing insecurity. For the OUD screen, we developed an automated search query within the Epic-based EHR that searched the text of medical notes for specific free text entries potentially indicating OUD. For our housing insecurity screen, we identified housing insecurity utilizing EHR address confirmation, nursing admission screening, and clinical documentation of social determinants of health. Patients from the OUD screen were then assessed via chart review by a nurse for housing insecurity and those from the housing screen were chart reviewed for markers of opioid use disorder. Patients identified as “likely to have OUD and housing insecurity” were then referred to an addictions provider for clinical evaluation and official assessment for MOUD.

RESULTS: From 11/2/2020 until 12/23/2020, a total 120 patients were identified from the OUD screen. Of those, 33/120 (28%) were concurrently found to have housing insecurity. A total of 105 patients were identified from the housing insecurity screen and of those, 32/105 (30%) were likely to have OUD. 57 unique patients were identified from these combined screens. 19/57 (33%) were determined to have housing insecurity and confirmed OUD

through bedside assessment by our addiction clinician. These patients were subsequently assessed for initiation and/or optimization of MOUD.

CONCLUSIONS: We developed two complementary EHR screening methods to identify patients with OUD and housing insecurity. Approximately 30% of the patients from this dual screen were considered likely to have OUD & housing insecurity upon further review by a nurse. After clinical assessment by an addictions provider, 33% of these patients were confirmed to have housing insecurity and OUD. Automated strategies may help health systems identify at-risk patients.

LEARNING OBJECTIVE #1: To create a prospective screening method to identify patients with suspected opioid use disorder (OUD) and housing insecurity.

LEARNING OBJECTIVE #2: To connect patients with OUD and housing insecurities to an addictions provider for initiation and optimization of medications for opioid use disorder (MOUD).

INVESTIGATING RACIAL/ETHNIC INEQUITIES IN INTER-HOSPITAL TRANSFER AT A MAJOR ACADEMIC HEALTH CARE SYSTEM

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BACKGROUND: Interhospital transfer (IHT), which is often performed to provide patients with necessary procedural and specialized care, is a common occurrence in modern healthcare. Racial/ethnic inequities in IHT have been described using nationally representative data, however such inequities have not been characterized at a more local level, which can provide more granular data to adjust for possible confounding. The purpose of this study was to determine if there were racial/ethnic inequities in IHT for common medical conditions within our major academic healthcare system.

METHODS: We performed a retrospective matched cohort study of patients admitted to general medicine services at community hospitals within our system. We included adult patients age ≥ 18 with all medical diagnoses admitted to these hospitals between June 2015 to December 2018 and excluded intensive care unit patients. The outcome was IHT to the tertiary care hospitals within our system. The primary predictor of interest was Black race and Latinx ethnicity. We used a matched cohort study design in which one Black patient with an index admission to one of our system's community hospitals was matched to three White patients based on their origin hospital, age within five years and similar electronic cardiac arrest risk triage (eCART) score on admission. The same design was then used for Latinx and White patients. Following this match, rates of transfer were compared between the groups. This was done using a series of conditional logistic regression models, including an unadjusted model and a model which adjusted for patient-level demographic and clinical covariates. Analyses were considered significant at a 2-sided p-value of 0.05.

RESULTS: Among the 72,113 admissions included in the cohort, 1,209 (2.1%) of White, 132 (2.3%) of Black and 138 (2.1%) of Latinx patients underwent IHT. After matching, compared to White patients, Black and Latinx patient had significantly higher rates of Medicaid as primary insurance and of being in the lowest zip code median income quartile. There was a non-significant signal toward lower odds of IHT for Black compared to White patients in unadjusted (OR 0.86, 95% CI 0.70-1.05, $p=0.14$) and adjusted (OR 0.80, 95% CI 0.62-1.02; $p=0.074$) models. There was no significant difference for Latinx compared to White patients.

CONCLUSIONS: Black patients had a non-significant signal toward lower odds of IHT to tertiary hospitals within our system compared to White patients after adjusting for patient clinical and demographic variables. There are several potential explanations for these findings, including provider bias toward Black patients. Our findings emphasize the need for better understanding of transfer practices so that such inequities may be eliminated.

LEARNING OBJECTIVE #1: To identify potential racial and ethnic inequities in specialty care access

LEARNING OBJECTIVE #2: To understand the role that provider bias may play in decision-making surrounding the triage of patients to higher levels of care.

MODIFIED CLINICAL RISK SCORE TO PREDICT HOSPITAL ADMISSION AND IN-HOSPITAL MORTALITY IN COVID-19 PATIENTS

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BACKGROUND: The COVID-19 pandemic has resulted in over 1 million deaths globally. Prognostic tools to identify high risk patients are crucial to guide resource allocation efforts. We aimed at developing a risk assessment tool for patients with COVID-19 based on the risk factors with most significant effect on hospital admission and in-hospital mortality

METHODS: We performed a retrospective analysis of patients with positive COVID-19 presenting in between 3/31/2020 – 5/15/2020 at Beaumont Health's 8 emergency departments (ED). Data was abstracted using automated reports. The electronic health record (EHR) embedded risk score previously externally validated was modified based on risk factors, with different points given those that were statistically significant. Two outcome variables were measured, both using a yes/no binary scale: hospital admission and in-hospital mortality. Hospital admission, on the first encounter to the ED, was evaluated for the entire cohort, while mortality was evaluated only for inpatients discharged prior to 5/12/2020. Descriptive statistics, univariate/multivariate analyses by logistic regression were performed and presented in terms of Adjusted Odds Ratios (AOR) with corresponding 95% confidence intervals and P-Values. Any P-Values < 0.05 were considered as statistically significant associations.

All analysis was done in SAS 9.4 (SAS Institute Inc. Cary, NC).

RESULTS: 2,735 encounters were extracted from EHR. 68.06% were hospital admissions and 9.97% experienced in-hospital mortality. 61.23% were <69 years old. 58.07% had hypertension (HTN), 46.29% had chronic pulmonary disease (CPD), 37.81% had diabetes (DM), and 6.71% had end-stage renal disease (ESRD). Mean length of stay was 8.43 days. In the multivariate model to predict admission, ESRD (AOR 1.97), liver disease (AOR 7.77), CPD (AOR 1.63), DM (AOR 1.70), HTN (AOR 1.97) and nursing home residence (NH) (AOR 1.90) were independently associated with admission. For prediction of in-hospital mortality in the multivariate model, CPD (AOR 2.35), and NH (AOR 1.58) were significantly associated with in-hospital mortality. The modified risk score recognized the statistically significant comorbid conditions and attributed 0 points to non-significant values. The cross-validated C-Statistics for the modified risk score model showed good discrimination for both hospital admission (C=0.72 vs 0.70) and in-hospital mortality (C=0.74 vs 0.70) when compared to the automatically generated risk tool for this cohort.

CONCLUSIONS: The modified risk score model created using statistically significant risk factors yielded a better scoring system than the scoring system automatically generated in Epic. This risk scoring model may help predict hospital admissions and in-hospital mortality for COVID-19 patients. Further external validation in a different cohort is recommended.

LEARNING OBJECTIVE #1: Timely identification of COVID 19 patients at higher risk for hospital admission.

LEARNING OBJECTIVE #2: Recognition of predictive factors of poor outcome in COVID 19 patients.

MULTIMORBIDITY AND 30-DAY READMISSIONS AMONG MEDICARE BENEFICIARIES USING A NEW ICD-CODED MULTIMORBIDITY-WEIGHTED INDEX

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BACKGROUND: Medically complex patients with disability have among the highest 30-day readmissions. However, physical functioning is neither readily available in claims data nor included in CMS risk-adjustment models.

We previously validated among Medicare beneficiaries an ICD-coded multimorbidity-weighted index (MWI-ICD) that weights chronic conditions by their impact on physical functioning. We aimed to examine the association between multimorbidity and physical functioning with readmissions and compare MWI-ICD with traditional measures.

METHODS: We included Medicare beneficiaries continuously enrolled in Parts A/B with at least one hospitalization 2000-2015, and who participated in a Health and Retirement Study interview before admission. We excluded adults dead at discharge or admitted to skilled nursing facility. We used Medicare claims to compute the predictor MWI-ICD by summing physical functioning-weighted conditions. The outcome 30-day readmission was binary. For those with a 30-day readmission, we examined discharge destination and mortality at 30, 90 and 360 days after readmission using multivariable logistic regression. For all participants we examined MWI-ICD and length of stay through zero inflated negative binomial models since most lacked a readmission. We adjusted for age, sex, race/ethnicity, BMI, smoking, physical activity, education, net worth, living arrangement/marital status from the HRS interview. To compare model fit among MWI-ICD, disease count, Charlson, Elixhauser we used AIC and C-statistics.

RESULTS: The final sample of 14,061 participants had mean±SD age 75.3 ±8.9 years, MWI-ICD 13.7±8.8 and 19% had a 30-day readmission. Those in the highest vs lowest quartile MWI-ICD had 78% increased odds of 30-day readmission (OR=1.78, 95%CI: 1.56-2.03). Each 1-point increase in MWI-ICD was associated with 2% increased odds of readmission over 30 days (OR=1.02, 95%CI: 1.02-1.03). Among those readmitted, 68% died (12% within 30 days, 17.4% within 90 days, 27% within 1 year), and each point increase in MWI-ICD was associated with 2% increased odds of death within 1 year of discharge (OR=1.02, 95%CI: 1.01-1.03). Survivors were most commonly discharged home with selfcare (49%) or home health service (18%) or to a skilled nursing facility (16%). Those with the highest vs lowest quartile MWI-ICD had a 36% increased number of expected hospitalized days over 30 days (IRR=1.36, 95%CI: 1.18-1.56). C-statistics and AICs were comparable across measures but MWI-ICD had the broadest distribution.

CONCLUSIONS: Among Medicare beneficiaries, multimorbidity using a validated MWI-ICD is monotonically associated with increased risk of 30-day readmission, mortality and longer length of stay. MWI-ICD appears to be a valid measure of multimorbidity that embeds physical functioning and presents an opportunity to incorporate functional data into risk-adjustment models in administrative claims.

LEARNING OBJECTIVE #1: Assess new multimorbidity-weighted index and readmissions

LEARNING OBJECTIVE #2: Compare multimorbidity metrics for readmissions

NIGHTTIME SUPERVISION OF INTERNAL MEDICINE RESIDENTS IN THE ICU: PERCEPTIONS OF RESIDENCY PROGRAM DIRECTORS FROM A NATIONAL SURVEY

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BACKGROUND: The ACGME requires programs to have "...the appropriate level of supervision in place for all residents." Hospitals have since changed staffing to provide greater nighttime presence of attendings. The aims of this study were to describe who provides nighttime supervision of residents in the ICU and the sufficiency of attending staffing at night as perceived by internal medicine (IM) program directors (PDs).

METHODS: The APDIM Annual Survey of Residency PDs studies issues critical to IM training. The 2017 survey was disseminated to PDs from all 379

APDIM member residency programs with ACGME accreditation. The Academic Hospitalist Commission of SGIM submitted 12 questions for inclusion in the survey addressing nighttime supervision and education of residents. Results from a subset of those questions is included in this study. Descriptive statistics included the reporting of frequencies and percentages. Group-based significance testing was conducted using the Adjusted Wald test for categorical variables and Welch's t-test to compare mean differences using continuous variables. Analyses were two-tailed (where applicable) with α set to 0.05.

RESULTS: The survey response rate was 70%. There was no statistical association between respondents and non-respondents based on essential program and PD characteristics. Among those who reported onsite nighttime supervision was available in the ICU, the most common type of physician was a critical care attending (n = 144/207, 69.6%). The remainder used a variety of non-critical care physicians for supervision. However, 21.9% of PDs reported there was no nighttime resident supervision in the ICU. Compared to all other program types, university-based programs more commonly reported nighttime supervision by subspecialty fellows (p = 0.009) and less by tele-ICU (p = 0.036).

Respondents reported at least "sometimes" having insufficient attending staffing overnight to ensure high-quality patient care (42.9%) and patient safety (40.1%) in the hospital. Compared to university-based programs, a higher percentage of respondents from all other program types reported "never" having insufficient attending staffing overnight to ensure high-quality patient care (40.4% and 53.7%, respectively, p = 0.024) and patient safety (43.0% and 56.8%, respectively, p = 0.027).

CONCLUSIONS: While the majority of PDs reported in-house supervision of residents in the ICU, a large number reported insufficient attending nighttime staffing to provide high-quality and safe patient care. This merits further exploration of optimal staffing models to assure resident supervision and high quality patient care.

LEARNING OBJECTIVE #1: Describe who supervises internal medicine residents in the intensive care setting at night. (PBLI)

LEARNING OBJECTIVE #2: Recognize program directors' perceptions about the adequacy of nighttime faculty staffing to provide high-quality and safe patient care. (SBP)

OUR HANDS ARE TIED UNTIL YOUR DOCTOR GETS HERE: NURSING PERSPECTIVES ON INTER-HOSPITAL TRANSFERS

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BACKGROUND: The transfer of patients between hospitals (inter-hospital transfer, or IHT) is a common occurrence for patients, but best practices to ensure safe and effective IHTs are lacking. Poor IHTs result in higher rates of mortality, longer lengths of stay, and higher hospitalization costs compared to admissions from the emergency department. Nurses are often the first point of contact for IHT patients, yet the literature lacks input from these stakeholders. To characterize the IHT process and identify best practices, we examined the experiences of inpatient nurses caring for IHT patients at time of arrival to the accepting hospital.

METHODS: This qualitative study used semi-structured focus groups and interviews with adult medicine inpatient nurses from a 678-bed academic acute care hospital that cares for an average 7,000 IHT patients annually from October 2019 to July 2020. A combined inductive and deductive coding approach guided by thematic analysis was used until thematic saturation was achieved, when no new information emerged.

RESULTS: Participated: 21 nurses (80% female) with 1-21 years of nursing experience (mean 5.1 years).

We found that no standardized process for nurses to coordinate care before or at time of patient arrival exists. Nurses described IHTs as problematic 1) when nursing handoff report was incomplete or inaccurate, 2) when admitting clinicians were difficult to identify and reach and, 3) when clinician orders were not placed in a timely manner - "It takes a while for orders to be put in and I feel like several hours go by without knowing what's going on."

Due to the lack of standardized information transfer and delay in clinician orders, nurses expressed professional dissatisfaction related to being immediately responsible for IHT patients yet being unaware of the care plan and unable to provide care until orders were placed - "Our hands are tied until your doctor gets here."

Nurses' suggestions to improve IHTs included: 1) standardization of handoff reports to help nurses prepare for the patient's arrival, 2) assignment of admitting teams ahead of patient arrival with contact information readily available and, 3) improved timeliness of admitting clinician evaluation and orders - "if the physician can come see the patient and put in an order sooner... we can act on those orders and have a better relationship with the patient."

CONCLUSIONS: In our study, we found that there is no standardized process for IHTs. This negatively impacted nursing care and nursing professional satisfaction. To streamline care for IHT patients and reduce nursing stress, IHT best practices should include highly reliable handoff reports, timely identification and easy access to admitting clinicians, and timely clinician evaluation and orders. Next steps are to study other stakeholder perspectives to further refine best practices.

LEARNING OBJECTIVE #1: Characterize communication issues experienced by nurses caring for inter-hospital transfer patients

LEARNING OBJECTIVE #2: Identify system-level IHT components for targeted intervention

RACIAL AND ETHNIC DIFFERENCES IN INPATIENT OPIOID PRESCRIBING AMONG COMMON DIAGNOSES FROM AN INTERNAL MEDICINE SERVICE

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(Control ID #3535758)

BACKGROUND: Prior studies have found racial disparities in opioid prescriptions for patients treated in emergency departments and surgical settings, as well as incongruencies between prescribing rates and existing guidelines for pain-related indications. However, racial and ethnic disparities in opioid prescribing by diagnosis have not previously been studied or published for inpatient medicine. We examined opioid prescriptions associated with select conditions among patients admitted to an internal medicine service with a focus on differences by race and ethnicity.

METHODS: We identified all adult hospitalized patients who received opioid medications during their inpatient stay from 2013-2020 at a 600-bed urban academic teaching hospital. We selected six of the most common primary hospital problems with 350+ patients, including pain and non-pain related diagnoses, to capture the breadth of conditions treated by inpatient physicians: acute abdominal pain, cellulitis, chronic obstructive pulmonary disease (COPD) exacerbation, gastrointestinal (GI) bleed, pancreatitis, and pneumonia. The primary predictor was self-reported race/ethnicity: White, Black, LatinX, Asian, American Indian or Alaskan Native, Native Hawaiian or Other Pacific Islander, Other, or Unknown/Declined. We performed a multivariable linear regression with the primary outcome of inpatient daily opioid administration calculated as total morphine milligram equivalents (MME), adjusting for patient demographics (age, gender, primary language), hospitalization factors (intensive care management, opioid prescription on admission, discharge service), and medical comorbidities.

RESULTS: We identified 29,567 patients who received opioids during their hospitalization. In the multivariate regression analysis, Black patients with cellulitis (-57.3 MME, 95% CI: -107.4 - -7.1, $p=0.025$) and pancreatitis (-48.1 MME, 95% CI: -95.1 - -1.0, $p=0.045$), Asian patients with cellulitis (-92.9 MME, 95% CI: -159.4 - -26.4, $p=0.006$), and patients classified as Other with pneumonia (-65.5 MME, 95% CI

-123.2 - -7.8, $p=0.026$) received less opioids than White patients. LatinX patients with GI bleeds (49.1 MME, 95% CI: 1.8 - 98.4, $p=0.042$) received more opioids than White patients. There were no significant racial or ethnic differences associated with acute abdominal pain or COPD.

CONCLUSIONS: In a cohort of patients from an internal medicine service, compared to White patients, Black, Asian, and patients classified as Other received less opioids while receiving care for cellulitis, pancreatitis, and pneumonia while LatinX patients received more opioids in care for GI bleeds. Our findings indicate further opportunity for standardized inpatient opioid prescription recommendations across diagnoses to eliminate racial/ethnic disparities.

LEARNING OBJECTIVE #1: Identify racial and ethnic disparities in opioid prescribing for hospital medicine services

LEARNING OBJECTIVE #2: Examine differences in opioid prescribing practices associated with common conditions experienced by hospitalized patients

RISK OF INTESTINAL NECROSIS WITH SODIUM POLYSTYRENE SULFONATE (KAYEXALATE). A SYSTEMATIC REVIEW AND META-ANALYSIS.

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BACKGROUND: Sodium Polystyrene Sulfonate (SPS) has been prescribed for hyperkalemia since 1958. However, severe gastrointestinal (GI) side effects, particularly intestinal necrosis, have led some to recommend newer costlier alternatives. A prior systematic review found 30 cases comprising 58 patients treated with SPS who developed severe GI side effects. No prior systematic review has included controlled studies reporting intestinal necrosis rates associated with SPS.

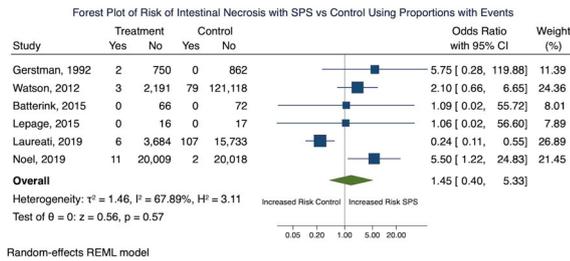
METHODS: A literature search used Cochrane Library, Embase, Medline, Google Scholar, Pubmed, Scopus, and Web of Science Core Collection from inception through 10/2/2020. We included any clinical trial, cohort or case-control study reporting an association between SPS and intestinal necrosis or severe GI side effects. 2 reviewers performed data extraction and quality assessment using the Risk of Bias in Non-randomized Studies of Interventions (ROBINS-I) and the Cochrane risk of bias tools. Risk of intestinal necrosis and severe GI disease associated with SPS were pooled using random-effects meta-analysis. Heterogeneity was estimated using the I^2 statistic and strength of evidence was assessed using GRADE.

RESULTS: 806 studies were screened for inclusion. 6 studies including 26,716 patients treated with SPS with controls met inclusion criteria and pooled odds ratio of intestinal necrosis was 1.45 (95% CI 0.40-5.33). The pooled hazard ratio for intestinal necrosis from the two studies that performed survival analysis was 2.00 (95% CI 0.45-8.78). The pooled hazard ratio for severe GI adverse events was 1.46 (95% CI 1.01-2.11). Most studies had high risk of bias. Strength of evidence was low.

CONCLUSIONS: Based on our review of six controlled studies, the risk of intestinal necrosis with SPS is small and not statistically greater than controls although there was a statistically significant increased risk of severe GI side effects based on 2 studies. Due to risk of bias from potential confounding and selective reporting, the overall strength of evidence to support an association between SPS and intestinal necrosis or other severe GI side effects is low. The use of costlier new medications is not supported by the literature.

LEARNING OBJECTIVE #1: Learn about rates of severe gastrointestinal side effects, particularly intestinal necrosis, associated with SPS compared to controls.

LEARNING OBJECTIVE #2: SPS is an inexpensive therapy for hyperkalemia but safety concerns have been cited to promote use of newer more expensive medications. It is important to review the evidence before adopting costlier alternatives.



UNDERSTANDING THE ASSOCIATION BETWEEN ADMISSION SOURCE AND IN-HOSPITAL DELIRIUM: A RETROSPECTIVE COHORT STUDY

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BACKGROUND: Patients admitted via interhospital transfer (IHT) are shown to have worse outcomes including increased length of stay (LOS), mortality, and discharge to facility, however the etiology is not well understood.^{1,2} We hypothesize that interhospital transfers are more likely to experience in-hospital delirium as compared to patients admitted to the hospital via the emergency department (ED) and clinic. The objective of our study was to evaluate whether admission source, specifically interhospital transfer (IHT), is independently associated with in-hospital delirium.

METHODS: Retrospective cohort study of all adults admitted to medical, surgical, neurologic and OBGYN services at academic medical center who were screened for delirium between 8/2018 and 1/2020. The independent variable was admission source, coded as a categorical variable (IHT vs ED vs clinic). The primary outcome was in-hospital delirium, assessed with twice daily brief cognitive assessment method (bCAM) screening. Secondary outcomes were discharge to a facility and LOS. Multivariable regression models were used to evaluate the association between admission source and in-hospital delirium controlling for potential confounders.

RESULTS: 29,582 patients were included in this study with 3,680 patients (12.4%) developing delirium during their hospitalization. IHT patients accounted for 19.6% (5,789/29,582) of total admissions but 33.6% (1,237/3,680) of patients with in-hospital delirium. Patients admitted via the ED and clinic made up 66.4% (19,363/29,582) and 14.1% (4,157/29,582) of total admissions but only 60.3% (2,218/3,680) and 5.4% (225/3,680) of patients screening positive for delirium. Multivariable logistic regression adjusting for sociodemographic factors, ICU stay, medication orders and comorbidities showed that patients admitted through IHT or ED had twice the odds (OR 2.0, 95% CI 1.697, 2.390) or 1.6 (1.376, 1.892) times the odds, respectively, to develop in-hospital delirium than those admitted from clinic. Additional regression analysis demonstrated increased odds of discharge to a facility for IHT (OR 3.181, 95% CI 2.720, 3.719) and ED (OR 1.770, 95% CI 1.532, 2.045) compared to admission from clinic. Preliminary multivariable analysis also showed an increased LOS for ED patients of 4.1% (RR 1.041, CI 1.017, 1.066) and 30.8% for IHT (RR 1.308, CI 1.272, 1.345) when compared to clinic admissions.

CONCLUSIONS: Patients admitted through IHT and ED had higher odds of developing in-hospital delirium when compared to clinic sources. By identifying the increased risk of delirium in IHT patients, we can begin to understand the increased morbidity and mortality suffered by these patients.

LEARNING OBJECTIVE #1: Recognize risks associated with interhospital transfers (IHTs) and assess whether there is an association between admission source and risk for delirium.

LEARNING OBJECTIVE #2: Evaluate the association of secondary outcomes including length of stay and discharge disposition to admission source.

Scientific Abstract - Medical Education and Education Scholarship

A BRIEF INTERACTIVE WORKSHOP INCREASES CONFIDENCE, COMFORT, AND EFFECTIVENESS OF RESIDENT RESPONSE TO GENDER DISCRIMINATION AND SEXUAL HARASSMENT

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BACKGROUND: Gender discrimination and sexual harassment are common in academic medicine and associated with negative outcomes, including burn-out, depression, and even thoughts of suicide. In qualitative work, providers who are unprepared to respond to these incidents often use indirect responses, such as ignoring the event or humor. These indirect responses can leave providers feeling guilty for not responding. While required harassment training is common, there are no published intervention for medical trainees to better prepare them to respond to incidents of gender discrimination and sexual harassment.

METHODS: We adapted an in-person faculty development workshop to be given to internal medicine residents virtually due to the COVID-19 pandemic and limits on in-person learning. The workshop had three components: 1) an introduction to the problem of sexual harassment in medicine, 2) cases for guided-practice responding to different instances of harassment, 3) review of Title IX. The workshop was presented to residents during protected academic time. Prior to the workshop all residents were invited to participate in a pre-survey, which assessed their experience with gender-discrimination and sexual harassment during the prior 6 months, their response to these incidents, and self-reported preparedness to respond. A post-survey was sent to those who attended the workshop to assess satisfaction with and impact of the workshop. **RESULTS:** Out of 119 residents, 89 (74.8%) completed the pre-survey. The majority, 65 (73.0%) of residents reported at least one incident of gender-discrimination or sexual harassment in the prior 6 months, from either a patient, patient's family member, or colleague. When broken down into categories, 62 (69.7%) reported an incident of gender harassment, 26 (29.6%) reported unwanted sexual attention, and 2 (2.3%) an incident of sexual coercion. The majority, 53 (62.4%), reported previous training, but only 28 (32.6%) felt well trained.

79 residents attended the workshop and 53 (67.1%) completed the post-survey. The majority of residents, 98.1%, felt the training was applicable, and 88.7% were satisfied with the training. Compared with before the workshop, residents reported more comfort (mean rating of 2.88 vs 3.39, p-value of 0.0304) and confidence (mean rating of 3.47 vs 3.88, p-value 0.0284) in responding to incidents of harassment. They were more likely to use active responses, such as express discomfort (15.0% vs 51.0%), express a preference (15.0% vs 53.1%), and de-brief (13.3% vs 63.3%) and less likely to ignore the incident (56.7% vs 34.7%).

CONCLUSIONS: Incidents of gender-discrimination and sexual harassment are common in academic medicine and medical trainees do not feel prepared to respond to these incidents. This workshop offers one potential solution by better preparing residents to actively respond to these incidents.

LEARNING OBJECTIVE #1: Understand the problem of sexual harassment and gender discrimination

LEARNING OBJECTIVE #2: Recognize the importance of training for responding to events of harassment

ADDRESSING MICROAGGRESSIONS AND DISCRIMINATION IN THE CLINICAL ENVIRONMENT DURING MEDICAL SCHOOL: A MULTI-YEAR EDUCATIONAL INTERVENTION

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BACKGROUND: Microaggressions and discrimination are common in the clinical setting and harm both patients and providers. However, interventions to improve efficacy at handling these situations, particularly for students, have not been well described.

METHODS: We created a two-hour workshop, consisting of a didactic session and a small group, case-based component, aimed at teaching medical and dental students how to recognize and address microaggressions and discrimination in the clinical setting. All first-year medical and dental students at our institution participated in the workshop across three years. Participants completed paired pre- and post-workshop surveys.

RESULTS: 461 first-year medical and dental students took part in the workshop, with 321 (69.6%) responses to the pre-workshop survey and 162 (50.4%) linked responses to the post-workshop survey. Over 80% of students reported experiencing a microaggression in a clinical setting, with significantly higher rates reported by female students ($p < .001$) and students from underrepresented backgrounds in medicine (URM, $p = .04$). The workshop significantly reduced self-reported barriers to addressing microaggressions and discrimination ($p < .001$). The efficacy of the workshop was consistent across all three years, including in the virtual format.

CONCLUSIONS: Microaggressions are exceedingly common in the clinical environment, with female and URM students particularly affected. Our workshop mitigated barriers to responding to microaggressions and demonstrates efficacy in both live and virtual formats. These findings suggest the value of expanding similar workshops across institutions as part of a coordinated effort to address structural racism in the medical education and clinical settings.

LEARNING OBJECTIVE #1: To document the experiences of microaggressions/discrimination in the clinical environment for medical and dental students.

LEARNING OBJECTIVE #2: To reduce barriers to addressing microaggressions and discrimination and enable better communication between teams and patients in the clinical environment.

AN OBESITY MEDICINE CURRICULUM FOR INTERNAL MEDICINE RESIDENTS INCREASES SELF-EFFICACY FOR LIFESTYLE COUNSELING

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BACKGROUND: Internal medicine (IM) residency offers an opportunity to address physicians' educational gaps in obesity treatment; however, no curricula have been rigorously tested. Our objective was to develop and evaluate an obesity medicine curriculum for IM residents.

METHODS: We conducted a prospective, 6-month evaluation of an obesity medicine curriculum among IM residents. A team of residents and an obesity medicine expert developed the curriculum that combined self-directed online modules with three live group sessions during resident conference, which outlined guideline concordant obesity care practices for lifestyle counseling, medications, and surgery (Feb 2020-April 2020). Residents were also provided Epic Smart Phrases to facilitate documentation and patient communication. We recruited 39 residents from 2 programs to participate (20 intervention; 19 control). All residents completed a baseline and 6-month survey on self-efficacy to counsel on key obesity topics. Responses were dichotomized as 'very confident' versus 'less confident' (somewhat/not very/not at all). Intervention residents completed a survey post-program to determine satisfaction. We used Chi² tests to compare 6-month outcomes between groups.

RESULTS: Overall, 65.8% were women, 53.8% had a primary care interest, and training level 30.8% PGY1, 30.8% PGY2, and 38.5% PGY3. Table displays differences in residency self-efficacy between groups. Among intervention residents, 75.0% were 'very satisfied' and 25.0% 'somewhat satisfied' with the overall curriculum, and 83.0% were 'very likely' to use the knowledge/skills learned.

CONCLUSIONS: Residents who participated in obesity medicine curriculum had significantly greater self-efficacy in dietary, behavioral, and bariatric surgery counseling as compared to residents without this training. Resident satisfaction with the curriculum was high. We found no significant between-group differences in medication counseling, which may be related to timing of the medication module that occurred during the height of COVID-19 changes. Our preliminary results show promising results, and additional analyses are planned to determine the curriculum's effect on residents' clinical practices.

LEARNING OBJECTIVE #1: Patient Care: Utilizes evidence-based models of health behavior change to effectively counsel patients for weight management.

LEARNING OBJECTIVE #2: Medical Knowledge: Applies knowledge of using nutrition, physical activity, behavioral, pharmacologic, and surgical interventions to develop a comprehensive, personalized obesity management care plan.

A NOVEL ASYNCHRONOUS APPROACH TO TEACHING ORAL CASE PRESENTATIONS VIA DIGITAL VIDEO

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BACKGROUND: The oral case presentation is an essential skill to master during undergraduate medical training and an invaluable tool for assessing students' clinical reasoning. Unfortunately, there is not great evidence for how to best teach this skill, and historically, methods for improving students' oral case presentations have been time- and labor-intensive. To overcome this barrier, an asynchronous learning modality was designed for medical students to improve their oral presentation skills while minimizing time commitment requirements for faculty.

METHODS: A pilot program was delivered in December 2019 over a one-week period to 121 second year medical students. First, students watched a 23-minute video on how to deliver an oral presentation. They then watched an interview with a standardized patient and recorded themselves presenting this patient. This video was uploaded to an online learning platform. Faculty evaluators viewed a sample of student videos and provided aggregate feedback to the group. Students then viewed a video of an attending physician modeling an oral presentation for the same patient. All students completed pre- and post-intervention surveys and received a completion grade for this assignment. Paired t-tests were performed to determine if the curriculum was effective in improving self-reported confidence levels for various aspects of delivering an oral case presentation.

RESULTS: Pre- and post-intervention surveys revealed a statistically significant difference in self-reported confidence in all four domains evaluated: (1) delivering an organized oral patient presentation ($p < 0.01$); (2) delivering a concise and effective oral patient presentation ($p < 0.01$); (3) presenting an oral patient presentation to an attending physician ($p < 0.01$); and (4) knowing what specific qualities make an oral patient presentation outstanding ($p < 0.01$). Sixty students provided additional free-text feedback on the effectiveness of this activity. An analysis of the feedback revealed three major themes: (1) students wanted education on oral presentations earlier in their curriculum; (2) they would have preferred an in-person component in addition to the virtual component; and (3) they desired more practice delivering oral presentations.

CONCLUSIONS: This curriculum was designed prior to the COVID-19 pandemic, but the results of this study have wide implications in the post-pandemic era. When faculty time, financial resources, and physical space are limited, oral case presentations can still be taught effectively and widely in either preclinical or clinical settings. An online repository of videos of master clinicians demonstrating clinical skills is easily scalable and could be used to effectively teach learners across specialties and training levels.

LEARNING OBJECTIVE #1: Describe an innovative and scalable strategy for teaching clinical skills in a remote learning environment.

LEARNING OBJECTIVE #2: Analyze the efficacy of this asynchronous approach in improving medical students' confidence with oral case presentations.

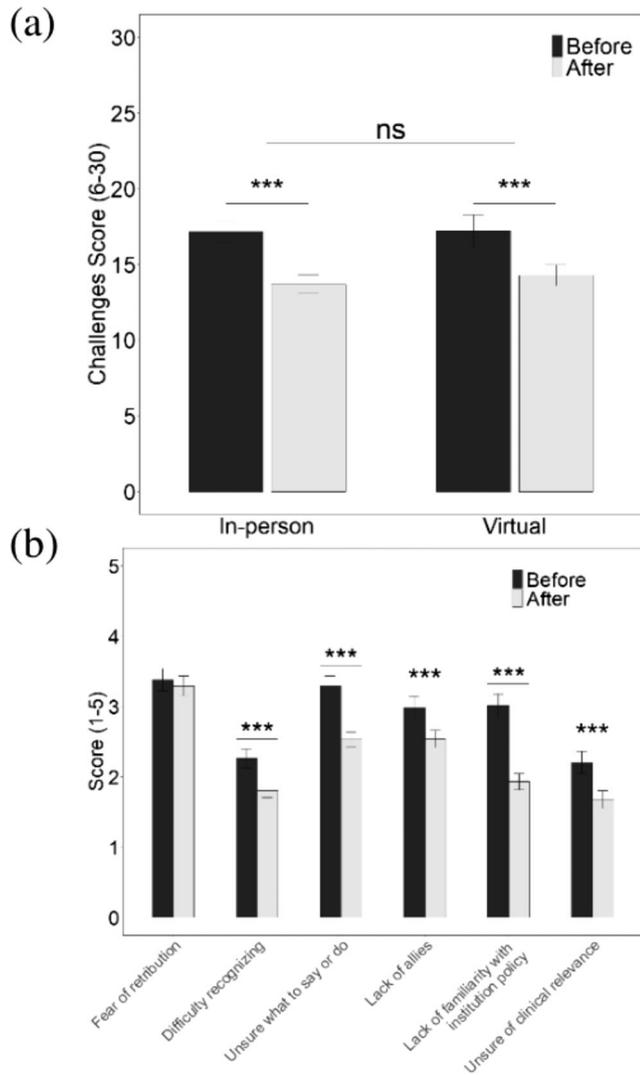


Figure 1. (a) Efficacy of workshop in reducing overall barriers to addressing microaggressions across in-person and virtual formats. (b) Efficacy of workshop in reducing specific barriers to addressing microaggressions. Error bars represent 95% CI. *** $p < .001$ ns $p > .05$

A NOVEL PROGRAM EMPLOYING RESIDENT COACHES TO PROVIDE NON-EVALUATIVE FEEDBACK TO INTERNAL MEDICINE CLERKSHIP LEARNERS

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BACKGROUND: Distinguishing between formative and evaluative feedback in medical education can be challenging. For clerkship students, formative feedback may elicit defensive or negative reactions due to concern for their final evaluation, thus lessening the impact of feedback. To overcome this barrier, we developed a resident coaching program within the internal medicine clerkship. The purpose of the resident coach was to provide feedback in a non-evaluative fashion, thereby focusing on growth instead of performance.

METHODS: Starting July 2020, all Internal Medicine (IM) clerkship students at the Perelman School of Medicine participated in the resident coaching program. Students were randomly assigned to receive feedback from a coach individually based on observation of rounds, or after presentation to a group of two to three peers with the coach participating. Senior IM residents underwent training on clinical coaching, observation, and feedback, and were assigned a faculty mentor for support. Coaches used standardized QR-generated electronic feedback forms as an observation guide, and provided feedback virtually or in person. Students were surveyed regarding their experiences through a mandatory, electronic, end-of-clerkship evaluation.

RESULTS: Initial data is available from a total of 40 students to date. Nearly all students (97%) agreed or strongly agreed that they felt comfortable delivering a presentation to their coach and peer group. Slightly fewer students (91%) agreed or strongly agreed that they felt comfortable discussing goals and feedback with their coach and peer group. Only 44% of students agreed or strongly agreed that they felt safer (or more comfortable) presenting and getting feedback from their coach compared to their clinical team, with 21% disagreeing with the statement.

CONCLUSIONS: Almost all students felt comfortable presenting and discussing goals and feedback with their coach and peer group. However, students varied more in how they felt presenting to their coach compared with their clinical team. Nearly half indicated they felt more comfortable presenting and receiving feedback from their coach compared to their clinical team, suggesting that for some, individual non-evaluative feedback may be more effective than clinical team feedback. Analysis of future data will show whether this trend is persistent, and whether students' comfort level with their coach varied based on randomization to individual, direct-observation or peer group feedback. Understanding the effectiveness of individual versus group feedback by a neutral coach has implications on the burgeoning implementation of coaching in medical education at large in terms of feedback strategies and staffing.

LEARNING OBJECTIVE #1: To implement a non-evaluative observation and feedback program for internal medicine clerkship students to improve patient care and communication.

LEARNING OBJECTIVE #2: To assess student comfort levels with receiving feedback from a coach in different settings compared to their clinical team.

ANTI-RACISM IN GRADUATE MEDICAL EDUCATION - A CALL FOR CHANGE

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BACKGROUND: The prevalence and impact of the dimensions of racism (interpersonal, personally-mediated, institutionalized, and structural) and antiracism in medical education have not been widely studied. We explored attitudes and behaviors related to racism among internal medicine faculty and assessed for change after an antiracist staff development curriculum.

METHODS: We designed a curriculum based on recent literature, medical education research, medical sociology frameworks, and data from national accrediting medical education bodies.

A survey tool was created to assess attitudes and behaviors around the dimensions of racism and antiracism before and after the curriculum. We validated the tool with a qualitative assessment by 30 volunteers similar to the intended audience.

The finalized survey had three parts: PRE (pre-survey), POST (post-survey), and RPP (retrospective pre-test). Each component had 24 attitude and 36 behavior questions. The PRE elicited baseline attitudes and behaviors; the RPP and POST reflected attitudes and behaviors in the six months before and after the curriculum, respectively. The PRE was administered just prior to the curriculum, and RPP and POST were given together after the curriculum. We used Wilcoxon signed-ranked and paired t-tests to compare the mean scores between the following three pairs: RPP vs POST, PRE vs POST, and RPP vs PRE.

RESULTS: Of 70 faculty participants, 35 completed the full survey and were included in the analysis.

They were mostly female (71%), and non-Hispanic white (52%). Two identified as underrepresented minorities in medicine (URiM).

Overall, participants felt strongly confident in defining aspects of racism and reported always or often providing mentorship and opportunities for URiM trainees. They disagreed with racist statements regarding URiM performance and reported rarely or never using derogatory terms to describe patients. They reported the institution could do better supporting equity in the healthcare workforce, and racial, ethnic, and language concordance between patients and providers.

There were significant ($P < 0.05$) increases in the mean scores for RPP vs POST ($n = 48$ questions, 80% of total), PRE vs POST ($n = 37$, 61.7%), and PRE vs RPP ($n = 8$, 13.3%), suggesting the curriculum increased self-awareness of participants' role in perpetuating racism, and readiness to engage in anti-racist practices.

CONCLUSIONS: The RPP vs POST showed the most significant changes, suggesting the curriculum impacted faculty attitudes on racism while influencing them to engage in future anti-racist behaviors. These findings suggest that racist and anti-racist attitudes and behaviors can be measured with this instrument. Future directions include assessing if the changes in attitudes and behaviors persist, and whether results can be replicated in non-medical fields.

LEARNING OBJECTIVE #1: Understand attitudes and behaviors of internal medicine faculty towards racism in graduate medical education.

LEARNING OBJECTIVE #2: Assess impact of antiracism training on faculty attitudes and behaviors.

ASSESSING HEALTHCARE PROVIDER KNOWLEDGE OF HUMAN TRAFFICKING.

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BACKGROUND: Human trafficking is a serious problem and healthcare workers are in a position to intervene. This study sought to determine the knowledge levels of healthcare providers who are most likely to be in direct contact with a victim of human trafficking.

METHODS: An anonymous survey assessing knowledge of specific topics of human trafficking was developed and distributed online. Demographic information and questions pertaining to training and knowledge of trafficking in a healthcare setting were asked. The primary outcomes were descriptive statistics and secondary outcomes were comparisons among demographic groups. Qualitative methodology via content analysis was implemented on an open-ended question.

RESULTS: The 6,603 respondents represented all regions of the country. Medical, nursing, and physician assistant students comprised 23% of the sample, while 40% were either physicians, fellows, or residents. Less than half the respondents (42%) have received formal training in human trafficking, while an overwhelming majority (93%) believe they would benefit by such training. Overall, respondents thought their level of knowledge of trafficking was average to below average (mean=2.64 on a 5-point scale). There were significant differences in knowledge of trafficking by age group ($p < .001$), region ($p < .001$), and educational training level ($p < .001$). 949 respondents (14.4%) provided free-text comments that further described their opinions.

CONCLUSIONS: Most respondents have not had training but felt they would benefit from it. There were significant differences between demographic groups. Further innovation is needed to design a universally appropriate

curriculum on human trafficking accessible to all healthcare providers as well as mandatory training programs for all institutions.

LEARNING OBJECTIVE #1: To determine the knowledge level of healthcare providers who may come in contact with victims of human trafficking.

LEARNING OBJECTIVE #2: To assess the differences in knowledge of trafficking by age group, region, and educational training level.

ASSESSING MEDICAL STUDENTS' KNOWLEDGE, CONFIDENCE, AND SKILLS IN CARING AND ADVOCATING FOR UNDOCUMENTED IMMIGRANT PATIENTS.

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BACKGROUND: Patients who are immigrants, notably those with undocumented status, face challenges to equitable healthcare access. By understanding immigration status as a social determinant of health (SDOH), physicians can begin to address such disparities. However, few undergraduate medical curricula include formal longitudinal instruction addressing immigration. We conducted a needs assessment of a medical school's curricular content in teaching medical students to address immigration as a SDOH.

METHODS: MS1-3 students from a school in Bronx, NY where 35% of the patient population are immigrants, received a 13-question email survey via surveymonkey.com. Students were assessed on three primary areas based on a literature review on sanctuary doctoring and SDOH: 1) Knowledge of immigrants' barriers to care (4-point scale, strongly disagree to strongly agree); 2) Confidence in assessing patient immigration status, taking an immigration history, and advocating for patients at risk of deportation (3-point scale, not confident to very confident); and 3) Frequency of assessing patients' immigration status, identifying immigration status when presenting cases, and referring undocumented patients to social/legal resources (4-point scale, never to always). Outcomes were compared between pre-clinical (MS1-2) and clinical (MS3) students.

RESULTS: Among 539 students, 159 (29.5%) responded, with 104 pre-clinical and 55 clinical students. 79.2% strongly agreed that undocumented immigration status limits healthcare access. Few students reported being very confident in asking about immigration status (8.8%), taking an immigration history (12.6%), providing legal information (2.5%) and advocating for patients at risk of deportation (6.3%). Compared to the pre-clinical cohort, clinical students were significantly more confident in taking an immigration history ($p = 0.04$) but not in other skills. Few students endorsed frequently or always asking patients about immigration status (3.2%), identifying immigration status when presenting patients (4.5%), and referring undocumented patients to appropriate resources (8.3%). There were no significant differences in frequencies of use of clinical skills pertaining to care of immigrant patients in the pre- and clinical cohorts.

CONCLUSIONS: Students are aware of barriers that immigrant patients face but lack confidence and experience in identifying and supporting undocumented patients. Our results will inform a revision of the longitudinal curriculum, including didactics and practical activities.

LEARNING OBJECTIVE #1: 1. Assess students' skills and confidence in identifying and advocating for undocumented immigrant patients in clinical practice

LEARNING OBJECTIVE #2: 2. Assess students' knowledge of immigrants' barriers to care

BELIEFS, ACTIONS, AND INTENT: MEASURING STUDENT PERSPECTIVES ABOUT TEACHING

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BACKGROUND: Student evaluation of teaching assumes that students can assess the quality of teaching, regardless of their conscious or unconscious bias toward particular styles of teaching. If such evaluations are to be useful and equitable, we need to understand what pedagogical biases students bring to the evaluation of teaching. In this project, we modified a well-validated measure of teachers' styles (the TPI, available at www.teachingperspectives.com) to articulate students' potential bias toward particular forms of effective teaching.

METHODS: We are recruiting students from the 2nd- and 4th-year classes at 7 medical schools (Yale, Einstein, U Vermont, Penn State U, SUNY-Buffalo, Tulane, U Rochester) to complete a modified student version of the TPI (the TPI-S). The teacher version of the TPI has 45 items that ask teachers a range of questions about their beliefs, actions, and intent, given a specific teaching scenario, and classifies scores into five teaching perspectives (transmission, apprenticeship, developmental, nurturing, social reform). Teachers can have a combination of perspectives, but most have one dominant perspective. For the TPI-S, we modified the instructions to direct students to respond to the 45 items while thinking of a specific teacher that they found particularly effective in the past 6 months. Our underlying assumption was that each student's effective teacher would serve as a proxy for that student's perspective on effective teaching, and potentially indicate their preference for a specific teaching perspective.

RESULTS: To date, we have collected data from 377 students (52% 2nd-years). Psychometric analyses of the TPI-S show Cronbach Alpha values for the five perspectives ranging from 0.84 (transmission) to 0.89 (social reform). Percentages of preference for the five perspectives were similar between 2nd- and 4th-year students. In the 70% of cases where students described their effective teacher with a single dominant perspective, the most common was the apprenticeship perspective (47%), with nurturing second most common (28%). However, a significant proportion of students (23%) did not show a preference, and 7% showed a preference for multiple perspectives.

CONCLUSIONS: The TPI-S has good internal consistency and may be a reasonable way to collect data about student perspectives on effective teaching. The similarity of dominant perspectives between 2nd- and 4th-year students suggests a similar vision for effective teaching, regardless of clinical or preclinical context. While most students held a dominant perspective, 30% of the sample did not, suggesting that some students either hold multiple perspectives or do not differentiate among perspectives. Further work is needed to explore how student perspectives influence their evaluations of teaching effectiveness.

LEARNING OBJECTIVE #1: Differentiate among five perspectives of teaching

LEARNING OBJECTIVE #2: Describe student perspectives of teaching

CASTING A BROAD NET: A DESCRIPTIVE ANALYSIS OF THE DIDACTIC METHODS AND REVIEW PROCESSES OF THE TOP HUNDRED MEDICAL PODCASTS (2018-2020)

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BACKGROUND: Internal medicine residents learn outside the hospital primarily through podcasts. Despite their pervasiveness, there has been no systematic survey of important pedagogical characteristics such as didactic method, editorial process, and advertising.

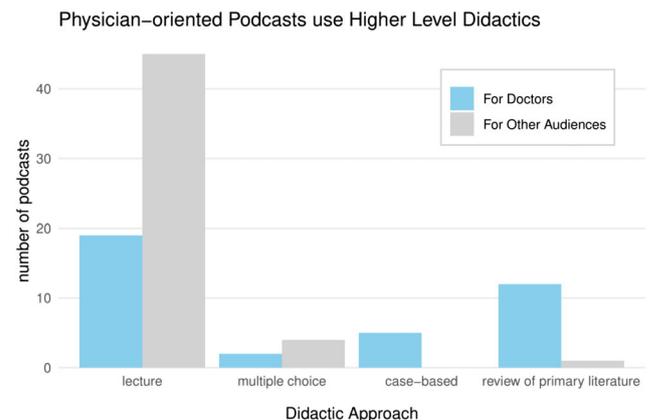
METHODS: Two years of Apple Podcasts charts in the category Medicine were tabulated, from June 1, 2018 through September 30, 2020. Average rank positions were calculated to generate a list of the top 100 medical podcasts in this period. A framework based on Bloom's taxonomy was developed to categorize didactic methods. A codebook collecting data on didactic method, review process, format, and advertisers was developed and validated. The top 100 podcasts were independently coded by two coders and the third resolved disagreements. Descriptive statistics were calculated with R.

RESULTS: Of the top 100 medical podcasts, 39 are podcasts intended for physician education (PIPE); the remainder are for other health professions or the general public. Of the 28 PIPE that focus on a specific specialty, emergency medicine (9) is the most common, followed by pediatrics (5), internal medicine (4), and psychiatry (4). PIPE are most often affiliated with medical journals (12) or produced by individuals (12). Few are affiliated with a university (1) or residency training program (1). The majority of PIPE (27) are targeted towards all levels of learners. For all podcasts in our study, the most common format is monologue, followed by interviews and conversations. Advertising is less common in PIPE (36%) than in podcasts for other audiences (53%). Compared to podcasts intended for other audiences, PIPE use a wider variety of didactic methods, including reviews of primary literature (Figure).

CONCLUSIONS: Despite their reputation for primarily being audio lectures, PIPE use a variety of didactic methods, many of which engage higher skills on Bloom's taxonomy and are thus more aligned with adult learning theory. These podcasts are mostly produced by individuals or medical journals. Financial interests in PIPE are less common than in medical podcasts intended for other audiences.

LEARNING OBJECTIVE #1: Characterize the didactic methods employed by medical education podcasts.

LEARNING OBJECTIVE #2: Assess the strengths and deficiencies of medical education podcasts pertaining to issues of peer review, advertising, and specialty representation.



CHANGING CULTURE: ASSESSING RESIDENT BARRIERS AND MOTIVATORS TO ENGAGING IN PANEL MANAGEMENT PATIENT CARE ACTIVITIES

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BACKGROUND: Panel management (PM) is the process of ensuring patients on a provider's panel have routine preventative, screening, and chronic disease-related care performed in a timely manner. Panel management is a component of ACGME's system based practice and practice based learning milestones. Consistent uptake and sustainable implementation of PM by residents has been challenging at our clinic. Existing literature does not fully address barriers or suggest best-practices for ensuring successful PM curricula. We aimed to assess internal medicine resident attitudes towards current PM curricula using a targeted needs assessment, followed by re-design of the PM curriculum.

METHODS: A single focus group was held with primary care residents (n=8) to design a survey assessing engagement with PM projects, explore barriers to engagement, and gather opinion about strategies to better incorporate PM into the curriculum. Our survey used 5 point likert agreement scale and was administered to 12 primary care residents. In the next three months this anonymous survey will be distributed to all primary care and categorical internal medicine residents at three primary care clinic sites (n = 90). The focus group was recorded and reviewed by two individuals and common themes were identified in a collaborative discussion although no formal coding was done.

RESULTS: Our focus group revealed three key themes:

- 1) A need for more skill development on how to do panel management activities
- 2) A need for more dedicated clinical time to apply to structured PM activities for patient outreach
- 3) Experiences of feeling overwhelmed and unsuccessful when attempting PM activities

Pilot survey data show residents feel PM is important (100%), and they know how to identify patients to focus on for PM (69%), but do not feel comfortable creating action steps (31%) nor do they feel they are kept accountable to those steps by faculty (15%) or themselves (15%). They find reviewing dashboard metrics helpful (77%), but also discouraging (77%). They want more protected time (69%), in a group setting with a preceptor (77%), to work on panel management outreach activities.

CONCLUSIONS: PM is an important skill for primary care physicians. Our preliminary data show that primary care residents agree PM is important. Barriers include insufficient knowledge of how to create an individualized PM action plan, lack of protected time for PM activities, lack of accountability to PM activities, and discouraged feelings when reviewing dashboard metrics. PM curricula will need to address these barriers if they are to be successful. These data about resident attitudes towards PM will inform curricular re-designs, ideally helping residents to develop skill in PM during clinical practice.

LEARNING OBJECTIVE #1: Create a culture shift in how primary care resident clinic by assessing motivators and barriers for resident engagement in panel management activities.

LEARNING OBJECTIVE #2: Brainstorm ideas to increase buy in and to integrate panel management into routine clinical care activities

CHANGING HATS: LESSONS LEARNED INTEGRATING COACHING INTO UME AND GME

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BACKGROUND: The transition from medical school to residency is characterized by an abrupt transition of learning needs and goals. Coaching is a

promising intervention to support individual learning and growth trajectories of learners. It is uncommon for medical school faculty to have undergone training as coaches. We explored our faculty's perceptions and skills after instituting a new coaching program.

METHODS: Faculty advisors (N=12) and GME (N=16) participated in a coaching development program and in community of practice meetings where challenging coaching scenarios were shared. GME faculty also participated in a Group Objective Structured Clinical Exam (GOSCE) to practice and receive feedback on their skills. Peer-faculty observers and resident raters used behaviorally grounded checklists to assess faculty performance. We conducted 2 focus groups: 1) UME advisors engaged in longitudinal coaching (n=9) and 2) GME faculty participating in the coaching development program (n=8) to better understand how faculty make sense of and put into practice these new coaching roles and skills.

RESULTS: Simple thematic coding showed that both groups emphasized the blurring of the many roles they serve when interacting with trainees and struggled with recognizing both which "hat" to wear (role to adopt) and which skills to call upon in specific situations. UME advisors who have dedicated "advising/coaching" roles reported assuming multiple roles at different times with their same students. Many of the GME coaches serve as Associate Program Directors, and described adopting a coaching frame of reference (mentality) and requiring external reinforcement for coaching skills. Some reported realizing after the fact that coaching would have been a valuable approach.

Faculty newer to their role felt more successful in engaging in coaching mindset and coaching. Faculty were curious about how trainees would feel about this approach and anticipated that some would appreciate this more than others.

12 faculty participated in a three station Coaching GOSCE. Both resident raters and faculty peer raters suggested faculty coaches were able to establish trust and engage in authentic listening. Coaches negotiated the tension between empathetic listening with supporting goal-setting. Residents provided slightly lower ratings than peer observers on coaches' ability to ask questions and assume a coachee- focused agenda.

CONCLUSIONS: Medical educators may benefit from obtaining coaching skills, but deliberate training in how these skills complement, and differ, from existing skills requires both didactic and experiential learning. Cultivating a community of practice and offering opportunities for deliberate practice, observation and feedback is essential for medical educators to achieve mastery as coaches.

LEARNING OBJECTIVE #1: Identify and perform appropriate learning activities to guide personal and professional development (PBL)

LEARNING OBJECTIVE #2: Understand and apply core longitudinal coaching skills (Professionalism)

CLINICAL SPANISH PROFICIENCY AMONG INTERNAL MEDICINE RESIDENTS

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BACKGROUND: The population of Spanish-speaking individuals in the United States continues to grow. Linguistic barriers contribute to disparities in healthcare. Language concordance between patients and providers associates with increased patient satisfaction and understanding of their care. More Spanish-speaking physicians are needed to bridge this communication gap. As language acquisition occurs longitudinally, residency training affords a unique opportunity for structured education to advance language skills. However, limited data exist on Spanish language skills and acquisition among residents. Furthermore, whether resident providers adhere to best practices for interpreter use or complete proficiency examinations to perform bilingual visits is unknown.

METHODS: We distributed an electronic survey to 167 Internal Medicine and 16 Medicine/Pediatrics residents at a large academic program. The goal was to ascertain residents' prior Spanish language education, perceived proficiency, barriers to achieving proficiency, patterns of interpreter use, and interest in additional training. Statistical analysis was performed in Microsoft Excel. This study qualified as quality improvement and was exempt from review by the IRB.

RESULTS: Among the 90 (49%) respondents, 76 (84.4%) reported prior Spanish language training.

Of those, 41 (45.5%) residents received undergraduate level training and 37 (41.1%) residents received prior training in medical Spanish. When asked to rate their own Spanish proficiency, 17 (18.9%) reported clinical proficiency and 8 (8.9%) assessed themselves fluent. Among those, only 12 (48%) reported completing a hospital proficiency examination for bilingual providers. Of residents who reported less than clinical proficiency in Spanish, 22% reported rarely or never using an interpreter to communicate with Spanish-speaking patients when pre-rounding. The majority of respondents, 80 (88.9%), expressed interest in participating in a medical Spanish curriculum if offered during residency. Among resident respondents who reported prior training, perceived barriers to achieving full Spanish proficiency included insufficient time and opportunities to practice conversing in Spanish in a clinical setting safe for patient care.

CONCLUSIONS: Many residents have had prior Spanish language training, though few feel they have achieved clinical proficiency or fluency. Despite this, residents who report inadequate language proficiency communicate with Spanish-speaking patients without using a professional interpreter. Additionally, less than half of residents who feel comfortable conducting a clinical encounter in Spanish have taken a hospital language proficiency exam. More robust opportunities for Spanish language education, proficiency assessment, and education on appropriate use of medical interpreters are needed.

LEARNING OBJECTIVE #1: Describe Spanish language proficiency and patterns of interpreter use among residents.

LEARNING OBJECTIVE #2: Identify the need for Spanish language education and proficiency assessment during residency.

COMMUNICATION SKILLS OVER TIME FOR EIGHT MEDICAL SCHOOL COHORTS: EXPLORATION OF SELECTION, CURRICULUM, AND MEASUREMENT EFFECTS

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BACKGROUND: NYU uses the same 14-item checklist for assessing medical student communication skills across our curriculum, which includes high-quality Objective Structured Clinical Skills Exams throughout the first three years of medical school: a 3-station Introductory Clinical Experience OSCE (ICE), a 3-station end-of-clinical skills OSCE (Practice of Medicine; POM); and an 8-station, high-stakes OSCE (Comprehensive Clinical Skills Exam; CCSE) after core clerkship. We describe how skills change throughout school and explore how patterns vary by cohort (class) in ways that could be explained by admissions criteria, measurement quality, and/or curriculum changes.

METHODS: Three domains are assessed: Info gathering (6 items), relationship development (5 items); and patient education & counseling (3 items). Checklist items use a 3-point scale (not done, partly, well done) with behavioral anchors. Internal consistency (Cronbach's alpha) exceeds .75 for all sub-domains and across all years. Domains are supported by Confirmatory Factor Analysis. Mean average % well done was calculated across cases and individuals for each subdomain in an OSCE and compared over the OSCEs and between 8 classes of medical school students entering from 2009 to 2016 (graduating 2013 to 2020) (n=1569).

RESULTS: Cohorts showed similar patterns communication skills trajectories – improvement over time. Despite changes in admissions criteria and processes, cohorts did not differ in terms of demographics, undergraduate GPA, or MCAT scores. Variability in scores decreased in all cohorts over time while communication improved. Patient education & counseling was significantly

and substantially lower than other domains. In terms of cohort effects, communication scores for the entering class of 2013 at the start of medical school (ICE OSCE) were significantly higher than the previous 4. At the end of MS2, scores were similar for cohorts for info gathering and relationship development domains (and high, mean range=77-87% well done) but patient education & counseling varied: Improvement from the 1st to 3rd cohort and then decline for the last 5 cohorts. Within the CCSE (8-station pass/fail, MS3), communication scores increased steadily across entering classes, especially from cohort 4 on. These changes over time and between cohorts were mapped onto a priori descriptions of curricular, measurement and admission changes.

CONCLUSIONS: Our cohort data showed interesting and complex patterns. This study reinforces some limitations of linking curriculum to performance (e.g., no direct measures of the curriculum in terms of content, process and intensity over time, limited data on what makes cohorts different, variable measurement over time, and being unable to control for broader trends likely to influence both cohort and time effects) while also demonstrating the promise of longitudinal perspectives on the development of core competencies.

LEARNING OBJECTIVE #1: Understand cohort performance in relation to curricular trends.

LEARNING OBJECTIVE #2: Describe variation in performance.

COMMUNITY PARTNERS' EXPERIENCES COLLABORATING WITH MEDICAL STUDENTS VIA SERVICE-LEARNING

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BACKGROUND: When service-learning is aligned with community goals, it can cultivate deep engagement between learners and their communities. Medical students engaging in service-learning develop a more nuanced view of physician leadership, sustain high levels of civism, and reinforce intrinsic motivations core to their professional identity. Community partners' experiences of collaborating with medical students via service-learning has not been well-characterized. The University of Colorado School of Medicine (CUSOM) integrated a year-long service-learning curriculum into a longitudinal integrated clerkship for third-year medical students. In the third year of this program, we undertook a qualitative study of community partners' motivations for and experiences with this collaboration.

METHODS: This is a qualitative exploratory study utilizing seven semi-structured interviews with the primary liaisons at seven community-based organizations that had partnered with CUSOM medical students via service-learning for at least two academic years. Interviews were conducted by a faculty-student dyad from the CUSOM. Interviews were audio recorded, transcribed verbatim, and analyzed by five investigators using a grounded theory framework.

RESULTS: Interviews explored community partner motivations for partaking in service-learning, their experiences collaborating with medical students, outcomes achieved, and their aspirations for future collaborations. Community partners reported engaging in service-learning with the hope of influencing professional identity development of medical students. Partners aspired to impact medical students' attitudes and professional goals by increasing students' knowledge of the challenges faced by individuals served by their organizations. Partners identified meaningful outcomes for their organizations, clients and communities. Challenges related to curricular structure, student variability, communication, and scheduling; many partners were eager for expanded roles in student assessment.

CONCLUSIONS: Findings demonstrate that service-learning can be understood via a dynamic socio-ecological model involving academic institutions, medical students, community-based organizations, clients, and communities. While previous literature has examined the benefits to medical students, this study contributes to our understanding of how community partners' experience the interconnected relationships between various stakeholders. An understanding of the motivations and experiences of community partners can inform curricular design to increase benefit for all stakeholders.

LEARNING OBJECTIVE #1: Assess community partners' motivations for and experiences when participating in service-learning with medical students.

LEARNING OBJECTIVE #2: Describe a dynamic socio-ecological model of service-learning involving academic institutions, medical students, community-based organizations, clients, and communities.

COMPLEXITY OF RESIDENT-IDENTIFIED CHALLENGES DURING TRAINING

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BACKGROUND: On the road to becoming competent, compassionate and ethical physicians, trainees need to reflect on their experiences, understand the clinical and social contexts, and integrate cognitive and affective reactions in ways that build resilience and a coherent professional identity. Using a qualitative approach, this study seeks to identify medical residents' stressors and challenges, and to understand their experience of the internal and external factors of such situations. Such information can guide educators to develop curricula that better meet residents' needs.

METHODS: Primary Care residents at NYU School of Med have ongoing Psychosocial Rounds (PSR) throughout their 3 years, facilitated by a faculty member and Chief Resident, where residents present challenging cases or situations, framed by a specific question. Semi-structured notes taken by facilitators, including question, case description, process of discussion and teaching points were compiled into a deidentified database of 119 cases spanning 2010-2019. These notes were coded by three coders using iterative thematic analysis.

RESULTS: Seventy four of the 119 cases have been coded to date. Four general themes emerged, with each comprised of 2 to 4 main codes. These themes were 1) Self (S): including management of medical uncertainty, emotional reactions, roles and responsibilities, self-care; 2) Teams (T): including relationship with peers, supervisors, other health professionals; 3) Understanding Patient and Families (PF): including social and cultural context, mental health issues, patient/ family and provider disagreements; and 4) Hospital, Healthcare and Societal issues (HHS). There was a high co-occurrence of themes within cases, 60% had 2 themes present, 24% had 3, and only 16% had one theme. Cases with 3 themes most often included S, T and PF.

CONCLUSIONS: This analysis of PSR cases identifies issues for which residents seek help and support in a safe, case-oriented problem-solving discussion group, and allows for in-depth reflection and exploration. The co-occurrences of themes indicate the complexity of issues faced, and the importance of integrating multiple domains when beginning to understand these issues.

LEARNING OBJECTIVE #1: Professionalism: Coping with challenges of becoming resilient physician with emotional and cognitive capacity to deal with complex situations

LEARNING OBJECTIVE #2: Interpersonal and Communication Skills: Develop awareness and skills to negotiate interpersonal situations

COULD COMMENTS BE THE KEY? A RETROSPECTIVE STUDY OF OBJECTIVE STRUCTURED CLINICAL EXAMINATIONS (OSCES) QUALITATIVE DATA AND ITS ABILITY TO PROFILE STRUGGLING STUDENTS

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BACKGROUND: Quantification of medical students' performances provides a trusted yet incomplete view of their competence. The qualitative data which OSCEs can produce have been shown to capture deficiencies that quantitative scoring does not, yet such data goes unused in assessment. The application of profile analysis facilitates use of qualitative data through practical depiction and integration. The aim of this study is to evaluate if the themes found in

standardized patients' (SP) OSCE comments (qualitative data) can augment existing markers of clinical performance (quantitative data) in accurately identifying students at risk of struggling clinically.

METHODS: SP comments from 2 years of OSCEs occurring at the end of year two at the Albert Einstein College of Medicine were analyzed. This dataset contained comments in the domains: history taking, physical exam, communication/interpersonal skills, and global rating. The investigators built a descriptive coding framework for the comments through an iterative process of coding until saturation. Each SP comment was rated on a scale to assess if it was positive (compliment of the performance) or negative (critique). Inter-rater reliability was calculated for coding and rating. Next, student's clinical performance (clinical clerkship grades, step 1 scores, and SHELF scores) were analyzed using profile analysis. The resulting quantitative profiles were then correlated with the themes from students' SP comments to determine which were strongly indicative of future success or failure.

RESULTS: A total of 75 unique themes were identified (interpersonal/communication skills n=28, global rating n=17, history taking n=17, and physical exam n=13). Negative comments prevailed (history taking – 73.7%, physical exam–69.6%, communication and interpersonal–65.7%, global rating–66.0%). Profile analysis of the students' clerkship grades (% Honors [H]), STEP 1 scores, and the internal medicine (IM) SHELF examination produced three profiles: high performing students (STEP 1 mean =239, IM SHELF mean =81.5, mean number of clerkship H =60.3), middle-range performing students (STEP 1 mean = 225, IM SHELF mean =73.6, mean number of clerkship H=19.5), and low-performing students (STEP 1 mean = 215, IM SHELF mean =71.2, mean number of clerkship H =11.8). Correlation between students' SP comments and their clinical profiles are ongoing with results expected before the SGIM 2021 conference.

CONCLUSIONS: Interpersonal/communication skills had the greatest number of themes suggesting a greater impact on patients' experiences. Interestingly, the addition of multiple shelf scores reduced the number of statistically significant and independent profiles from three to two, suggesting that repeated quantitative methods are less helpful in distinguishing at-risk students from the higher performing students.

LEARNING OBJECTIVE #1: Understand the limitations of quantitative data in performance-based assessment

LEARNING OBJECTIVE #2: Appraise the use of profile analysis as a predictive method of student future clinical success

COVID-19 VACCINE HESITANCY AMONG MEDICAL AND DENTAL STUDENTS

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BACKGROUND: As healthcare professional students, medical (MS) and dental students (DS) are exposed to COVID-19 patients. They will also be entrusted with advocating for the COVID-19 vaccine and counseling vaccine hesitant patients. Additionally, dentists are at a higher risk of acquiring COVID-19 infection due to their exposure to aerosolizing procedures. It is therefore important to achieve high COVID-19 vaccination coverage rates in both these groups. We developed a survey to assess the vaccine hesitancy amongst MS and DS to COVID-19 vaccination.

METHODS: The study was conducted at 3 dental schools in Michigan, Florida and Utah as well as an allopathic medical school in Michigan. An anonymous online survey was developed based on past research involving attitudes and behaviors about vaccination. The survey assessed (1) previous immunization behavior; (2) attitudes and perception of COVID-19 vaccines; (3) personal experience with COVID-19 infection. All authors reviewed free-text comments for emerging themes and patterns.

RESULTS: The survey was completed by 248 DS and 167 MS.

MS were more likely ($p=0.0001$) as compared to DS to take the COVID-19 vaccine. (75.4% vs 55.2%). As compared to DS, MS were significantly more likely ($p=0.0001$) to agree that COVID-19 vaccination should be mandatory for the general public (67.9% vs 40.3%), health care providers (85.9% vs 53.1%) and to trust information about the COVID-19 vaccine (87% vs 65.6%). DS were more likely than MS ($p<0.05$) to have had the COVID-19 infection (10.6% vs 3.1%) and to personally have known someone who has had COVID-19 infection (89.8% vs. 75.5%). They were more likely to have delayed getting a vaccine as an adult (23.3% vs 11.1%, $p=0.0025$) and were more likely to receive the COVID-19 vaccine only if it was mandated by the health system (31.6% vs 14.7%, $p=0.0001$).

Themes identified in the comments reflected concerns about vaccine safety/efficacy, rapid development/implementation, trust in regulatory agencies, politicization, resources and education for public amongst both groups.

CONCLUSIONS: One-quarter of MS and half of DS were hesitant to receive the COVID-19 vaccine. Although more DS had personal experience with COVID-19 infection, they were less trusting of public health experts and disagreed with a vaccine mandate. These results highlight the need for profession specific curriculum designed to enhance student knowledge about the COVID-19 vaccine and also teach them vaccine counseling. It is hoped that vaccinated students will share their experiences with their patients and encourage vaccine uptake.

It is the responsibility of health care organizations to train these future professionals to make strong vaccine recommendations and respond effectively to vaccine-hesitant persons.

LEARNING OBJECTIVE #1: To assess the attitudes of medical and dental students to COVID-19 vaccines (Medical knowledge)

LEARNING OBJECTIVE #2: To assess the prevalence of vaccine hesitancy and factors impacting vaccine acceptance amongst medical and dental students. (Systems-based practice)

DESCRIBING TRENDS FROM A DECADE OF RESIDENT PERFORMANCE ON CORE CLINICAL SKILLS AS MEASURED BY UNANNOUNCED STANDARDIZED PATIENTS

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BACKGROUND: Primary care (PC) residency training is a period that provides opportunity to develop skills required for independent practice. Unannounced Standardized Patients (USPs), or secret shoppers, are a controlled measure of clinical skills in actual practice. We sought to describe differences in core clinical communication skills over the last decade for PC residents.

METHODS: USPs presented as a new patient for a comprehensive visit while portraying one of six unique, outpatient cases (with either chronic or acute symptomatology). Actors received extensive training to ensure accurate case portrayal. Each completed a post-visit, behaviorally anchored checklist (not, partly, or well done) in order to provide extensive, actionable feedback. A standardized checklist was used, consisting of individual items across domains including information gathering, relationship development, patient education, activation and satisfaction. Chronbach's alpha for domains ranged from 0.62-0.89. Summary scores (mean % well done) were calculated by domain and compared by year for all learners and by PGY within year for the primary care (PC) residency. Differences were assessed using ANOVA. Case portrayal accuracy was ensured using audio tape review.

RESULTS: 396 visits were conducted with PC residents in our urban, safety-net hospital system between 2013 and 2020. While looking across the 8 years, there was variation in mean scores per domain, though Kruskal-Wallis H test did not show any statistical difference. Relationship development and info gathering were the highest rated skills, at 75% and 76% well done, respectively, on average. Patient satisfaction and activation remained uniformly low across years, with scores averaging 36% and 39% well done, respectively. Multi-variate analysis showed no significant changes across domains by cohort (grad year) and PGY levels. Further, there were no significant differences by PGY year or cohort in terms of scoring using a two-way ANOVA, though

there was a slight upward trend in relationship development skills since 2017 for all PGY levels. There were similar trends in most domains, with 2020 scores being higher than previous years. There were no significant differences across domains while looking at PGY1 learners only.

CONCLUSIONS: While there were no significant differences in scores, we can postulate that PC residents enter the residency with consistent foundational communication skills, possibly attributable to training. We elected to use the visit itself as the unit of analysis, which does not allow us to tease out differences in individual learners. We also have small sample sizes for earlier years of the USP visit program, which may hinder results. Regardless, results warrant further research in order to gain a more thorough understanding, possibly in relation to curricular trends. Further study will look at individual resident differences and ideally provide insight into curricular improvement areas.

LEARNING OBJECTIVE #1: Describe assessment measures

LEARNING OBJECTIVE #2: Explore clinical competency

DEVELOPMENT OF A PUBLIC & POPULATION HEALTH CURRICULUM WITHIN LONGITUDINAL INTEGRATED CLERKSHIPS: A COMPREHENSIVE NEEDS ASSESSMENT

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BACKGROUND: It is critical that public health concepts be incorporated into medical education. This needs assessment aimed to gather local expert input on priority public/population health content to inform development of a pilot public/population health curriculum for the Denver Health Longitudinal Integrated Clerkship (LIC) at the University of Colorado School of Medicine (CUSOM). This pilot curriculum will inform the broader development of curriculum at CUSOM.

METHODS: A survey of key informants (public health faculty, medical school faculty, clinicians involved in public health work, and medical students) was conducted using a convenience sample of individuals with known expertise. Likert-scale questions (1=minimally important, 5=essential) assessed relative importance of 12 population health competencies developed by the Regional Medicine-Public Health Education Centers (RMPHECs) (1). Open-ended questions assessed existing curricular content and sought input on additional key topics. Relevance scores for each competency were averaged collectively and across each role-based subgroup. Means were compared using ANOVA testing. Qualitative responses regarding additional topics were analyzed with content analysis whereby coded topics were categorized by associated RMPHEC competency. Uncategorized codes were used to develop additional competencies.

RESULTS: Sixty-one informants participated (50% response rate). All RMPHEC competencies had an overall average score greater than three, indicating at least moderate importance. Competencies with the highest overall average scores related to social determinants of health (mean 4.72, SD 0.52), interpreting evidence (mean 4.48, SD 0.72), and prevention (mean 4.41, SD 0.76). Significant differences in role-based subgroup means existed between public health faculty and medical students for competencies related to community assets (mean 3.65 vs. 4.56, ANOVA $p=0.05$) and public health systems (mean 4.15 vs. 2.89, ANOVA $p=0.01$). Codes unrelated to existing competencies focused on inter-professionalism. Results were used to inform development of a pilot curriculum.

CONCLUSIONS: The RMPHEC competencies align with local expert opinion. This needs assessment informed which topics should be prioritized within each competency. Interprofessional experts are needed to inform the development of robust and relevant public/population health curricula in medical schools. Reference:

1. Maeshiro, R., et al. (2010). Medical education for a healthier population: reflections on the Flexner Report from a public health perspective. *Academic Medicine*, 85(2), 211-219.

LEARNING OBJECTIVE #1: Describe an approach to using local expert opinion to inform development of public/population health curricula for medical students.

LEARNING OBJECTIVE #2: Understand the importance of incorporating public health content into medical education to advance systems-based practice.

EFFECTIVE MODALITIES FOR TEACHING QUALITY IMPROVEMENT

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BACKGROUND: The ACGME holds systems-based medicine and quality improvement (QI) as core competencies for pediatric resident education. The literature has shown longitudinal, project based, and in-person curricula result in strong QI knowledge and confidence, but not all pediatric residencies can provide these resources. In the wake of the COVID-19 pandemic, many residencies have been forced to use online modules and virtual learning. The goal of this study was to determine if there were knowledge or attitude differences in pediatric residents who receive online learning compared to those who also received experiential learning.

METHODS: First year pediatric residents were assigned to online learning only (control) or in-person experiential learning in addition to online learning (intervention). Due to the COVID-19 pandemic, residents who had their rotation early in the academic year were in the control group while those who had their rotation later in the academic year were in the intervention group. All residents were given the AQIKS assessment at 2 time points: prior to any quality improvement curricula (pre-test), at the end of their first 2-week rotation (post-test). Shapiro Test was used to check normality. Paired t-tests and unpaired t-tests were used to compare changes from pretest to posttest within groups and test scores across groups respectively. Residents also completed a survey. Wilcoxon Rank Sum test was used to compare Likert scores between the two groups.

RESULTS: 25/30 residents participated in the study. There were no differences across groups for either the pretest or the posttest. The average pre-test score was 23.1 and 22.7 for the control and intervention groups ($p = .87$). The average post-test score was 39.9 and 39.4 for the control and intervention groups ($p = .851$). For both groups, the difference between post-test and pretest were significant ($p < .001$). Likert survey responses were generally similar between the two groups. Both groups believed their curriculum was useful and contributed to their knowledge. However, the intervention group was more likely to report greater confidence and intention applying QI to clinical practice ($p = .040$).

CONCLUSIONS: There was no difference between QI test performance between control and intervention groups. In terms of meeting ACGME requirements and resident expectations, online modules seem to be sufficient for achieving QI competency in pediatric residents. However, interactive QI meetings may still be useful in demonstrating how QI can be applied to clinical practice.

LEARNING OBJECTIVE #1: Residents can successfully learn Quality Improvement knowledge and apply them to a validated assessment tool (AQIKS).

LEARNING OBJECTIVE #2: Residents can gain appreciation and confidence to utilize the principles of QI in the clinical setting.

EFFECT OF AN IMMERSIVE PRIMARY CARE TRACK ON EDUCATIONAL AND CLINICAL OUTCOMES: TRANSLATING THE VALUES OF GENERAL MEDICINE INTO ACTION IN GRADUATE MEDICAL EDUCATION

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BACKGROUND: The shortage of primary care physicians in the US is a threat to the public health. Internal medicine training provides inadequate exposure to outpatient general internal medicine, communicating an implicit deterrence to entering careers in primary care. We aim to design and implement

a novel, immersive primary care training program that achieves superior educational and clinical outcomes.

METHODS: Setting and Participants: Internal medicine residency training program where 12/98 residents participate in the intervention each year, 11 year historical cohort of residents.

Intervention: Two 6-month continuous blocks of ambulatory training that take place during the 2nd and 3rd years

Outcomes & Analysis:

1. Perceptions and objective measures of the educational experience between intervention and non-intervention participants using 1-5 scales and t-tests of significance.

2. Using similar methods, we compared career preparation among intervention participants (2014-19) and a historical cohort of primary care trainees (2008-14).

3. We modeled rates of cancer screening and control of diabetes and hypertension using a log-binomial regression model with generalized estimating equation methods to account for clustering at the level of the physician to compare clinical performance. The independent variable was having experienced the intervention or not.

RESULTS: The intervention improved outcomes across all domains (TABLE). Alumni who participated in the intervention (2014-2018) compared to a historical cohort of primary care trainees (2008-2014) reported better career preparation ($p < 0.001$).

CONCLUSIONS: Compared to a standard internal medicine training, an immersive primary care program significantly improved both educational and clinical outcomes. This pilot provides a model for not just PC training, but internal medicine training.

LEARNING OBJECTIVE #1: Design an intervention to enhance primary care training for internal medicine residents.

LEARNING OBJECTIVE #2: Evaluate the impact on education and quality of care.

FACILITATING #FOAMED: INDEXING INTERNAL MEDICINE PODCASTS TO PROMOTE INTEGRATION INTO MEDICAL CURRICULA

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BACKGROUND: Medical podcasts are popular education resources. With the increasing number of Internal Medicine (IM) podcasts, it can be hard for learners and educators to find podcasts that fit their needs. Currently, no method exists for categorizing podcasts to make it easy for learners and educators to integrate them into their curricula. We indexed three internal medicine podcasts and developed a classification schema that can be applied to other FOAMed material to facilitate the integration of podcasts in curricula.

METHODS: We reviewed three IM podcasts: The Curbsiders, Core IM, and The Clinical Problem Solvers. We chose them because they are widely used and focus on medical content that can be integrated into existing curricula. We built a database indexing factors important for learners and educators, including length, topic, and availability of additional learning resources. We then analyzed which podcasts covered topics in the ABIM blueprint and iteratively developed content categories to organize the podcasts based on topic and learning need.

RESULTS: We analyzed 507 podcast episodes. Average length was 48 minutes (standard deviation, 18). Podcasts primarily covered medical knowledge (80%) (subtopics: diagnosis/management, clinical reasoning, clinical skills, journal club), but some covered career development (9%) (subtopics: career pathways, diversity/equity/inclusion, narratives, interprofessional education, medical education, wellness) or social medicine and population health (6%) (subtopics: ethics, health equity, health policy, health systems, high value care, specific patient populations). The number of podcast episodes covering each ABIM category differed substantially: Otolaryngology 0, Dermatology 3, Ophthalmology 3, Allergy/Immunology 5, Obstetrics/Gynecology 5, Medical Oncology 5, Geriatrics 9, Psychiatry 12, Rheumatology/Orthopedics 21, Gastroenterology 23, Hematology 24, Pulmonary 25, Endocrinology/Diabetes/Metabolism 30, Neurology 31, Cardiovascular 37, Nephrology/Urology 40,

Infectious Disease 59. Most podcasts episodes had educational supplements including learning objectives (46%), summary points (76%), infographics (48%), testing (22%) and Tweetorials (6%).

CONCLUSIONS: Podcasts cover diverse topics that can be categorized to help educators seeking to integrate podcasts into their curricula and learners wanting to supplement their education. Our findings suggest that some ABIM content areas receive less coverage by podcasts, which could help prioritize content areas for future podcasts. Next steps include building a searchable database and studying the impact of the database as a resource for learners and educators.

LEARNING OBJECTIVE #1: Identify how podcasts can be used in medical education.

LEARNING OBJECTIVE #2: Describe content gaps in IM podcasts.

INCREASING DIVERSITY IN CARDIOLOGY: A FELLOWSHIP DIRECTOR'S PERSPECTIVE

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BACKGROUND: Under-represented minority (URM) physicians, specifically African American, Native American, Hispanic, and/or Pacific Islander, constitute only about 10% of practicing cardiologists. Diversity in cardiology is essential to serve a growing number of minority patients, starting with recruitment within cardiology programs. The goal of this study is to ask current cardiology fellowship program directors regarding their views of diversity and recruitment of URM.

METHODS: A questionnaire containing items that assess cardiology fellowship program demographics and characteristics, attitudes, strategies, and responsibility regarding increasing diversity in cardiology was developed for submission to cardiology fellowship program directors (PDs). The list of cardiology PDs was abstracted from the FREIDA AMA Residency & Fellowship Database. An email containing a link to the electronic survey was submitted to current program directors. Data was collected from September to December 2020. Data was analyzed using standard statistical methods.

RESULTS: Response rate to the survey was 28.4% (71/250). The majority of program director respondents were not URM (n=55, 77.5%), however 71.8% (n=51) programs had more than 2 URM faculty members and 62.0% (n=44) reported having URM faculty hold leadership positions. 69% (n=49) of PDs strongly agree that diversity is important to their residency program. Of the respondents, 45.1% (n=32) of cardiology PDs reported ≤ 3 URM fellows in their programs, while a total of 54.9% (n=39) reported > 3 URM fellows in their programs. The majority of the PDs (n=42, 59.2%) believe that allowing applicants the opportunity to interact with URM cardiology fellows, directly recruiting URM to apply to their fellowship program (n=43, 60.6%), and involving current program fellows in informal recruitment of URM (n=39, 54.9%) may increase diversity in cardiology residencies. These opportunities were implemented by 54.9% (n=39), 49.3% (n=35), and 62.0% (n=44) of respondents. Most PDs (n=48, 67.6%) agreed that conducting a holistic review of applicants played an important role in diversifying the cardiology applicant pool and 69.0% (n=49) implemented this method. However, deemphasizing USMLE scores when reviewing URM applications (n=24, 33.8%) and considering more IMG applicants (n=16, 22.5%) were less supported by PDs for increasing program diversity. Lastly, the majority of PDs (n=35, 60.3%) reported actively increasing the number of URM faculty members.

CONCLUSIONS: The findings of this study may be useful to medical students and resident physicians considering cardiology fellowship, while also providing a glimpse into what efforts are being made to increase diversity in cardiology. In addition, this study may be used to inform cardiology fellowship program directors of which interventions are being used in other programs,

which programs are most supported by their peers, and which initiatives may yet need to be implemented.

LEARNING OBJECTIVE #1: Professionalism

LEARNING OBJECTIVE #2: Systems-Based Practice

INTERPROFESSIONAL EDUCATION: HELPING RESIDENTS EXCEL IN TEAM BASED CARE

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BACKGROUND: Proficiency in interprofessional collaboration is a core competency of resident education according to the Accreditation Council for Graduate Medical Education. Teaching this skill in primary care is challenging due to scheduling, time and space limitations, and physical separation of the trainee from clinic. Residents work within the VA's version of the patient centered medical home, called Patient Aligned Care Team (PACT), to provide primary care but struggle to master interprofessional collaboration.

METHODS: A monthly case-based curriculum highlighting the different members of PACT was developed and implemented at mandatory pre-clinic conferences. After an introduction session reviewing the evidence for PACT, each month focused on a different PACT member; registered nurses (RN), licensed practice nurses (LPN), pharmacists, primary care mental health integration (PC-MHI) psychologists and pharmacists, social workers (SW), and registered dietitians (RD). Our curriculum was designed for in-person learning and was impacted by the COVID pandemic. Five curriculum sessions were completed in person and two were delivered by email.

RESULTS: Residents completed pre/post surveys focused on knowledge of PACT members and comfort/satisfaction with engaging these members. Surveys were IRB approved, paper based, coded and given to all 31 residents (9 PGY1s, 11 PGY2s and 11 PGY3s) with 100% response rate.

There was a meaningful positive change in residents' knowledge of how to contact all PACT members. The largest gains in knowledge were in contacting the pharmacist, RD, PC-MHI therapist and PC-MHI pharmacist. For example, the percent who knew how to contact the PC-MHI pharmacist went from 12.9% to 63.3%.

Resident comfort and satisfaction levels improved for all PACT members. All the improvements were statistically significant ($p < 0.05$) except for satisfaction in collaborating with RN ($p = 0.08$), which was high prior to the curriculum. Additionally, satisfaction with clinic improved in all measures, except for continuity with patients.

CONCLUSIONS: We found that implementation of a curriculum focused on interprofessional collaboration improved residents' knowledge, satisfaction and comfort in interacting with the interprofessional team. Interestingly, our results show that in-person learning may not be vital as we had significant gains in all measures for PACT members whose curriculum sessions were emailed.

LEARNING OBJECTIVE #1: Improve trainees' ability to communicate and work with interprofessional team members to deliver patient care.

LEARNING OBJECTIVE #2: Identify appropriate resources within the patient centered medical home to provide care that is of optimal value.

LEARNING BEYOND THE SIMULATION CENTER WALLS: TRANSITIONING AN IN-PERSON SIMULATION FOR NEAR-GRADUATING MEDICAL STUDENTS TO A VIRTUAL-ONLY FORMAT

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BACKGROUND: In response to the pandemic, we adapted a 4hr in-person simulation, Night-onCall (NOC), to a fully-virtual format to prepare, assess, and support the transition-to-internship for final-year medical students at 3 US medical schools. We describe the virtual experience and performance of final-year medical students.

METHODS: NOC is an immersive educational experience during which near-graduating medical students play the role of an intern as they complete a series of authentic clinical activities during a simulated “night on call” while assessed by multiple standardized raters from different perspectives. Fundamental NOC activities include standardized patient (SP) encounters with a standardized nurse (SN) present, an oral case presentation to a standardized attending, an evidence-based medicine activity, and a handoff of the patients to a standardized intern. Students encounter 3 patient scenarios: post-operative oliguria (OL), headache with hypertension (Hyp), and informed consent (IC) with a family member present. Assessing students’ physical examination skills in a virtual environment required a new approach. Students were told to describe their physical exam (e.g., “I’m pushing down on the artery in your leg”) and SPs were trained to respond accordingly (e.g., “my pulses are strong”). Virtual NOC was implemented across 2 web-based platforms, Zoom and Webex, and assessments were collected using REDCap and Qualtrics.

RESULTS: 65 students across 3 institutions participated in virtual NOC 2020. Results are presented as the mean % of items well done. Students demonstrated strong communication skills from the SP perspective across the 3 patient cases: Ol 74%, Hyp 83%, IC 73%. In the cases where students also interacted with a SN (Ol, Hyp), relationship building performance was strong: Ol 79%, Hyp 88%. However, students struggled to know what to ask and how to engage the SN during patient encounters: Ol 51%, Hyp 60%. Students demonstrated challenges with the physical exam (PEX): Ol 50%, Hyp 58%. Performance during virtual NOC is similar to the in-person NOC that over 400 near-graduating medical students have completed over the past 4 years.

CONCLUSIONS: NOC performance, whether in-person or a virtual space, reveals comparable similarities in graduating medical students’ readiness strengths and challenges. Students consistently demonstrate strong communication skills and struggle with involving the SN, suggesting an emphasis on interprofessional teamwork may be warranted. PEX skills also need additional development. Our virtual and non-virtual findings suggest low PEX scores may not be related to physical performance but rather recall and cognition. Our findings also suggest that the virtual format provides a comparable and appropriately challenging learning experience for final-year medical students.

LEARNING OBJECTIVE #1: Summarize graduating medical students’ readiness-for-internship.

LEARNING OBJECTIVE #2: Identify readiness-for-internship assessments.

LET’S GET READY FOR RESIDENCY: A SURVEY OF INTERNAL MEDICINE INTERNS REGARDING TOPICS TO INCLUDE IN A TRANSITION TO RESIDENCY COURSE FOR FOURTH YEAR MEDICAL STUDENTS

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BACKGROUND: Transition to residency, or “bootcamp,” courses aim to ensure graduating medical students have the skills to be successful interns. These courses are becoming increasingly popular, and as of 2018, 71 US medical schools had their own bootcamps. Our institution requires graduating medical students to enroll in a general bootcamp, which includes simulation of acute clinical scenarios, standardized patient cases, and didactics, with specialty tracks based on residency choice. Although several institutions offer residency bootcamps, there is no curricular consensus of these courses. We are designing an internal medicine bootcamp curriculum based on literature

review, local educator expertise, and intern input. We believe the interns’ perspective will ensure the curriculum is practical and useful. The aim of this study was to solicit intern input by surveying internal medicine interns regarding topics to include in the internal medicine specialty track.

METHODS: Categorical internal medicine interns at our program were surveyed in October 2020, regarding which topics would be most useful to include in a bootcamp course. This survey was designed and administered using the online platform RedCap and piloted for face validity and clarity with faculty members, residents, and medical students. The interns were asked to choose the 5 most important topics from a list of 16 medical knowledge and 19 clinical/professional topics compiled through a literature search, educator input, and refined from a survey previously developed by the authors. Interns could identify additional topics in a free response section which were coded by three authors to full agreement.

RESULTS: The response rate among categorical interns was 76.9% (40/52). The top 5 medical knowledge topics chosen were: inpatient management of diabetes 60% (24/40), approach to antibiotics 55% (22/40), electrolyte abnormalities 50% (20/40), evaluation of altered mental status 50% (20/40), and non-opioid pain management 45% (18/40). The top 5 clinical/professional topics were: efficiency during intern year 67.5% (27/40), code status 62.5% (25/40), cost effective care 60% (24/40), introduction to cross cover 47.5% (19/40), and responding to challenging patient scenarios 40% (16/40). The top 3 free responses included the following categories: essential intern skills 47.4% (18/38), critical care 23.7% (9/38), and communication skills 23.7% (9/38).

CONCLUSIONS: The topics suggested by the interns will be used to inform the curriculum development of the bootcamp course, to be taught in May 2021. The bootcamp participants will be surveyed regarding their comfort with these topics before and after the course, as well as during their intern year, to understand the impact of this experience towards residency-readiness.

LEARNING OBJECTIVE #1: To identify medical topics that will ensure readiness of graduating medical students entering Internal Medicine residency

LEARNING OBJECTIVE #2: To design a practical and useful residency boot camp curriculum by incorporating the intern perspective

LOOKING BACK 10 YEARS: HAS RECOGNITION OF GENDER BIAS IMPACTED THE LANGUAGE USED IN LETTERS OF RECOMMENDATION?

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BACKGROUND: Letters of recommendation (LOR) are used by the majority of Internal Medicine (IM) program directors in their decision to interview and rank applicants. To effectively perform holistic review of applicants, it is essential to understand if gender differences exist in LOR. To date, no studies have investigated how the content of LOR may vary by gender of IM applicants. Understanding if there is gender bias in LOR and whether this has changed over time is essential given the high stakes nature of the residency selection process. One way to evaluate for gender differences in LOR is to look at how agentic (i.e., stereotypical male; assertive, dominant) and communal terms (i.e., stereotypical female; compassionate, kind) are used to describe applicants. The purpose of this study was to determine if there were gender differences in LOR for IM residency applicants in terms of frequency of agentic and communal term use over ten years.

METHODS: The authors retrospectively reviewed LOR from the University of Utah IM residency program in 2009 and 2019. Using text analysis, the frequency of agentic and communal terms used in LOR was calculated. Analysis of variance was used to determine if the presence of agentic and communal terms was different for (1) applicant gender by application year and (2) letter writer gender by applicant gender by year.

RESULTS: Agentic terms were used more often in LOR irrespective of gender in 2019 relative to 2009, $F(1,383)=4.49$, $p=0.035$, $np2=0.01$, as were communal terms, $F(1,383)=28.07$, $p<0.001$, $np2=0.07$ for 387 LOR. Letter writers used more communal terms in men applicants’ LOR relative to women

applicants' LOR in 2009, $F(1,158)=9.80$, $p = 0.001$, $np2=0.06$ and there was more communal presence in women writers' LOR relative to men writers' in 2009, $F(1,158)= 8.97$, $p =0.003$, $np2=0.04$, but these effects did not persist in 2019.

CONCLUSIONS: The presence of agentic terms to describe IM residency applicants did not differ based on gender over time. However, the frequency of agentic and communal terms used to describe applicants increased over the last 10 years. It is unclear how the equivalent use of terms in LOR impacts women applicants' success as prior work has shown that women are less likely to get traditionally male stereotyped jobs if they are equivalent to their male counterparts. Potential gender bias may need to be considered by investigating how IM programs are using LOR.

LEARNING OBJECTIVE #1: Participants will be able to build interpersonal and communication skills in terms of effectively describing letters of recommendation bias.

LEARNING OBJECTIVE #2: Participants will be able to reflect on the their own biases and biases in others' for practice based learning and improvement.

MEDICAL STUDENTS' CONFIDENCE IN AND FREQUENCY OF CONDUCTING PATIENT- CENTERED COMMUNICATION WITH PATIENTS WHO HAVE LIMITED ENGLISH PROFICIENCY

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BACKGROUND: Despite known disparities in health outcomes for patients with limited English proficiency (LEP), medical students infrequently receive training on caring for patients with language barriers. In recent years, our institution introduced a 1-hr lecture and a case-based practicum with standardized patients to teach students skills for working with interpreters. This study assessed medical students' confidence and frequency in performing patient-centered tasks when caring for LEP patients.

METHODS: We administered an electronic survey in Fall 2020 to all 3rd and 4th year medical students at one institution. The survey assessed: demographics, confidence in performing 8 clinical tasks with an English-speaking vs LEP patient, and frequency of performing 5 clinical tasks with English-speaking vs LEP patients. Questions were repeated for in-person and telehealth encounters. We report only descriptive statistics and include only responses from those who answered >50% of questions.

RESULTS: A total of 121/444 responded (27%); 72 answered >50% of questions. Among the 72, 39% fluently speak ≥1 non-English language. 71% had ≥15 in-person encounters with LEP patients and 30% had ≥5 telehealth encounters with LEP patients. Confidence in Clinical Tasks: For all clinical tasks, respondents were 2-3 times more likely to report confidence working with English-speaking than LEP patients (Table). Frequency of Clinical Tasks: For in-person encounters, respondents discussed non-medical interests (76%) and performed teach back (51%) less frequently with LEP patients. Most respondents discussed social history details (40%), elicited beliefs about diagnosis (44%), and made personal connections (39%) equally frequently with both patients. The same trends were observed in telehealth encounters.

CONCLUSIONS: Despite training in working with interpreters, medical students have less confidence performing clinical tasks and report having patient-centered communication less often with LEP patients. Medical schools need additional strategies to support students in using patient-centered communication skills to mitigate language barrier during in-person and telehealth encounters.

LEARNING OBJECTIVE #1: To highlight a need for more training in LEP patient-centered care.

LEARNING OBJECTIVE #2: To show disparities in quality and quantity of patient-centered communication with LEP patients.

	In-Person		Telehealth	
	English	LEP	English	LEP
Identifying patient's agenda	100%	47%	74%	32%
Setting the visit agenda	83%	19%	57%	18%
Assessing medication adherence	79%	19%	54%	17%
Developing Trust	85%	15%	39%	8%
Understanding patient's beliefs regarding diabetes	74%	10%	51%	7%
Eliciting concerns & preferences related to diabetes management	85%	17%	61%	10%
Empowering patient with understanding of lifestyle modification	78%	13%	43%	10%
Incorporating patient preferences and goals in action planning	67%	13%	40%	11%

Table. Percentage of medical students confident in performing tasks across 8 domains.

MEDICINE RESIDENT EXPERIENCES WITH TRIAGE DURING THE COVID-19 PANDEMIC

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BACKGROUND: Triage during the COVID-19 pandemic has been challenging, and internal medicine residents are often the clinicians performing this difficult task. The psychological toll of pandemic medicine on resident physicians, specifically those performing triage, has yet to be described. Utilizing focus groups and open-ended questionnaires, we explored the experiences of medicine residents involved in triage at an urban academic medical center during spring 2020 of the COVID-19 pandemic.

METHODS: Data was collected via questionnaires and focus groups. Recruitment was performed via email. Eligible residents were those who worked at least 1 ICU triage shift between March 15th and May 1st, 2020. Twenty residents out of 71 indicated that they were eligible, and ultimately nine residents participated (2 via questionnaire and focus group, 5 via questionnaire, 2 via focus group; overall 45% response rate). A codebook was developed utilizing an inductive approach in order to identify themes.

RESULTS: Four recurring themes were identified across all responses: moral distress, resource limitations, the importance of the team, and guidance seeking (Figure 1). Eighty-six percent of those who responded to the questionnaire agreed or strongly agreed with the following statement: "I felt pressured to make challenging ethical decisions quickly during triage of patients with COVID-19."

Moral distress related to crisis standards of care	"...another thing I thought about was like the oath we take about do no harm and... knowing that you're clearly not at your best and being like I don't think that I'm caring for you properly and I think I am causing you harm." (P21)
Strain of resource limitations	"...sure, we were not out of ventilators, but we were out of experts in managing ventilators, out of CVVH machines, out of vigor, out of energy..." (P36)
Importance of support from colleagues and superiors	"...I felt so supported, even if it was just in ways like 'Look I don't know either. We're just going to do this. None of us know. This is new territory.'" (P39)
A search for guidance and direction	"I think there was a point where I was like what is the triage plan? Is the triage plan me just saying I would never do this to my mother..." (P21)

CONCLUSIONS: We found evidence that internal medicine residents at a major academic medical center experienced moral distress related to triage during the COVID-19 pandemic. Concrete guidelines, further triage training, and team-based support may help to reduce distress, improve performance, and contribute to professional development.

LEARNING OBJECTIVE #1: To explore the impact of the COVID-19 pandemic on the professional and ethical education of medicine residents

LEARNING OBJECTIVE #2: To understand the implications of pandemic resource limitations on doctors' ability to perform effective triage within a health care system

NOTESENSE: DEVELOPMENT OF A MACHINE LEARNING ALGORITHM FOR FEEDBACK ON CLINICAL REASONING DOCUMENTATION

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BACKGROUND: Clinical reasoning (CR) is a core component of medical training, yet residents often receive little feedback on their CR documentation. Here we describe the process of developing a machine learning (ML) algorithm for feedback on CR documentation to increase the frequency and quality of feedback in this domain.

METHODS: To create this algorithm, note quality first had to be rated by "gold standard" human rating. We selected the IDEA Assessment Tool—a note rating instrument across four domains (I=Interpretive summary, D=Differential diagnosis, E=Explanation of reasoning, A=Alternative diagnoses explained) that uses a 3-point Likert scale without descriptive anchors. To develop descriptive anchors we conducted an iterative process reviewing notes from the EHR written by medicine residents and validated the Revised-IDEA Assessment Tool using Messick's framework—content validity, response process, relation to other variables, internal structure, and consequences. Using the Hofstee standard setting method, cutoffs for high quality clinical reasoning for the IDEA and DEA scores were set. We then created a dataset of expert-rated notes to create the ML algorithm.

First, a natural language processing software was applied to the set of notes that enabled recognition and automatic encoding of clinical information as a diagnosis or disease (D's), a sign or symptom (E or A), or semantic qualifier (e.g. most likely). Input variables to the ML algorithm included counts of D's, E/A's, semantic qualifiers, and proximity of semantic qualifiers to disease/diagnosis. ML output focused on DEA quality and was binarized to low or high quality CR. Finally, 200 notes were randomly selected for human validation review comparing ML output to human rated DEA score.

RESULTS: The IDEA and DEA scores ranged from 0-10 and 0-6, respectively. IDEA score of ≥ 6.5 and a DEA score of ≥ 3 was deemed high quality. 252 notes were rated to create the dataset and 20% were rated by 3 raters with high intraclass correlation 0.84 (95% CI 0.74-0.90). 120 of these notes comprised the testing set for ML model development. The logistic regression model was the best performing model with an AUC 0.87 and a positive predictive value (PPV) of 0.65. 48 (40%) of the notes were high quality. There was substantial interrater reliability between ML output and human rating on the 200 note validation set with a Cohen's Kappa 0.64.

CONCLUSIONS: We have developed a ML algorithm for feedback on CR documentation that we hypothesize will increase the frequency and quality of feedback in this domain. We have subsequently developed a dashboard that will display the output of the ML model. Next steps will be to provide internal medicine residents' feedback on their CR documentation using this dashboard and assess the impact this has on their documentation quality.

LEARNING OBJECTIVE #1: Describe the importance of high quality documentation of clinical reasoning.

LEARNING OBJECTIVE #2: Identify machine learning as a novel assessment tool for feedback on clinical reasoning documentation.

PERCEPTIONS OF UGANDAN DOCTORS ON WESTERN INTERNATIONAL TRAINEES PARTICIPATING IN SHORT-TERM GLOBAL HEALTH ROTATIONS

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BACKGROUND: In recent years, there has been an increased interest among European and American medical trainees (EAMT) to participate in global health electives. Studies have investigated the motivations and experiences of EAMT's, but little data exists regarding the perceptions and opinions of host country faculty and supervisors of EAMT's (Aluri et al., 2018). Given the current knowledge gap, we conducted qualitative interviews with clinical faculty at Makerere College of Health Sciences in Kampala, Uganda to determine characteristics of successful exchange programs and predictors of successful EAMT's.

METHODS: All Ugandan practitioners who worked with EAMT were eligible to participate. Participants were recruited via snowball sampling. Semi-structured interviews were conducted by two Ugandan research assistants between November 4th-December 16th 2020. Interviews focused on the following subjects: 1) positive experiences and characteristics of successful EAMT, 2) challenges associated with EAMT, and 3) suggestions for better EAMT rotation design. Interviews were transcribed by the same research assistants. Five transcripts were analyzed using grounded theory by two independent reviewers to develop a codebook and themes. Ten additional interviews were then coded utilizing the aforementioned codebook. Due to COVID-19, 5 out of the 15 interviews were conducted virtually to allow for social distancing.

RESULTS: Fifteen subjects were interviewed, 53% female and 46% male. Participants were predominantly clinicians and lecturers (73%) but also included house officers (26%). Six medical specialties were represented with Infectious Disease being the most common (46%). Saturation of themes was noted by both reviewers after 15 interviews were analyzed.

The primary themes identified were as follows: successful trainees were noted to be 1. self-motivated 2. adaptable to a resource limited setting, 3. culturally competent and 4. fostered ongoing personal and professional relationships with Ugandan clinicians. When discussing challenges with EAMT the following themes were identified: lack of coordination between EAMT home institutions and host institutions, poor communication by administrators with medical wards hosting EAMTs and lack of clear objectives and expectations for EAMT.

CONCLUSIONS: In this study of Ugandan clinician perceptions of international trainees, the primary themes associated with successful EAMT were related to self-motivation to participate actively in patient care and adaptability to a resource limited settings. While additional research is required, these findings should help to inform pre-departure curricula for EAMT's. Additionally, our findings highlight the importance of communication between institutions participating in global rotations as well as between exchange program administrators and supervising clinical staff.

LEARNING OBJECTIVE #1: Demonstrate cultural competency and collaborate with clinicians in a global setting

LEARNING OBJECTIVE #2: Learn about patient care and management in a resource limited environment

POCUS CURRICULUM FOR INTERNAL MEDICINE RESIDENTS: USING SOUND WAVES TO AMPLIFY THE EXAM

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BACKGROUND: Internationally, point-of-care ultrasound (POCUS) has become a major competency in internal medicine residency programs.^{1,2} However, in the United States, POCUS has not yet been adopted as an ACGME requirement for internal medicine programs, although other programs have mandated the training. Several internal medicine societies have released position statements on the usefulness of POCUS for internists to improve diagnostic accuracy.³ Ultrasound improves patient satisfaction and procedural outcomes and should be initiated earlier and integrated into current training.⁴ We hypothesized that a longitudinal, spaced-learning curriculum would result in improved ultrasound knowledge and competency.

METHODS: We performed a prospective observational study assessing the efficacy of a longitudinal POCUS curriculum in a large Internal Medicine residency program from July 2019 through June 2020. Participants completed a pre/post-intervention knowledge-based examination that reviewed demographics, needs assessment, knowledge of ultrasound physics, procedural use, image acquisition and interpretation. The intervention consisted of twelve 50-minute didactic sessions held during their academic half day followed by hands-on learning. Pearson's chi-square test was performed to determine differences in proportions between pre/post-intervention categorical questions, whereas a two-sample t-test was performed to evaluate differences in questions based on a 5-point likert scale.

RESULTS: Of the 104 categorical and combined medicine-pediatrics and medicine-psychiatry residents, 78 (75%) residents participated in the pre-test and 66 (63%) in the post-test. Using a 5-point likert scale, there was a statistically significant increase in resident confidence from 2.1 to 3.0 ($p<0.01$). Mean knowledge scores (% of questions correct) increased from 38% to 75% ($p<0.01$) for the US physics and probe use, 35% to 52% ($p<0.01$) for procedure use, 12% to 50% ($p<0.01$) for image acquisition, and 12% to 60% ($p<0.01$) for image recognition. Statistically significant increases in correct answer responses were seen for each individual question of the assessment ($p<0.01$).

CONCLUSIONS: Internal medicine residency programs should consider the addition of point-of-care ultrasound to their current curriculum. A longitudinal, spaced-learning curriculum specifically showed significant improvements in residents' knowledge, practice and overall confidence. Limitations include limited resources, lack of trained faculty, decreased hands-on training during COVID and difficulty with developing an imaging portfolio. Future directions include adding simulation and a more accessible online curriculum.

LEARNING OBJECTIVE #1: Examine the gap in the Internal Medicine Graduate Medical Education curriculum with a needs assessment for point-of-care ultrasound (POCUS).

LEARNING OBJECTIVE #2: Implement and analyze the efficacy of a longitudinal, spaced-learning POCUS curriculum with didactic and hands-on instruction.

RAPID RESPONSE CURRICULUM: A GUIDE TO IMPROVING RESIDENT PERFORMANCE IN MEDICAL RAPID RESPONSES

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BACKGROUND: At Northwell Health, internal medicine residents are expected to competently lead medical rapid responses in collaboration with critical care nurses and respiratory therapists. The residents practice their skills for running rapid responses through simulation training sessions. Because these simulation sessions occur sporadically throughout the year, there is concern that first-year internal medicine residents (interns) do not feel adequately prepared to assist the senior residents who lead these rapid responses. A literature review revealed that several articles focused on simulation training for medical rapid responses, but there is a paucity of studies showing the effect of additional educational resources.

METHODS: A needs assessment was conducted of internal medicine residents (PGY1-3) which included a global survey of preparedness to participate in a rapid response as well as a post simulation session survey on the need for further education on medical rapid response training for interns. Based on the responses, three educational modules were created focusing on the topics most requested by the survey respondents. Modules were interactive and web based.

The modules were distributed to the following year's intern class with pre- and post-curriculum surveys.

RESULTS: To date 40/62 (65%) interns have completed the modules. Of the survey respondents, 97.5% agreed that the modules were beneficial to their rapid response training, 97% felt more prepared to assist during a rapid response, and 97.5% felt they developed a deeper understanding of how to assess and diagnose a patient during a rapid response.

CONCLUSIONS: Internal medicine residents, early in their residency training, have a need for additional educational resources for medical rapid response training. The rapid response curriculum modules we introduced served as an effective learning tool to improve intern medical knowledge and confidence as members of the rapid response team and supplemented an already existing simulation curriculum.

LEARNING OBJECTIVE #1: To determine if introducing educational modules for rapid response training to complement existing simulation training would further solidify intern medical knowledge.

LEARNING OBJECTIVE #2: To determine if introducing educational modules for rapid response training will increase intern confidence in serving as part of the rapid response team.

REPORT: A REALISTIC, INTERACTIVE WAY TO LEARN DIAGNOSTIC REASONING WITH PEERS

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BACKGROUND: Morning report is a favored and foundational curricular element of medicine and pediatric residency training programs across the country¹. While the interactive nature of report likely contributes to its favorability²⁻³, the specific features of resident report which make it a successful or useful clinical learning activity remain to be distinguished. In a busy and continuously changing clinical environment, understanding the constructive and detrimental aspects of resident report will enable training programs to enhance this and other curriculum to best meet the needs of their learners and their patients. The aim of this study is to understand the value of resident report in the context of residency training and patient care and to identify opportunities for enhancing key elements of report and replicating them elsewhere.

1. Ways M, Kroenke K, Umali J, Buchwald C. Morning Report. A survey of resident attitudes. *Arch Intern Med.* 1995;155:1433-7.

2. Parrino T. The Social Transformation of Resident Report. *J Gen Intern Med.* 1997;2:332-3.

3. Parrino TA, Villaneuva AG. The principles and practice of morning report. *J Gen Intern Med.* 1997;12:332-3.

METHODS: Focus groups and observations were conducted in three specialties at a single academic institution: pediatrics, neurology, internal medicine. We used a qualitative, constructivist, grounded theory approach to analyze the transcript and observation data. Data were reviewed, preliminarily coded and grouped, and then coded in-full by two study members using constant comparison and iterative modifications as needed by the data. HyperRESEARCH™ software was used to group ideas and develop themes.

RESULTS: Data analysis identified three primary themes: (1) Report is valued over other conference types because of its practical and real-life application and its structured interactivity. (2) A major driver of resident motivation to come to report is the casual environment and the opportunity to interact with peers and faculty. (3) The primary learning that occurs in report is diagnostic reasoning.

CONCLUSIONS: This study demonstrates key characteristics that have contributed to resident report's steadfast presence in resident education. The stepwise unraveling of real patient cases encourages a robust diagnostic discussion which broadens ideas, enables the sharing of approaches to various case presentations and allows the learner to self-assess their learning needs. The informal nature of report enables residents to contribute ideas and ask questions in a way that they might not feel comfortable in the clinical space or in other conferences. Each of these critical components of report may be enhanced or suppressed by the facilitation skills of those present.

LEARNING OBJECTIVE #1: Describe key characteristics of report that residents value.

LEARNING OBJECTIVE #2: Describe aspects of report which are perceived to enhance resident learning.

RESIDENT VIEWPOINTS ON AMBULATORY CURRICULUM AND TEACHING MODALITIES AT AN ACADEMIC CENTER

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BACKGROUND: Despite changes and innovations in ambulatory curriculum among internal medicine residency programs in recent years, there is a paucity of data on residents' preferences for ambulatory teaching modalities, opportunities to teach, and plans to be involved in education in the future. Given most internal medicine graduates will practice in an ambulatory setting, aligning training modalities with resident preferences is important to maximize ambulatory education.

METHODS: In July 2020, we surveyed residents (n=191) in a university-based, internal medicine residency program to assess their preferred ambulatory education modalities, viewpoints on ambulatory education, teaching opportunities in clinic, and career plans in education. Resident preferences were measured on a 4-point Likert scale and analyzed for comparison.

RESULTS: A total of 85 residents (45%) across all training levels, clinic sites, and educational tracks completed the survey. Forty-nine percent (n=42) of respondents stated that ambulatory education was "extremely" or "very important" to their future careers. Across all training tracks, residents favored primary care attendings (n= 66, 78%) to deliver ambulatory education over fellows, sub-specialty attendings, and chief residents. Furthermore, cold-cases (40%, n=34) and in-person lectures (29%, n=25) were preferred over online modules, virtual lectures, and journal clubs. Nearly all respondents stated they want to teach, indicating either that they "want teaching to be a large part of my career" (49%, n=41), or "I would like to incorporate some teaching into my practice" (49%, n=41). Despite this, 38% (n=32) of respondents stated they "never" had time to teach in clinic and 43% (n=36) felt they were unprepared to enter a career as a medical educator.

CONCLUSIONS: This survey adds unique data on resident preferences on ambulatory education at a large, academic center. Importantly, residents clearly prefer in-person teaching from primary care attendings over other teaching modalities. While the COVID-19 pandemic has limited these opportunities, this may indicate a need to return quickly to in-person learning once safe, despite the conveniences of virtual education. Furthermore, this study demonstrates a paucity of opportunities for internal medicine residents to teach in a clinic-based setting, despite the intention of the majority of residents in our program to teach during their career. Opportunities for senior residents to precept in clinic and workshops to focus on resident teaching in the ambulatory setting may help fill this gap. Further work should be directed towards educational initiatives that align with resident ambulatory teaching preferences.

LEARNING OBJECTIVE #1: Assess resident preferences on ambulatory education modalities at a large, academic center (Interpersonal Skills and Communication).

LEARNING OBJECTIVE #2: Identify residents' educational career plans and align teaching modalities to better fit these goals. (Practice-Based Learning and Improvement)

STUDENT AND FACULTY PERCEPTIONS OF BEST PRACTICES FOR AMBULATORY PRECEPTING IN LONGITUDINAL INTEGRATED CLERKSHIPS: A MULTI-SITE QUALITATIVE STUDY

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BACKGROUND: Longitudinal integrated clerkships (LICs) are growing in popularity in part due to their benefits in leading to sustained

improvements in patient-centeredness and empathy among medical students. Continuity of relationships with preceptors and patients and creation of authentic roles in patient care are proposed mechanisms of learning in LICs; effective precepting strategies that support these proposed mechanisms and optimize learning in the LIC model have not been well-characterized.

METHODS: A qualitative study of five student and eight faculty focus groups drawn from participants at two longitudinal integrated clerkships sites within the University of Colorado School of Medicine (CUSOM) was conducted to describe precepting best practices. Faculty participants included representatives from pediatrics, internal medicine, family medicine, psychiatry, emergency medicine, and obstetrics/gynecology. Focus groups were analyzed by five investigators using an inductive phenomenological framework.

RESULTS: Five best practice themes were identified: 1) Teaching strategies cognizant of the learning trajectory of LIC students; 2) Intersession teaching included supported self-directed learning, feedback, and ongoing dialogue about patient care; 3) Intentional precepting practices to integrate students in healthcare teams and empower them in longitudinal care of patients; 4) Goal setting and feedback adapted to the LIC structure by way of shifting frequency and duration of feedback sessions; 5) Shared map of longitudinal markers to guide expectations, goal setting, and feedback in the LIC. A sixth theme centered on discrete opportunities for faculty development including training on the LIC model and strategies to support student-patient continuity.

CONCLUSIONS: Teaching and learning in an LIC model poses unique challenges and opportunities. Experiences for both students and faculty can be optimized by intentional precepting practices that take advantage of the longitudinal and dynamic interplay between students, preceptors, healthcare teams, and patients. An understanding of impactful precepting practices unique to the LIC can inform faculty development for clinician educators precepting in LICs.

LEARNING OBJECTIVE #1: Identify strategies of effective preceptors for optimizing learners' clinical education in longitudinal integrated clerkships.

LEARNING OBJECTIVE #2: Describe targeted faculty development opportunities for faculty precepting in longitudinal integrated clerkships.

TELEMEDICINE TRAINING IN THE COVID ERA: ADAPTING A ROUTINE OSCE AND IDENTIFYING NEW CORE SKILLS FOR TRAINING

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BACKGROUND: During the rapid onset of the pandemic, clinicians transitioned from traditional outpatient practice to telemedicine for triaging COVID-19 patients and providing routine care to patient panels. Telemedicine training and assessment had not been systematically incorporated into most residencies. In response, a scheduled Internal Medicine (IM) Objective Structured Clinical Examination (OSCE) was adapted to a telemedicine-emphasized, virtual modality to become a just-in-time learning experience for trainees.

METHODS: Remote cases deployed on common web-based video conference platform included; (1) a potential COVID-19 triage, (2) educating on buprenorphine maintenance, (2) counselling on mammogram screening, and (3) addressing frustration with electronic health record documentation. Simulated Patients (SPs) rated residents on communication skills, patient activation and satisfaction, and case-specific telemedicine items. Analyses included a comparison of domain scores (mean % well done) for residents who participated in both the 2020 remote and 2019 in-person OSCEs, and a review of written resident feedback.

RESULTS: Fewer than half (46%) of 2020's residents (n=23) performed well on the COVID-19 case's telemedicine skill domain. Residents excelled in using nonverbal communication to enrich on-camera communication (100%), but struggled with virtual physical exams (13%), gathering information (4%), and optimizing technology (4%). Residents expressed interest in more opportunity to practice telemedicine skills going forward.

Residents' overall COVID-19 knowledge was fair (54% of items were rated as 'well done'). Fewer than half (45%) advised the SP that testing was not available at the time, but that he should call the city hotline for information, and about half (55%) provided quarantine/ home care instructions.

In comparing 2020 (virtual) to 2019 (in-person) OSCE scores, residents who participated in both assessments (n=9) performed similarly on communication skills including information gathering (84% vs. 83%), and relationship development (93% vs. 92%), patient satisfaction (72% vs. 80%) and activation (65% vs. 66%). Patient education scores were significantly lower during the virtual OSCE (40% vs. 76%, P=.008).

CONCLUSIONS: Our reformulated OSCE accomplished three goals: (1) physically distancing residents from SPs, (2) providing residents the opportunity to practice critical telemedicine skills, and (3) alerting our educators to curricular improvement areas in virtual physical exam, patient education, gathering information and optimizing technology. Our methods are scalable at other institutions and have applications to the larger medical and clinical education community.

LEARNING OBJECTIVE #1: Describe challenges and barriers to effective communication and clinical skill utilization during televisits.

LEARNING OBJECTIVE #2: Understand resident physician practice patterns and communication regarding infectious disease.

THE HYPOTHESIS-DRIVEN PHYSICAL EXAM FOR COMMON INPATIENT PRESENTING SYMPTOMS

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BACKGROUND: Medical education and clinical practice's emphasis on the physical exam has declined with advancing technology and diagnostics. Recently, there is renewed interest in the physical exam as an essential diagnostic and medical decision-making tool. The physical exam is classically taught as "head-to-toe," where students memorize and perform a list of maneuvers without tailoring it to patients' presenting symptoms or diagnoses. This affords the opportunity to practice the spectrum of exam skills, but does not provide context to findings or simulate the process applied by practicing clinicians. In contrast, the hypothesis-driven physical exam (HDPE) involves predicting and recognizing specific exam findings to create and refine differential diagnoses, making it more adaptable and useful for developing clinical reasoning skills. Yet, there lacks consensus regarding the essential HDPE elements. While existing evidence-based resources provide data on the predictive value of isolated exam findings for specific diagnoses, it is difficult to translate into clinical practice and medical education.

METHODS: We reviewed 118 inpatient admission notes from 67 3rd year medical students at a single institution from January-July 2017, identifying each note's chief complaint. Based on expert clinical experience and literature review, we made a list of common associated diagnoses and exam maneuvers for the 4 most common complaints. We conducted a 2-round modified-Delphi survey of physical diagnosis educators to establish a consensus list of maneuvers. Experts were asked to rate the maneuvers' importance during initial exam for a specific chief complaint and identify maneuvers to be performed in a hypothesis-driven manner for specific diagnoses. Mean importance ratings were calculated and exam maneuvers identified for HDPE were noted.

RESULTS: 9 chief complaints were identified. Four (shortness of breath, chest pain, upper and lower abdominal pain) comprised 64% of all complaints. The 4 chief complaints formed the Delphi survey's basis. Of the 31 experts invited to participate, 87% (27) completed the 1st round; 91% (20/22) completed the 2nd round. 7 maneuvers received a mean importance rating >4 for shortness of breath, 9 for upper abdominal pain, 10 for lower abdominal pain, and 7 for chest pain. The majority of maneuvers for each chief complaint were rated >3. Maneuvers identified for specific diagnoses were highly variable.

CONCLUSIONS: We were unable to obtain local consensus through a 2-round modified-Delphi survey on HDPE for common inpatient chief complaints and diagnoses. This outcome may reflect the challenge in identifying the most important exam maneuvers for particular diagnoses without readily

available evidence to support maneuver selection and variability in clinical practice. Future efforts should explore alternatives for obtaining consensus.

LEARNING OBJECTIVE #1: Apply physical exam principles in a new way to augment patient care.

LEARNING OBJECTIVE #2: Learn a new approach to teaching medical students the physical exam.

THE SPACE BETWEEN: ASSESSING ROLE IDENTITY FORMATION AND ATTITUDES TOWARDS HEALTH SYSTEMS SCIENCE AMONG MEDICAL STUDENTS PURSUING PRIMARY CARE CAREERS

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BACKGROUND: Health system science (HSS), or the principles, methods, and practice of healthcare delivery, has been identified as the third pillar of medical education with basic science and clinical science. Studies show that there is mixed medical student receptivity to and satisfaction with HSS education, but there has been limited research of perceptions of HSS among medical students interested in primary care careers. The purpose of this study was to assess attitudes, perceptions, and role identity formation of HSS including telehealth, interdisciplinary teams, and population health in medical students interested in primary care.

METHODS: A Primary Care and Health Systems Science elective was developed as a core requirement of a newly developed Primary Care Pathway program at our medical school. Students (n=17) participating in the elective in January 2020 were surveyed and participated in one of 3 focus groups held on day one. Surveys were anonymous and assessed baseline perceptions of the value of different HSS domains for the Primary Care Physician (PCP). Focus group questions focused on the role identity of the PCP, the role of the PCP as it pertains to HSS, and opportunities for improved HSS training. Initial themes that arose were categorized and formal qualitative analysis is underway. This study was approved by the IRB.

RESULTS: All students (n=17) completed the survey and participated in the focus groups. 88% of students felt that HSS was part of the PCP role (median 4), 94% felt HSS was important (median 4), and 82% felt excited about HSS (median 5). In open-ended comments students felt their ideal primary care job would provide them autonomy, work life balance, with dedicated time to pursue professional passions, whether that be quality improvement work, advocacy, or working with vulnerable populations. In the interviews, students expressed they had minimal exposure to HSS, but recognized its importance and potential to both improve quality of care and complicate the physician-patient relationship. In terms of professional role identity, students developed their understanding of the PCP's role by seeing care lapses resulting from a lack of primary care rather than from direct clinical experiences. Students also perceived that the growing focus on population health creates a tension between individual patient relationships and the PCP's responsibility to care for a wider panel of patients.

CONCLUSIONS: Despite limited experience with HSS, post-clerkship medical students pursuing primary care careers feel that components of HSS including telehealth, panel management, and working in interdisciplinary teams are important elements of the PCP role, and that they need more training in these areas.

LEARNING OBJECTIVE #1: Assess medical student attitudes towards health systems science as part of the primary care provider's role identity through a mixed method research study.

LEARNING OBJECTIVE #2: Identify opportunities within medical education to shape the primary care provider's role identity to include health systems science.

THE USE OF PODCASTS AS A TOOL TO IMPROVE CLINICAL REASONING: A PSEUDORANDOMIZED AND CONTROLLED STUDY

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BACKGROUND: Several academic institutions have emphasized the need for better training in medical-decision making, stimulating national efforts focused on clinical reasoning (CR) education. Podcasts have emerged as a time-efficient, portable method for widespread delivery of educational content. Several CR-focused podcasts use example-based learning (EBL) by exposing listeners to the medical decision-making process of an expert, however, the impact of such podcasts on learners' CR skills has not been established. We set out to determine whether exposure to expert reasoning in a podcast format leads to enhanced CR skills.

METHODS: Podcasts were developed from four "clinical unknown" cases presented to expert clinician educators. Discussants were prompted to "think out loud" and discuss core elements of CR: problem representation, prioritized differential diagnoses, illness scripts, and cognitive biases. Third-year medical students rotating on their 8-week internal medicine clerkship were pseudo-randomized to complete either pre-established online CR modules, or both the online modules and the novel podcasts in weeks 1&2. Student hospital admission notes for weeks 3-7 were collected, de-identified, and assessed for reporting, diagnostic reasoning, and decision making via the validated IDEA rubric. A longitudinal regression model was used to compare groups.

RESULTS: In total, 90 control and 128 intervention admission notes were scored. Over 70% of the intervention group reported listening to the entirety of the four podcasts. Out of 45 total points, mean IDEA scores for the control group were 35.2 and 32.4 at weeks 3 and 7, respectively, while scores for the intervention group were 33.7 and 35.0 at weeks 3 and 7. In regression analysis, there were no significant differences in mean IDEA scores between the two groups at any time point during the study period ($p=0.49$). Participants in the intervention group were more likely to identify discussion of CR principles by their ward attendings (3.2/5 vs 2.5/5, $p=0.05$) and reported that the podcasts improved acquisition of knowledge (3.0/5), application of clinical reasoning skills (3.4/5), and expressed that they were likely to listen to podcasts in the future.

CONCLUSIONS: In this novel evaluation of clinical reasoning podcasts, we found no significant impact on written clinical reasoning skills in 3rd year IM clerkship students. Despite this, increased recognition of clinical reasoning principles by participants suggests that podcasts may have an important role in priming learners to recognize and appreciate clinical reasoning concepts in the clinical context. Podcasts appear to be a viable, well-received, asynchronous tool for medical education, and further exploration of their potential role in fostering the development of clinical reasoning skills is warranted.

LEARNING OBJECTIVE #1: Evaluate the impact of podcast-delivered case-based discussions on clinical reasoning via written assessments.

LEARNING OBJECTIVE #2: Assess the usage/perception of novel asynchronous podcasts in medical trainees.

TRANSFORMATIVE LEARNING DURING THE COVID-19 PANDEMIC: A CROSS-SECTIONAL SURVEY OF TRAINEES AT AN ACADEMIC MEDICAL CENTER

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BACKGROUND: The novel coronavirus pandemic (COVID-19) had a transformative effect on the lives of individuals across the world. Those on the healthcare front lines were uniquely affected. Transformative learning (TL) is an educational theory in which an individual's worldview is fundamentally altered through conscious reflection (Cognitive), insights (Extrarational), or social reform (Social Critique). Through the lens of the COVID-19 pandemic,

we utilized transformative learning theory to characterize the experiences of medical students and more advanced learners.

METHODS: We used the Transformative Learning Survey, a convergent mixed-methods data collection tool designed to evaluate the processes and outcomes of TL to compare how COVID-19 led to TL in health professions students and housestaff at our medical center. We analyzed TL scores for 3 process domains (Cognitive, Extrarational, Social Critique) and one outcome domain (TL). If a process domain showed a significant ($p < 0.05$) difference between the groups, we then examined the sub-processes within that domain. Our quantitative hypothesis was that students and housestaff varied in how TL was experienced. For our qualitative analysis, we inductively coded the survey's two open-ended questions.

RESULTS: Students were more likely than housestaff to undergo TL due to COVID-19 through the Social Critique process ($p = 0.025$), in particular the sub-processes of Social Action ($p = 0.023$) and Ideology Critique ($p = 0.010$). No significant differences were observed within the Cognitive or Extrarational processes or for the outcome of TL. In our qualitative analysis, four major content areas emerged: (1) Negative transformation included changes to daily life, educational and financial stressors, and social isolation. (2) Reliance on technology, investment in oneself, and time spent with others in isolation resulted in positive transformation. (3) COVID-19 brought awareness to social pressures on medical experts, policy-makers, and the healthcare system. (4) Multiple respondents did not feel the pandemic was transformative.

CONCLUSIONS: Through the theoretical lens of transformative learning, our study provides insight into the lives of learners at our medical center during COVID-19. Our finding that medical students were more likely to use Social Critique has multiple parallels in the literature. One proposed explanation is that the clinical load of residency may diminish housestaff interest in social reform. If leaders in academic medicine truly desire to create enlightened change agents through transformative learning, such education must continue after medical school, throughout graduate medical education, and beyond.

LEARNING OBJECTIVE #1: Apply transformative learning theory to the experiences of undergraduate and graduate medical learners during the COVID-19 pandemic.

LEARNING OBJECTIVE #2: Examine how social justice is taught in medical education, in particular what influence the transition from medical school to residency has on retention of these knowledge, skills, and attitudes.

VALIDATION OF THE COMPREHENSIVE CLINICAL SKILLS EXAM (CCSE) MEASUREMENT MODEL

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BACKGROUND: Performance-based assessment & feedback during medical training is essential for a successful transition before moving onto residency and independent clinical practice. Learners at New York University's School of Medicine (NYUSOM) participate in a routine comprehensive clinical skills examination (CCSE) that takes place at the tail end of medical school. During this exam, learners interact with standardized patients (SPs) and are rated on specific skills using a standardized checklist, measuring important clinical skills domains. NYUSOM has utilized the same assessment tool since 2005. To date, there is limited evidence on the tool's validity and ability to differentiate among students. We sought to provide evidence for its reliability, validity, and generalizability.

METHODS: 1157 learners participated in the CCSE from 2011-2019 and were included in the analysis. Communication domain items assessed included patient education (3 items), relationship development (4 items), information gathering (6 items) and organization/ time management (3 items). Items were scored using a 3-point behaviorally-anchored scale (not, partly, or well done). In order to determine the degree to which the data mapped onto our theoretically-informed communication domains, we conducted a four-factor confirmatory factor analysis (CFA) allowing for factors to correlate (oblique rotation) and using means and variance adjusted weighted-least squares estimation (WLSMV) in order to account for the ordered categorical nature of the communication items. Model fit was assessed using root mean square of

approximation (RMSEA) < 0.08, comparative fit index (CFI) > 0.95, and standardized root mean square error (SRMR) < 0.08.

RESULTS: The model fit the data using RMSEA (0.04), CFI (0.98), and SRMR (0.05). All factors were significantly correlated with one another ($p < 0.05$), with the largest correlation between patient education and organization/time management (0.86), and information gathering (0.77). The smallest correlation was between organization/time management and information gathering (0.66). All items (factor loadings) significantly loaded on the factors they measured. Only one item had an insignificant threshold loading between partly and well done, suggesting this part of the response scale may be hard for SPs to differentiate between students with varying ability on this item. Each factor had at least one item that had a factor loading less than 0.7.

CONCLUSIONS: The analysis suggests each item on the communication checklist significantly measures domains they were designed to measure, and that items can be summated to compute overall scores. Domains had one item with a lower loading than the rest, suggesting these items may be measuring something different. Follow up measurement modeling and profile analysis is the next logical step in determining if there is an important sub-domain that identifies a student group operating differentially.

LEARNING OBJECTIVE #1: Understand clinical communication

LEARNING OBJECTIVE #2: Describe communication measures

WE ARE NOT ALONE: A REFLECTIVE CLINICAL MEDICINE WORKSHOP FOR THIRD-YEAR MEDICAL STUDENTS

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BACKGROUND: Reflective writing has been increasingly incorporated into pre-clinical medical education as a means to increase empathy and encourage well-being. Not all students inherently enjoy writing, and many may not have the opportunity to debrief on emotionally charged experiences with classmates. We introduced a mandatory reflective exercise for third-year medical students in the inpatient medicine clerkship that included a peer-driven discussion. We then assessed the students' experience and the thematic content of their pieces.

METHODS: Students created a reflective piece regarding their experience on the clerkship. Submissions could be prose, poetry, photography, or any other expressive form. Reflective pieces were subsequently distributed to the clerkship cohort who met for an hour-long, student-driven discussion about the pieces with assistance from a faculty moderator. Following the discussion, students completed an anonymous survey regarding workshop perceptions. We used qualitative content analysis to explore themes within students' reflective pieces. The themes were selected from a previously published qualitative assessment of students' reflective writing. The pieces were reviewed by two of the authors and a third author resolved any differing selections.

RESULTS: 91 students completed the workshop with an 82% survey response rate. 38% of students had never before used creative techniques as a form of professional reflection. Students found the small-group discussion more enjoyable than the creative process (72% vs 39%). They noted the "open and honest," "cathartic" discussion as a strength, with one student commenting, "...revealed that we are often not alone in our emotions regarding our experience in the clerkship." In content analysis, 44% of the pieces focused on relational issues, 32% on medical care, 22% on personal issues, and 11% on professional development. Common subthemes were death and dying (13%), communication with patients (12%), the physician-patient relationship (12%), and the student role (10%).

CONCLUSIONS: By a sizeable margin, students found the subsequent small-group discussion more valuable than the creative process itself, implying that reflective exercises are more constructive in conjunction with sessions that provide an opportunity for students to debrief and receive support from peers. The focus on certain themes suggests that clerkship students may benefit from formal debriefing opportunities regarding these topics, and institutions should assess their curriculum to assure they are addressed. Consideration should be given to adding peer discussion groups to open-form reflective workshops as a means of supporting students during this crucial time in their professional development.

LEARNING OBJECTIVE #1: To learn the value of adding a peer-driven discussion group to reflective workshops for medical students to aid in interpersonal communication skills.

LEARNING OBJECTIVE #2: To understand the underlying themes that medical students chose to reflect on as they form their professional identities.

WHY DON'T MORE WOMEN CHOOSE CARDIOLOGY? INTERVIEWS WITH FEMALE INTERNAL MEDICINE RESIDENTS

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BACKGROUND: In 2018, about 43% of third year medicine residents were women, but only 26% of cardiology first year fellows were female. Given lack of data on the transition from residency to fellowship, we sought to understand what barriers preclude female medicine residents from pursuing cardiology fellowships.

METHODS: We performed a qualitative study using semi-structured interviews to explore the knowledge, attitudes and beliefs of female medicine residents regarding cardiology. Female medicine residents from five local training institutions were recruited by email. A female medicine attending consented and interviewed each volunteer. The interview was about 75 minutes and addressed career and personal goals, experiences with cardiology, and gender inequities. Notes were taken and the interviewer summarized the main participant's responses as a form of member checking. The research team discussed and analyzed interview notes for themes using an iterative process. This study was approved by the local IRB. It was closed early due to the COVID pandemic.

RESULTS: Five PGY2 residents from two different programs were interviewed. Seven themes were identified: mentoring, research support, the impact of fellows on resident experience, negative perceptions of cardiology, sexually offensive comments and behavior, the gender pay gap and work-life balance. The need for facilitated mentoring and research were major themes. Many of the female residents described a desire to pursue cardiology in medical school but were unable to find mentors in residency. The residents' perceptions of cardiology were consistently unfavorable. A lack of teaching, older and largely male faculty, and unwelcoming fellows contributed to this perception. The residents interviewed were aware of how gender impacted their career. They described being perceived as less competent than male colleagues and being subjected to inappropriate behavior by patients. The female residents struggled with the anticipated pay gap, being judged for child-bearing and unequal balance of work at home.

CONCLUSIONS: In this qualitative study exploring gender disparities in cardiology, we identified potential barriers and opportunities. Several themes have previously been identified in the literature including lack of mentorship. Our findings indicate that there is still work to be done to match female residents with mentors and research opportunities, which might be helped by partnerships across institutions. Fellows play a key role in residency training and should be encouraged to mentor residents. The themes of sexual harassment and the gender pay gap provide areas for educational interventions to equip female residents with the tools to combat harassment and skills related to financial literacy. The major limitation of this study is small sample size.

LEARNING OBJECTIVE #1: Understand the barriers that preclude female medicine residents from pursuing cardiology fellowship

LEARNING OBJECTIVE #2: Propose strategies to overcome barriers for female medicine residents pursuing cardiology fellowship

"WILL I EVER BE GOOD ENOUGH?": A QUALITATIVE STUDY OF IMPOSTOR PHENOMENON AMONG INTERNAL MEDICINE RESIDENTS

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BACKGROUND: Impostor Phenomenon (IP) is a destabilizing internal experience characterized by feelings of inadequacy, fraudulence, and self-doubt; it is highly prevalent in medicine. IP is associated with burnout, anxiety, and depression. This study explores IP experiences among Internal Medicine residents.

METHODS: One-on-one, semi-structured interviews with a convenience sample of 28 Internal Medicine residents from Johns Hopkins Bayview were conducted from May-June 2020. Data was abstracted from the interview transcripts with adherence to the Framework Method. Transcripts were coded for meaningful segments of text reflective of IP. Participants also completed the Clance Impostor Phenomenon Scale (CIPS).

RESULTS: Study participants were mostly female (75%), and the mean age was 30 years. Six (21%) PGY1s, twelve (43%) PGY2s, and ten (36%) PGY3s participated. The average CIPS score was 62, indicating frequent IP experiences. Four major categories of thematic content emerged from transcript analysis. First, cognitive distortions are indicative of IP. Participants described powerful and persistent feelings of inadequacy related to knowledge, clinical decision making, procedural skills, leadership, and teaching. Self-deprecating thoughts and fears of 'not being enough' were common. IP was driven by self-comparisons with colleagues and unrealistic self-expectations. Second, systems and situations perpetuate IP. Participants associated IP with stressful situations such as ICU rotations, running codes, transitioning to new roles, and increasing responsibilities. IP was exacerbated by hierarchy, inadequate supervision, and confrontation with colleagues and attendings. Third, supportive relationships can minimize IP. Participants were less prone to self-criticism after talking with residents who shared similar struggles. Mentorship, attending role modeling uncertainty and vulnerability, and emphasis on relationships over medical hierarchy also increased confidence. Fourth, individual strategies can also mitigate IP. Participants were able to moderate impostor feelings by cultivating a growth mindset. This was aided by focusing on process versus outcome, challenging fixed expectations, embracing uncertainty and reflecting on prior successes.

CONCLUSIONS: This study describes the context, impact, and adaptive responses of residents experiencing IP. The new insights highlight approaches about how to minimize damaging IP sentiments from the individual and systems perspectives. IP should be openly discussed with residents, and trainees should be coached about the value of adopting a growth mindset throughout their career. Medical educators should create safe and supportive clinical learning environments by role modeling uncertainty, minimizing hierarchy, and helping trainees recognize their successes.

LEARNING OBJECTIVE #1: Describe the lived experience of a medical trainee impacted by impostor phenomenon

LEARNING OBJECTIVE #2: Elucidate the individual and environmental influences associated with impostor phenomenon during medical residency

Scientific Abstract - Medical Ethics, Professionalism, and Humanities

EXPLORING THE PROFESSIONAL IDENTITY OF EXEMPLARS OF MEDICAL PROFESSIONALISM

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BACKGROUND: A core responsibility of medical educators is to foster a strong sense of medical professional identity (PI). Few studies specifically examine the qualities that constitute the PI of physicians recognized for exemplary professionalism. We describe those qualities based on an assessment of PI to inform educational efforts and support learners' development of PI.

METHODS: We used Colby and Damon's criteria for selection of moral exemplars (1992) to invite nominations of exemplary faculty physicians at NYUGSOM from faculty and trainees. Participants completed the Professional Identity Essay (PIE), a 9-question reflective writing measure based on a well-

known model of adult development that explores meaning making on PI (Bebeau & Lewis, 2004; Kegan, 1982, 1994). Two raters with extensive training and experience in adult developmental theory rated PIE responses for stage or transition phase. PI stages include independent operator, team-oriented idealist, self-defining, and self-transforming. These stages reflect increasing complexity and internalization of PI. We also gathered information on specialty, years in practice, gender, and race/ethnicity.

RESULTS: Two hundred and twelve faculty were nominated; 35 were invited to participate (based on number of nominations, diversity of ages, backgrounds and career stage), and 21 completed scorable PIEs. They were from 13 specialties; mean career length was 21.5 years (range 6-45), and 35% were female. All but 2 were Caucasian. PIE scores ranged from 3 to 4.5 (Table 1), demonstrating differing and increasingly complex and internalized ways faculty understand their PI, and that not all nominated exemplars share a singular view of professionalism.

CONCLUSIONS: Physicians nominated as exemplars of professionalism embody a range of professional identities and professionalism world-views. Our study provides rich descriptions of multiple pathways to strengthening a physician's professional identities, of critical importance to faculty and physician development in a milieu of challenges to recruitment and retention of physicians. This approach can also inform educators' efforts to support PI development in learners and support the development of learning communities that foster a growth mindset.

LEARNING OBJECTIVE #1: Recognize importance of strong role models for MPI.

LEARNING OBJECTIVE #2: Describe the varying levels of MPI in a cohort of exemplar physicians.

MASKS AND THE HEARING IMPAIRED: AN ETHICAL QUAGMIRE

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BACKGROUND: COVID-19 continues to radically alter healthcare delivery around the world. Face masks, utilized for millennia to communicate cultural values, are now mandatory within all healthcare settings to decrease transmission of SARS-CoV-2 (1). Despite their public health benefits, masks may impact communication and generate ethically complex situations when caring for partially deaf patients (2). The tension between the necessity to decrease risk of infection and the obligation to sufficiently communicate with patients who rely on lip reading has potential to create moral injury among healthcare workers (HCWs).

METHODS: We explore the positive and negative externalities of mask use in caring for the hearing impaired.

RESULTS: In the United States, 15% of adults report hearing difficulty and greater than 50% of adults older than 75 suffer from hearing loss (2). Many hearing-impaired individuals rely on lip-reading to communicate (3). The American Speech-Language and Hearing Association (ASHA) and the National Institute on Deafness and Other Communication Disorders (NIDCD) acknowledge that masks exacerbate communication difficulties in this population (4,5). When comprehension is impaired, patients are at increased risk of isolation and misinterpretation of medical information (6,7,8). The American College of Physicians' Charter on Medical Professionalism underscores the primacy of patient welfare and patient autonomy, which rests upon adequate communication (9). When caring for hearing impaired patients, mask use illustrates a tension between the ethical principles of beneficence and non-maleficence. HCWs must choose between wearing a mask to protect their patients from COVID-19 (non-maleficence) or forgoing a mask to communicate medical information (beneficence). The patient's welfare is compromised regardless of the choice. Moral injury, defined as psychological stress that arises when forced to contradict deeply held moral principles, may result from these encounters; HCWs are compelled to violate one ethical principle in order to uphold another (10).

Moral injury is linked to burnout, suicide, depression, impaired clinical decision making, and substance use disorders (11,12).

CONCLUSIONS: Mask use will remain ubiquitous in healthcare settings and public spaces for the foreseeable future. If healthcare is to remain patient-centered and clinicians are to uphold ethical principles, effective communication tools and interventions are needed to provide comprehensive care to all patients regardless of disability. Continued scholarship on mask use and its impact on healthcare delivery, communication, and culture is of utmost importance now more than ever.

LEARNING OBJECTIVE #1: Appreciate that mask use may impact healthcare workers' abilities to effectively communicate with hearing impaired patients.

LEARNING OBJECTIVE #2: Explore the ethical tension between beneficence and non-maleficence that results from mask use when caring for the hearing impaired.

Scientific Abstract - Mental Health and Substance Use

A 12-WEEK PILOT ADAPTIVE TRIAL OF TEXT MESSAGES, MAILED NICOTINE REPLACEMENT THERAPY, AND TELEPHONE COACHING AMONG PRIMARY CARE PATIENTS WHO SMOKE

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BACKGROUND: Sequential multiple assignment randomized trials (SMART) inform the design of interventions that adapt based on treatment response. We assessed the feasibility of a SMART offering primary care (PC) patients who smoke daily an initial treatment with a tailored text message (SMS) program, followed by mailed nicotine replacement therapy (NRT) with or without telephone coaching.

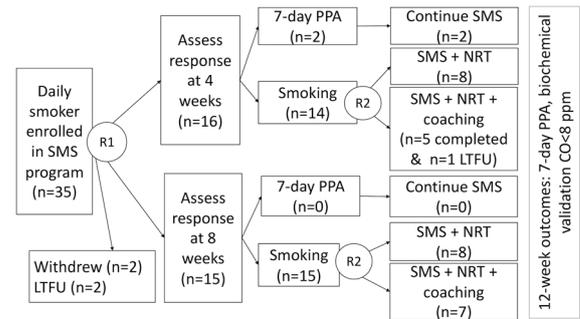
METHODS: A 12-week pilot SMART (NCT04020718) tested adaptation timing and treatments (Figure 1). Feasibility outcomes were retention and satisfaction. Preliminary clinical outcomes were self-reported and biochemically-validated 7-day point prevalence abstinence (7-day PPA).

RESULTS: During two phases of recruitment (Jan-Mar & July-Aug 2020), separated by a pandemic-related pause, we enrolled 35 patients (>18 years) from a Massachusetts PC network (mean age 53 years [sd 14], 49% female, 79% non-Hispanic white, 12% non-Hispanic black, 52% Medicaid, 42% commercial insurance, 6% Medicare, mean 16 cigarettes/day [sd 8], mean importance of quitting 9 [sd 2, 0-10 scale], mean confidence in quitting 5 [sd 3, 0-10 scale], mean past 2 week distress 7 [sd 3, 0-10 scale]). Retention at 12 weeks was 86% (30 completed, 5 withdrew/LTFU). Excluding n=4 withdrew/LTFU before R1 assessment, 6% (2/31) reported 7-day PPA with SMS alone; then 16 were randomized (R2) to NRT and 13 to NRT + coaching (mean duration 13 minutes). At 12 weeks, 20% (n=3) in 4-week assessment and 33% (n=5) in 8-weeks reported 7-day PPA, and 13% (n=2) and 27% (n=4) had CO<8ppm, respectively. Of those mailed NRT (R2), 19% (n=3) had CO<8ppm without coaching vs. 17% (n=2) with coaching. Overall, 93% (28/30) were satisfied, 87% (26/30) reported the study made them feel they knew the right steps to take to quit, and 80% (24/30) reported the study gave them confidence.

CONCLUSIONS: A SMART examining an adaptive treatment regimen for patients who had high importance but only moderate confidence in quitting was feasible. Retention and satisfaction were high and quit rates were promising at 12-weeks. While few participants quit with SMS alone, the messages may promote self-efficacy and treatment knowledge to enhance the impact of NRT and coaching.

LEARNING OBJECTIVE #1: Understand the feasibility of a pilot trial testing an adaptive smoking cessation treatment among primary care patients.

LEARNING OBJECTIVE #2: Measure preliminary smoking outcomes for an adaptive intervention combining SMS, nicotine replacement therapy and coaching.



AN ALCOHOL SYMPTOM CHECKLIST IS MORE STRONGLY ASSOCIATED WITH DEPRESSION IN PRIMARY CARE THAN AN ALCOHOL USE SCREEN

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BACKGROUND: An estimated 74% of adults treated for depression are treated in primary care. High-risk drinking and alcohol use disorder (AUD) can exacerbate depression symptoms and reduce the effectiveness of depression treatments. However, few primary care systems systematically screen for high-risk drinking and those that do almost never systematically assess AUD symptoms when patients report high-risk drinking. The objective of this cross-sectional study was to describe how the results of an alcohol consumption screen and a novel AUD symptom checklist are associated with depression symptoms when these measures were completed by patients in routine primary care.

METHODS: This cross-sectional study evaluated alcohol and depression screening scores completed by adult Kaiser-Permanente Washington patients as part of an annual behavioral health screen (N=369,943). Alcohol consumption was measured by the AUDIT-C (0-12 points) and depression was measured by the PHQ-2 (0-6 points). Patients with AUDIT-C scores 7-12 were asked to also complete a DSM-5 Alcohol Symptom Checklist on which they self-reported the presence or absence of all 11 AUD symptoms. Linear regression models evaluated whether AUDIT-C and Alcohol Symptom Checklist scores were associated with depression screening scores.

RESULTS: For the full sample, AUDIT-C scores were associated with PHQ-2 depression scores (Adjusted $R^2 = 0.01$, $p < .001$), with an AUDIT-C of 4 associated with the lowest mean depression screening score (mean PHQ-2 = 0.81) and an AUDIT-C of 12 associated with the highest (mean PHQ-2 = 2.69). In patients with AUDIT-C scores 7-12, who subsequently completed Alcohol Symptom Checklists, four times the amount of variance in depression screening scores was accounted for by AUD symptoms (Adjusted $R^2 = 0.12$, $p < .001$) than by AUDIT-C screens (Adjusted $R^2 = 0.03$, $p < .001$). Controlling for AUD symptoms, AUDIT-C screening scores no longer significantly predicted depression ($p = 0.24$). 16.7% of individuals with no AUD symptoms screened positive for depression, compared to 47.5% of individuals with severe AUD (6-11 AUD symptoms).

CONCLUSIONS: In primary care patients with high-risk drinking, a novel alcohol symptom checklist explained over four times as much variance in depression screening scores as an alcohol consumption-based screening measure. For these patients, the negative experiences associated with AUD symptoms may contribute more to depression than the amount of alcohol consumed. The AUDIT-C is a useful starting point to screen for high-risk drinking, and assessing AUD symptoms in patients with high-risk drinking may further elucidate the role of alcohol in depression symptoms.

LEARNING OBJECTIVE #1: Understand the associations of a consumption-based alcohol screening and symptom-based alcohol use disorder assessment with depression in a large primary care population.

LEARNING OBJECTIVE #2: Articulate how screening for high-risk drinking and assessing alcohol use disorder symptoms may be relevant when treating depression in primary care.

AN EDUCATIONAL NEEDS ASSESSMENT OF SAFETY NET PRIMARY CARE PROVIDERS TO IMPROVE COMPETENCE IN DEPRESSION CARE

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BACKGROUND: Major depressive disorder is highly prevalent and is the second leading cause of years lived with disability in the US. Evidence-based diagnosis and treatment (e.g. anti-depressant medications - ADM, behavioral therapy and patient psychoeducation), can mitigate poor health outcomes, disability and dysfunction associated with depression. Primary care providers (PCPs) treat most depression cases in the US but often lack training and expertise needed for effective treatment. Little literature explores PCPs' needs regarding depression education, or corresponding educational interventions. There are few related educational resources available. Such resources are critical in the safety net where access to psychiatrists and population-level depression interventions are limited. In developing a free, accessible, web-based educational module on optimal depression management, we surveyed safety net PCPs to better understand their depression education needs.

METHODS: In July 2020, we invited 160 PCPs from 13 San Francisco primary care safety net clinics (both hospital- and community-based) to complete an anonymous online questionnaire addressing provider, clinical practice and patient population demographics; attitudes toward importance of and comfort with depression care; learning preferences; experience in collaborating with behavioral health colleagues; desire for additional knowledge and skills; and barriers to caring for patients with depression.

RESULTS: The completion rate was 43% (69/160). Of the respondents: 82% practiced in hospital- based clinics, 87% were physicians, 38% were resident physicians. Most expressed comfort (>70% agreed/strongly agreed that they felt comfortable) with basic depression management including screening, diagnosis, ADM initiation and patient counseling. Most felt a web-based module on evidence-based depression management (83%) and a readily available depression treatment algorithm (93%) would be useful. Regarding learning format: an interactive, online case-based module was most favored (by 47%). Commonly named barriers to effective depression management included social stressors, patient resistance to treatment, lack of access to psychiatry, insufficient primary care clinic staffing and insufficient PCP time. Many PCPs desired training in advanced skills, including ADM augmentation strategies and treating special populations with depression (e.g. pregnant/lactating, comorbid chronic pain, geriatric).

CONCLUSIONS: Despite confidence in their provision of basic care for patients with depression, nearly all PCPs surveyed remain interested in further training. Using our findings, we will create a depression education module in a preferred format and focus the content to include: a treatment algorithm for ADM initiation, titration and augmentation; and advanced skills such as ADM use in special populations and strategies to combat identified barriers to optimal treatment.

LEARNING OBJECTIVE #1: Identify PCP depression education needs

LEARNING OBJECTIVE #2: Describe common barriers to depression management

A SINGLE DAY ADDICTION CONFERENCE FOR HOSPITALISTS AT AN ACADEMIC CENTER HAS LASTING IMPACT AT 3 MONTHS ON IMPROVING CONFIDENCE IN MANAGING OPIOID USE DISORDERS (OUD) WITH A TREND TOWARDS INCREASED BUPRENORPHINE AND METHADONE PRESCRIBING.

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BACKGROUND: -Up to 11-25% of hospitalized patients have a substance use disorder (SUD), with longer lengths of stay, higher costs and greater readmission

-Many hospitalists have limited experience and education managing SUD

-To authors' knowledge, no studies evaluate single day SUD trainings for hospitalists

METHODS: A single day elective conference was developed at an academic hospital with no formal addiction medicine service to increase hospitalist knowledge in treating SUDs. Addiction specialists provided didactic sessions and interactive case discussions. Topics were chosen based on ACAAM addiction fellowship criteria and internal health system education priorities, including: pathophysiology; stigma; harm reduction; diagnosis and treatment of alcohol, tobacco, stimulant and opioid use disorders; pain management in the context of OUD. Learner surveys were completed at the beginning, immediately after, and 3 months later to assess knowledge, practice and attitude changes. Data was analyzed via T-test and chi squared tests.

RESULTS: There were 38 participants (87% Internal Medicine, 13% Emergency Medicine, 45% women, average 7 years post residency, 61% White, 13% Asian, 13% LatinX, 13% Black). A total of 56% completed the pre-test (n=22), 39% completed the immediate post-test (n=15), and 29% completed the 3-month post-test (n=11). Before the conference, 70% of participants disagreed with the statement; "I am satisfied with the training I have received in alcohol and drug issues" and 91% would participate in future addiction curricula. After the training 100% would recommend to a friend. Before the training, 39% of attendees had x-waivers and 14% of those without planned to attain an x-waiver, which increased to 100% 3 months later, which patients attributed to the conference. Trends (non-significant) included increase in hospital-based buprenorphine and methadone initiation. There was an increase in confidence (5-point Likert scale) for: differentiating OUD vs chronic pain (3.05 vs 3.82 p=0.004); initiating buprenorphine (2.27 v 3.27 p<0.001), managing buprenorphine (2.60 v 3.91 p<0.001), initiating methadone (2.59 vs 3.36 p=0.04), managing methadone (3.36 vs 4.18 p=0.02), and referring for a stimulant use disorder (1.68 vs 2.82, p=0.001). Confidence in initiating naltrexone for alcohol use disorder increased after the training (2.73 vs 3.53 p=0.27), but was not significant at 3 months.

CONCLUSIONS: Implementing a one-day SUD training is feasible and has potential for lasting impact. At three months, there was a persistent increase in confidence managing OUD and trends towards improving confidence and care for other SUDs. Brief educational interventions might aid in bridging the gap between the need for SUD treatment and hospitalist knowledge and experience.

LEARNING OBJECTIVE #1: Identify the potential for brief educational interventions to contribute to increasing hospitalists knowledge base of SUDs.

LEARNING OBJECTIVE #2: Recognize that implementing a one-day SUD training is feasible and has potential for lasting impact.

COMPARISON OF DIRECTORY VS. CLAIMS-BASED PROVIDERS FOR MENTAL HEALTH SERVICES IN OREGON MEDICAID

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BACKGROUND: A provider network is a set of providers that a health plan contracts with to provide medical care to enrollees. Despite ongoing monitoring and regulation efforts to ensure network adequacy, plan directories often consist of providers who are inactive, do not accept certain insurance plans, have moved, or closed their panels. Using claims data and health plan directories, we sought to describe discrepancies between reported in-network providers and realized access to mental health services in Medicaid.

METHODS: Using 2018 Oregon Medicaid claims data, we identified adults aged 18-64 enrolled in Medicaid managed care for >=9 months, who had at least one claim with a primary mental health diagnosis as defined by Clinical Classifications Software Refined (CCSR) categories. Severe mental illness was defined as those with at least one inpatient hospitalization or two outpatient

encounters for bipolar disease, schizophrenia or related psychotic disorders, and major depressive disorder. Using the Center for Medicare and Medicaid Services' National Plan and Provider Enumeration System taxonomy codes, we identified all mental health providers (primary care physicians, psychiatrists, therapists, counselors, clinical psychologists, social workers, behavioral health specialists) associated with at least five unique beneficiaries over a 12-month period. We then compared provider counts, standardized by plan-level enrollment, to health plan provider directory data.

RESULTS: Of 412,022 Oregon Medicaid beneficiaries in our study, 3% (n = 12,950) had a severe mental illness and 22% (n = 90,197) had any encounter for a mental health diagnosis. Across 15 health plans, there was significant variation in total and across types of mental health providers. Mean number of in-network psychiatrists was 24.6 (provider to enrollment ratio, 1:1253) using claims and 98.4 (provider to enrollment ratio, 1:1352) using provider directories; in-network psychologists, 24.1 (provider to enrollment ratio, 1:1322) using claims data and 73.9 (1:1265) using provider directories; behavioral health social workers, 57.3 (1:402) using claims and 147.9 (1:281) using provider directories; primary care physicians, 269.3 (1:86) using claims and 1053.8 (1:46) using provider directories.

CONCLUSIONS: Provider directories may render understanding of provider networks incomplete. Our findings, while limited to one state, suggest that there remain significant discrepancies between reported in-network providers and those enrollees are actually accessing for care in Medicaid, one of the major payers of mental health services in the U.S. These discrepancies have important implications for federal and state efforts to monitor and enforce network adequacy standards, as well as for consumers seeking transparency and accuracy around provider coverage.

LEARNING OBJECTIVE #1: Describe challenges of monitoring and enforcing network adequacy

LEARNING OBJECTIVE #2: Describe implications of health plan provider directories that may not accurately reflect available providers

DEVELOPMENT OF THE HOPE MOBILE HEALTH APP TO SUPPORT PATIENTS RECEIVING MEDICATION ASSISTED TREATMENT FOR OPIOID USE DISORDER

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BACKGROUND: Opioid use disorder (OUD) is a public health crisis with more than 2 million people living with OUD in the United States. Medication assisted treatment (MAT) is an evidence-based approach to treating OUD using a combination of behavioral therapy and medication, but less than half of individuals living with OUD access this treatment. Mobile technology can enhance treatment of chronic diseases through self-monitoring and support. Our aim is to describe the development of a mobile platform for patients in treatment for OUD and preliminary pilot testing results.

METHODS: The study was conducted with patient and provider participants at an academic MAT clinic and was approved by the Institutional Review Board. The formative phase included semi-structured interviews to understand OUD patient needs, provider perspectives, and opportunities for MAT support via a mobile app. A second round of formative interviews used mock-ups of app features to collect feedback on feature function and desirability. Formative participants' input from 16 interviews then informed development of a functional smartphone app. Patient participants (n=25) and provider participants (n=3) were enrolled in a 6-month pilot study of the completed platform. Patient app usage and usability interviews, including a system usability score and open-ended questions, were completed 1-month into the pilot study. Open-ended responses were analyzed for prevalent themes.

RESULTS: A mobile app, named HOPE, was developed using input from the formative interviews that included evidence-based and participant-prompted features. Features included daily prompts for monitoring mood, stress, treatment adherence, and substance use; patient tracking of goals, reminders, and triggering or encouraging experiences; informational resources; an anonymous community board to share support with other patients; and secure messaging for communication between patients and providers. All patient participants engaged with at least one app feature during their first month of the pilot study. Daily self-monitoring prompts were the most used feature.

Patients and providers reported high levels of system usability (86.9 ± 10.2 and 83.3 ± 12.8, respectively). Qualitative analysis highlighted the value of self-monitoring, access to support through the app, and a perceived improvement in connection to care and communication for both patient and provider participants.

CONCLUSIONS: Through a user-centered development process, we created an app that was highly usable and acceptable. Use of the HOPE program by pilot participants, high system usability scoring, and positive perceptions from 1-month interviews indicate successful program development. Next steps include evaluation of program impact on clinical outcomes and patient engagement in care.

LEARNING OBJECTIVE #1: Describe user-centered development process for a mobile health intervention to support medication assisted treatment for opioid use disorder.

LEARNING OBJECTIVE #2: Identify desired features and system usability for the intervention.

EVALUATING HAZARDOUS ALCOHOL USE AMONG UNDOCUMENTED URBAN LATINO IMMIGRANTS

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BACKGROUND: In our non-profit clinic serving undocumented Latino immigrants in Philadelphia (Puentes de Salud), we have noted high rates of alcohol use and early alcoholic cirrhosis. Alcohol consumption among undocumented immigrants is not well described, although prior survey studies have shown that up to 27% of farmworkers report heavy drinking.^[1] Risk factors for hazardous drinking may include being male, being single, English proficiency, and family conflict.^{[2],[3]}

METHODS: Community health workers distributed anonymous Spanish-language surveys to adults prior to appointments, capturing demographic data and open-ended questions about motivations for drinking and containing the AUDIT questionnaire (in Spanish), to quantify alcohol consumption. Results were aggregated according to sex, age, country of origin, years of education, occupation, and household size. Thematic analysis of the open-ended prompt was conducted to analyze motivations for drinking.

RESULTS: We collected 87 surveys with completed demographics and 70 with completed AUDIT questionnaires, capturing a population that was 13% female, 84% male, 3% unknown with a median age of 36 and primarily from Mexico (48%), a median of 9 years of schooling and 10 years in the United States. Typical professions included the restaurant industry (40%) and construction (18%), with a median weekly pay of \$400. Median household size was 4, with 76% of respondents living with family. Of the AUDIT questionnaires completed, 6 (8.5%) had high-risk drinking and almost certain dependence (AUDIT ≥ 20) and 7 (10%) with high-risk behavior and possible dependence (AUDIT ≥ 16), 8 (11%) with risky or hazardous behavior (AUDIT 8 to 15). Hazardous drinkers were entirely male, with a median age of 33, 12 years of education, and 14 years in the United States. Of these hazardous drinkers, 7 (47%) work in the restaurant industry and 7 (47%) in construction. Reasons for drinking included spending time with friends and coping with work stress, living situation and relationship status did not appear to be protective factors.

CONCLUSIONS: In our study, 21% of patients had problem alcohol use, which is especially concerning, given these patients' lack of health insurance and access to alcohol rehabilitation programs or liver transplantation. We have found that hazardous alcohol use is indeed prevalent in this population, is concentrated

among men in the restaurant and construction industries, and highlights the need to develop universal alcohol screening for urban undocumented Latinos. We plan to implement universal alcohol screening to identify high risk individuals in our clinic and refer these patients to appropriate resources and counseling.

LEARNING OBJECTIVE #1: Quantify the amount of problem drinking in this patient population (Medical Knowledge)

LEARNING OBJECTIVE #2: Describe the demographic and self-reported factors associated with high rates of alcohol abuse (Patient Care).

EXAMINATION OF ASSOCIATIONS BETWEEN BARRIERS TO MEDICAL CARE AND PRESCRIPTION OPIOID USE

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BACKGROUND: The opioid epidemic is a public health crisis and despite the attention the opioid epidemic has received recently, prescription opioids have persisted as the basis of chronic pain pharmacotherapy. Joint and back pain are common, and patients are frequently managed with prescription pain medication, including opioids. Some chronic pain can be surgically addressed, however, barriers in medical care can prevent patients from getting the pain addressed. Although the association between opioid prescription rates and insurance status has been well-established, the association between cost-related barriers and opioid prescription use is unclear.

METHODS: We conducted a cross-sectional analysis of the 2018 Medical Expenditure Panel Survey (MEPS), a nationally representative survey. We identified survey participants to have barriers to medical care if they responded “Yes” to questions about could not afford medical care, could not afford prescription medication, delayed medical care for cost, and delayed getting prescription medication for cost. We first performed descriptive statistics and then ran multivariable logistic regression models adjusting for sex, race/ethnicity, age, and health insurance.

RESULTS: Of 22,306 survey participants, 13,905 (68.0%, weighted) were privately insured, 6,189 (24.0%, weighted) were publicly insured, and 1,942 (7.9%, weighted) had no health insurance. One in eight (12.8%) of Americans had at least one barrier to medical care; 5.6% could not afford medical care, 3.9% could not afford prescription medication, 9.6% delayed medical care for cost, and 4.4% delayed getting prescription medication for cost. There were differences in the proportion of patients with barriers to medical care by insurance type: 10.2% of the privately insured, 14.7% of the public insured, and 28.5% of uninsured had barriers to medical care. Overall 8.1% of patients had prescription opioid use, 7.2% of patients with private insurance, 12.3% of publicly insurance, and 3.2% of patients with no insurance. Being public insured (odds ratio=1.80 [1.55-2.08] and having barriers to medical care (odds ratio=1.48 [1.26-1.73]) were associated with increased prescription opioid use. The presence of barriers to medical care was associated with prescription opioid use even among patients with private insurance (odds ratio=1.71 [1.35-2.15]) but not public insurance (odds ratio=1.16 [0.93-1.44]).

CONCLUSIONS: Being publicly insured and the presence of barriers to medical care were associated with prescription opioid use. This suggests that ensuring access to health care may be important to address the opioid epidemic.

LEARNING OBJECTIVE #1: To improve clinical knowledge in prescription opioid use among patients with barriers to medical care.

LEARNING OBJECTIVE #2: To recognize cost barriers are associated with prescription opioid use.

FEASIBILITY OF AN ADAPTED BEHAVIORAL WEIGHT-LOSS INTERVENTION FOR INDIVIDUALS WITH SERIOUS MENTAL ILLNESS IN THE COMMUNITY

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BACKGROUND: The Achieving Health Lifestyles in Psychiatric Rehabilitation (ACHIEVE) trial demonstrated significant weight loss among persons

with serious mental illness (SMI). Given this population’s high prevalence of obesity, translating this effective intervention into staff-delivered curriculum within community mental health programs is critically needed. We present the results of a proof-of-concept study examining feasibility and acceptability of such an adapted intervention (“ACHIEVE-D”) – the first step in our implementation/dissemination plan.

METHODS: While retaining core components, ACHIEVE-D adaptations included: single session of weight management and group exercise, repeating lessons throughout a week, and adding video- assisted content to aid staff delivery within typical program schedules. A study-team health coach delivered 8 weeks of ACHIEVE-D to 17 participants with SMI at one community mental health program. To examine feasibility, we tracked participant session attendance and determined coach fidelity to the curriculum. Each session was video-recorded, and an investigator scored them using a standardized tool. Videos were available and scored for 71% of sessions. For satisfaction, we conducted and audio-recorded a focus group with 14 participants post-program. Two investigators coded transcripts for content, which were organized into themes.

RESULTS: Participants were 47% women, 47% white, and mean baseline weight 109 kg. Average attendance at the groups was 71% (range 7 to 13 participants). Fidelity to the ACHIEVE-D curriculum for most scored elements was high (Table); time management was challenging for several sections. During the focus group, participants stated that the program increased weight-loss knowledge, promoted behavior change, and group exercise built confidence to be more physically active. Overall, 88% wanted to continue with ACHIEVE-D and 94% would recommend ACHIEVE-D to other program clients.

CONCLUSIONS: ACHIEVE-D was feasible within the community mental health program setting and acceptable to participants with SMI. Further modifications to the curriculum to address the time management challenges will be made in preparation for our next step of training mental health program staff to deliver the ACHIEVE-D curriculum in a pilot study.

LEARNING OBJECTIVE #1: Medical Knowledge: Applies knowledge of using behavioral interventions as part of obesity management care plan for individuals with serious mental illness.

LEARNING OBJECTIVE #2: System-Based Practice: Utilizes chronic disease treatment models to advance obesity intervention efforts within the community domain for individuals with serious mental illness.

HOW MEDICAL ARE STATES' MEDICAL CANNABIS POLICIES?: PROPOSING A STANDARDIZED SCALE

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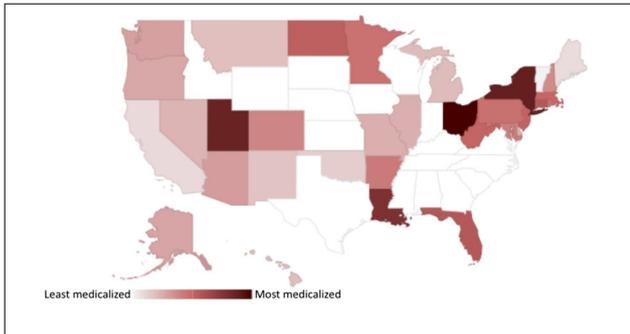
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BACKGROUND: There are important differences in medical cannabis laws across the United States. However, prior studies investigating the effect of medical cannabis laws on patient and public health outcomes disregard this heterogeneity by relying on simple dichotomous measures indicating whether or not a state had enacted a medical cannabis law. A national advisory group of medical cannabis experts developed and utilized the “medicalization of cannabis laws standardized scale” (MCLaSS), a systematic methodology to characterize and quantify state laws by their degree of medicalization, the extent to which medical cannabis is treated similarly to pharmaceutical medications.

METHODS: We conducted a systematic review of state-level medical cannabis laws in the U.S. Using the novel MCLaSS, we calculated domain scores in seven domains: patient-clinician relationship, manufacturing and testing, product labeling, types of products, supply and dose limit, prescription drug monitoring program, and dispensing practices. From the domain scores, we

created a summary score valued 0-100 for each state that had enacted a medical cannabis law as of July 2019.

RESULTS: We identified 110 unique legal documents from 33 states and the District of Columbia which had enacted medical cannabis laws. There was substantial heterogeneity in the degree of medicalization of states' medical cannabis laws, as demonstrated by the MCLaSS summary score, which ranged from 23 (least medicalized) in Vermont to 86 (most medicalized) in Ohio. There was also substantial variability in each of the seven MCLaSS domains. For example, 22 states' laws did not mention prescription drug monitoring programs (PDMPs) related to medical cannabis, 11 states required that providers review PDMP data prior to certification, and 2 states required that medical cannabis dispensing data be reported in the PDMP. A choropleth map depicting the states' summary scores is presented in Figure 1.



CONCLUSIONS: This methodology will advance the evidence base about the impact of medical cannabis laws on patient and public health outcomes. This is urgently needed to ensure the development of policies that minimize the risks and maximize the benefits of medical cannabis.

LEARNING OBJECTIVE #1: To be able to summarize the key differences in U.S. state medical cannabis laws

LEARNING OBJECTIVE #2: To identify a novel tool for classifying and studying differences in states' medical cannabis laws

LONG-TERM OPIOID THERAPY AND OPIOID OVERDOSE IN PATIENTS WITH AND WITHOUT CANCER

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BACKGROUND: Opioids are a cornerstone of cancer pain management, although opioid-related risks such as overdose are not well understood. In patients without cancer, higher opioid doses and increasing trajectories of opioid use are associated with increased risk of opioid overdose (OD). The few studies of OD in individuals with cancer have significant methodologic limitations, including a primarily ecological approach and reliance on notoriously fraught death certificate "cause of death" fields to identify individuals with OD. We aimed to investigate associations among opioid trajectory, cancer status, and OD in a national cohort including all Veterans with cancer and other conditions on long-term opioid therapy (LTOT).

METHODS: Using Department of Veterans Affairs data, we constructed a retrospective cohort of all Veterans with incident receipt of LTOT, defined as 90 days of pharmacy-dispensed opioid analgesic not interrupted by >30 days following a 6-month period without opioids, between 2010-2017. Latent trajectory models assessed trajectories of milligram morphine equivalent (MME) dose receipt among patients with and without cancer (PWC and PWOC). OD was defined by ICD-9 and ICD-10 codes indicating poisoning by opioids and other narcotics. Cox proportional hazard models estimated risk of OD as a function of trajectory controlling for gender, race, age, cancer group status, OUD, mental health diagnosis, benzodiazepine co-prescription, and LTOT initiation before 2016. The model estimated the moderating effect of cancer group status on trajectory.

RESULTS: Among 332,664 Veteran LTOT recipients, 13.8% were PWC. Compared to PWOC, PWC were equally likely to experience OD (0.2%; 0.2%). Opioid dose trajectories for PWC vs. PWOC, respectively, were as follows. Trajectory 1: low, stable dose (starting dose = 14.0 vs. 18.5 MME); Trajectory 2: low-moderate, decreasing dose (starting dose = 54.7 vs. 28.7); Trajectory 3: moderate, stable dose (starting dose = 47.1 vs. 47.7 MME); Trajectory 4: moderate-high, increasing dose (starting dose = 82.3 vs. 79.2 MME). PWOC were more likely than PWC to be in Trajectory 1 (low, stable), and PWC were more likely than PWOC to be in Trajectory 3 (moderate, stable). Relative to being in Trajectory 1 (low, stable), membership in any other trajectory was associated with greater risk of OD, regardless of cancer status.

CONCLUSIONS: PWC were more likely than PWOC to be in an opioid trajectory associated with higher OD risk. Clinicians caring for patients with cancer prescribed LTOT should counsel them on OD risk, discuss strategies like naloxone to reduce potential harms, and on an ongoing basis, weigh OD risk carefully with potential benefits.

LEARNING OBJECTIVE #1: Explain the gap in knowledge about unintentional opioid overdose in patients with cancer (ACGME competencies: Patient Care, Medical Knowledge).

LEARNING OBJECTIVE #2: Identify the relationship among cancer status, opioid dose trajectory, and unintentional opioid overdose in patients with cancer (ACGME competency: Medical Knowledge).

MEDICATIONS FOR OPIOID USE DISORDER IN MASSACHUSETTS JAILS: IMPACT ON OVERDOSE DEATHS

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BACKGROUND: The majority of jails and prisons in the US discontinue medications for opioid use disorder (MOUD) upon incarceration. Responding, in part, to a 12.7 times higher rate of death and a 129 times higher risk of overdose death among individuals upon release from incarceration, compared to age-matched controls, some carceral systems have implemented MOUD programs. Data from these programs allows for modeling of the impact of statewide MOUD access for incarcerated individuals on population-level overdose mortality.

METHODS: We employed a state-transition cohort-based mathematical model simulating the natural history of opioid use disorder (OUD) to estimate the number of averted overdose deaths over a five-year period (2021-2025) in the state of Massachusetts. We compared three strategies: 1) status quo—no medication treatment available, 2) naltrexone only—a scenario where only extended-release naltrexone was offered, with 66% of patients initiating treatment and 30% linking to treatment post-corrections and 3) all MOUDs—jails screen all individuals upon incarceration and offer all three MOUD, with 100% of individuals linking to some medication (33% buprenorphine, 66% methadone, 1% naltrexone) and 70% linking to treatment post-corrections. We derived model inputs and costs from state and national surveillance data, data on incarceration rates from the Massachusetts Department of Corrections, clinical trials, and observational studies. We modeled overdose deaths in an open cohort representing the general population of Massachusetts.

RESULTS: Assuming the status quo, the model projects 1956, 2037, 2125, 2217, and 2268 overdose deaths in Massachusetts in years 2021-2025, respectively. Compared to the status quo, a statewide extended-release naltrexone strategy for jailed individuals with OUD averted 94 deaths over 5 years—an overall decrease in overdose deaths 0.9%. A strategy including all three MOUD averted a total of 358 deaths over 5 years—a 3.4% decrease in overdose deaths compared to the status quo.

CONCLUSIONS: This modeling study confirms that correctional facilities are highly promising venues for offering MOUD in order to prevent overdose deaths, with a strategy including buprenorphine and methadone being particularly impactful. Given escalating overdose deaths during the COVID-19 pandemic and the demonstrated feasibility and life-saving impact of carceral MOUD programs, correctional facilities should urgently implement MOUD

programs as part of a suite of state and federal policies to combat the opioid epidemic.

LEARNING OBJECTIVE #1: To demonstrate the role of correctional health policies on the health of populations affected by opioid use disorder.

LEARNING OBJECTIVE #2: Using a mathematical model, to assess the impact of statewide implementation of programs distributing medications for opioid use disorder in Massachusetts jails over a five-year period.

MENTAL HEALTH CARE OF ADOLESCENTS AND YOUNG ADULTS DURING COVID-19: A QUALITATIVE STUDY WITH CLINICIANS SERVING A UNIVERSITY'S STUDENT HEALTH PROGRAM

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BACKGROUND: Population-based studies report that adolescents and young adults (AYA) have the greatest mental distress of all age groups from the COVID-19 pandemic. AYA in institutions of higher education are subject to stress and social disruption due to safety policies such as only online classes. Experiences and observations of mental health clinicians serving AYAs can elucidate gaps and opportunities to improve care of AYA students.

METHODS: A sample of 10 psychologists and 10 psychiatrists in a university's dept of psychiatry was invited by email to a 15-min key informant interview about mental health care while university offered only online classes. The interview guide addressed: 1) How has the pandemic affected your patients' mental health; 2) How has telemedicine affected patient care; 3) How has the pandemic affected your overall management? After consent, interviews were completed on Zoom in 9/20. Theoretical thematic analysis was conducted on transcribed data by 2 researchers to identify patterns in semantic content to codify into themes. Both researchers coded separately, with final codes resolved by consensus. Resultant themes categorized as positive or negative aspects of each question.

RESULTS: Key informant interviews completed with 6 psychologists and 4 psychiatrists (50% of invitees) including 3 men and 7 women. Marked increase in mental health disorders, especially anxiety, was seen as reflecting social isolation and lifestyle restrictions. A socioeconomic disparity described: lower-income students stayed home with remote peer support while wealthier students rented apartments close to school with peers. Positive themes about telemedicine were: greater accessibility with fewer no shows; safety; and ease. Negative themes were: technical problems; patients distracted; less confidentiality; difficulty establishing a therapeutic alliance; and managing unstable patients remotely. In-person visits if required were seen as riskier and limited by masks and distancing. Health care in other states restricted by licensure rules for visits and needed medication. Participants offered suggestions to overcome some barriers such as parameters for televisit etiquette and help with temporary licensure in other states.

CONCLUSIONS: Mental health professionals at a university endorsed greater student anxiety and distress, especially among lower income students in stressful home circumstances. Telemedicine was seen as offering greater safety and access but presented drawbacks to quality of mental health care. State licensure rules limited ongoing care. Overall, this qualitative study endorsed a greater need for AYA mental health care that was mitigated by telemedicine but with limitations for quality of care.

LEARNING OBJECTIVE #1: Patient care: To list 3 positive and 3 negative aspects of telemedicine for mental health care of adolescents and young adults.

LEARNING OBJECTIVE #2: Practice-based learning improvement: To describe 4 potential solutions to achieve higher quality remote mental health care.

MICRODOSE BUPRENORPHINE INDUCTION: EXPANDING TREATMENT ACCESS TO HOSPITALIZED PATIENTS WITH OPIOID USE DISORDER

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BACKGROUND: Patients with opioid use disorder can initiate buprenorphine without withdrawal through a microinduction protocol, but current evidence is limited to case reports and small case series. This study aimed to integrate the existing literature with our experiences providing microdosing to hospitalized patients with opioid use disorder over a year.

METHODS: We performed a retrospective cohort study of patients with opioid use disorder seen by a hospital-based addiction medicine consult service who underwent buprenorphine induction via microdosing between July 2019 and July 2020. We synthesized our results with the existing literature to create practice considerations.

RESULTS: Sixty-eight individuals underwent 72 buprenorphine microinductions. Reasons for microinduction, as opposed to a standard buprenorphine induction, included co-occurring pain (91.7%), patient anxiety around the possibility of withdrawal (69.4%), a history of precipitated withdrawal (9.7%), opioid withdrawal intolerance (6.9%), and other (18.1%). Recommendations for clinical scenarios include acute, severe illness, co-occurring pain, opioid withdrawal intolerance, transition from high dose methadone to buprenorphine, history of precipitated withdrawal, and rapid hospital discharge. We recommend a standard microinduction protocol with alterations for patients with acute pain, transition from high dose methadone, and rapid hospital discharge.

CONCLUSIONS: To our knowledge, this is the most comprehensive review of buprenorphine microinduction in the hospital setting. Our data support buprenorphine microinduction as a well-tolerated and versatile protocol for hospitalized patients with opioid dependence. We provide a synthesized review of practical recommendations for providers.

LEARNING OBJECTIVE #1: Describe existing buprenorphine microinduction protocols for hospitalized patients with opioid use disorder.

LEARNING OBJECTIVE #2: Apply buprenorphine microinduction protocols to several common clinical scenarios for hospitalized patients with opioid use disorder.

MINDFULNESS-ORIENTED RECOVERY ENHANCEMENT FOR OPIOID MISUSE AND CHRONIC PAIN IN PRIMARY CARE: A FULL-SCALE RANDOMIZED CONTROLLED TRIAL

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BACKGROUND: Successful treatment of opioid misuse among people with chronic pain has proven elusive. To combat the opioid crisis, guidelines encourage clinicians to consider non-opioid therapies, but the efficacy of mindfulness-based interventions for opioid misuse is uncertain. Here we present late-breaking results from a full-scale, NIH-funded randomized clinical trial (RCT) of Mindfulness-Oriented Recovery Enhancement (MORE). MORE is an integrative therapy rooted in affective neuroscience that unites training in mindfulness, reappraisal, and savoring skills to restructure reward mechanisms underpinning addictive behavior, emotional distress, and chronic pain. We hypothesized that MORE would produce superior outcomes through 9-month follow-up relative to an active supportive group (SG) psychotherapy control.

METHODS: Opioid misusing chronic pain patients (N=250) were randomized (1:1) to 8 weeks of MORE or a supportive group (SG) psychotherapy control delivered in a primary care setting. Primary outcomes were opioid misuse—as measured by the Drug Misuse Index (DMI), a composite measure triangulating self-report with blinded clinical interview and urine drug screen—and scores on the Brief Pain Inventory (BPI) through 9-month follow-up. Secondary outcomes were opioid dose, distress, and ecological momentary assessments of craving and affect. Psychophysiological responses to opioid cues and natural reward cues were assessed as a mediating mechanism.

RESULTS: By 9-month follow up, 47% of patients in MORE no longer met criteria for opioid misuse, compared to 23% in the SG, with an overall per visit odds ratio for lower misuse in MORE (relative to SG) of

2.05 ($p=0.011$). Additionally, subjects randomized to MORE demonstrated reduced pain interference (0.68 standardized mean difference, $p<0.001$), reduced pain severity (0.44 standardized mean difference $p=0.003$), and were more likely to decrease opioid dose by at least 50% (36% in MORE vs. 15% in the SG, $p=0.009$) – among responders in MORE, the mean opioid dose reduction was 76.4 morphine milligram equivalents. MORE also reduced distress ($p=0.026$) and opioid craving ($p=0.002$). Across 270 EMA time points, the MORE group reported lower opioid craving ($p=.002$), less pain ($p<.001$), and greater positive affect ($p=.001$) than the SG. MORE shifted autonomic responses to drug and natural rewards; this restructuring of reward salience mediated the effect of MORE on reducing opioid misuse.

CONCLUSIONS: MORE resulted in large improvements in opioid misuse, opioid dosing, and chronic pain symptoms that were maintained 9-months after the end of treatment, demonstrating the efficacy of this novel intervention for chronic pain patients in the primary care setting.

LEARNING OBJECTIVE #1: Inform patient care by translating novel mechanistic discoveries from social-behavioral science into interventions for opioid misuse among people with chronic pain.

LEARNING OBJECTIVE #2: Evaluate the efficacy of Mindfulness-Oriented Recovery Enhancement as a treatment for opioid misuse and chronic pain.

OLDER AGE IS ASSOCIATED WITH LONG-TERM RETENTION IN BUPRENORPHINE TREATMENT FOR OPIOID USE DISORDER

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BACKGROUND: Opioid use disorder (OUD) among older adults is a fast-growing public health problem, but only 8% of older adults with OUD receive medication treatment. Little is known about treatment outcomes among older adults in office-based buprenorphine programs. We examined how age was associated with buprenorphine treatment retention among adults with OUD who initiated buprenorphine treatment in an outpatient primary care setting.

METHODS: This retrospective cohort study includes all patients with OUD who initiated buprenorphine between June 1, 2015 and December 31, 2017 at a federally qualified health center affiliated with an academic medical center in Bronx, NY. We classified patients as young adults (age 18-40), middle-aged adults (age 40-49), and older adults (age ≥ 50). Comparisons of baseline characteristics were conducted using chi-square or fisher exact tests. Buprenorphine treatment retention was defined as days from first to last buprenorphine prescription in the electronic health record during an episode of continuous treatment (no gap of >60 days). To examine the association between age group and buprenorphine retention, we conducted multivariate logistic regression. The dependent variable was buprenorphine treatment retention (yes/no) at 30 days, 90 days, 180 days, 365 days, and 730 days. The main independent variable was age group, with young adults as the reference group; covariates in the models were sex, race, cannabis use and prior methadone treatment.

RESULTS: Of 239 participants, 83 (35%) were young adults, 62 (26%) were middle-aged, and 94 (39%) were older adults. Participants were 61% Hispanic and 28% non-Hispanic Black. Age groups differed by race and prior OUD treatment. Twenty-eight percent of older adults were non-Hispanic Black (compared to 11% and 10% respectively among young and middle-aged adults) and only 61% of older adults were Hispanic (compared to 73% and 84% among young and middle-aged adults respectively), $p = 0.0048$. More older and middle-aged adults, 68% and 70% respectively, had previously been treated with methadone for OUD (compared to only 45% of young adults), $p=0.0077$. Mean days in treatment was 411 (range: 4, 1693). In logistic regression analysis, older adults were more likely than young adults to be

retained in treatment at 1 year (aOR 2.24, 95% CI 1.60-4.30) and at 2 years (aOR 2.11, 95% CI 1.02-4.33); retention at earlier time points did not differ by age in multivariate logistic regression models.

CONCLUSIONS: Older adults in the office-based buprenorphine treatment program had over twice the odds of long-term retention in treatment at 1 and 2 years compared to young adults. These findings suggest that older adults can and should be treated in primary-care based buprenorphine treatment programs.

LEARNING OBJECTIVE #1: To describe how buprenorphine treatment retention outcomes differ by age group.

LEARNING OBJECTIVE #2: To recognize that buprenorphine treatment is effective for older adults.

OUTCOMES AFTER COVID-19 DIAGNOSIS FOR PEOPLE WITH VERSUS WITHOUT SERIOUS MENTAL ILLNESS

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BACKGROUND: Persons with serious mental illness (SMI) have a high burden of risk factors for COVID-19 morbidity and mortality including obesity, tobacco use, diabetes, lung diseases, and substance use disorder. However, little is known about clinical outcomes following COVID-19 infection among people with SMI.

METHODS: We used data from the TriNetX Research Network, a federated network providing access to deidentified aggregate electronic medical record data across 45 U.S. health systems. We identified adults (age >18 years) diagnosed with COVID-19 between January 20-November 30, 2020. We used ICD-10 codes to identify diagnoses of COVID-19, SMI (schizophrenia, bipolar disorder), and comorbidity (diabetes, hypertension, ischemic heart disease, obesity, chronic kidney disease, COPD, asthma, cerebrovascular disease, nicotine dependence, substance use disorder). Our outcome measures were inpatient admission for COVID-19, use of mechanical ventilation during inpatient admission, and mortality overall and among those with an inpatient admission within 30 days of a COVID-19 diagnosis. We matched cohorts with versus without SMI on demographics and comorbidities using 1:1 matching and greedy nearest neighbor propensity score approaches. We used logistic regression models to examine the association between SMI and COVID-19 clinical outcomes. Data analysis was performed on the TriNetX platform which utilizes a combination of JAVA, R, and Python programming.

RESULTS: In our unmatched cohorts diagnosed with COVID-19, we identified 67,938 individuals with SMI and 2,013,590 individuals without SMI. Of these, 16,302 (24%) individuals with SMI and 305,969 (15%) without SMI had an inpatient admission linked to a COVID-19 diagnosis. Analyses of the matched sample with COVID-19 showed that people with SMI were more likely than those without SMI to experience hospital admission (21.2% vs 15.7%; OR=1.45 [95% CI 1.41-1.49]) and mortality (1.1% vs 0.9%; OR=1.24 [95% CI: 1.11-1.3]). Of those hospitalized with a COVID-19 diagnosis, we found no difference in likelihood of use of mechanical ventilation (4.9% vs 4.9%; OR=1.00 [95% CI: 0.90-1.10]) or death (2.6% vs 2.5%; OR=1.06 [95% CI: 0.92-1.21]) between persons with or without SMI.

CONCLUSIONS: Persons with SMI are at elevated risk of COVID-19 infection leading to hospital admission and death compared with the general population. Possible explanations include vulnerability due to living situations (homelessness, congregate living) and chronic health conditions, and seeking healthcare later in the course of illness due to stigma or difficulty navigating the healthcare system. Once persons with SMI received acute care for COVID-19 infection, mortality rates appear similar to that of the general population.

LEARNING OBJECTIVE #1: Recognize persons with serious mental illness are an at-risk population for worse clinical outcomes after COVID-19.

LEARNING OBJECTIVE #2: Identify mechanisms why persons with serious mental illness may be more likely to experience poor clinical outcomes after COVID-19 infection.

QUANTIFYING USE OF STIGMATIZING LANGUAGE SURROUNDING SUBSTANCE USE DISORDERS IN THE PUBMED CENTRAL DATABASE

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BACKGROUND: Medical professionals rely heavily on specific terminology to communicate essential information that shapes medical judgements and informs high quality patient care. Medical journals are a mode of communicating vital information to guide medical practice, and journal articles should strive to use terminology that demonstrates respect for patients and promotes effective evidence-based treatment. In 2017, the White House Office of National Drug Control Policy (WHONDCP) developed guidance for the accurate use of language regarding substance use disorder (SUDs) in concordance with DSM-5. However, terminology that labels patients with SUDs in a way that conveys implicit bias is still widely used in medical journals. Commonly used terms such as “substance abuser” or “addict” convey the notion that a patient is morally at fault for their disease, and this can negatively affect healthcare delivery and result in treatment avoidance. The goal of this study is to evaluate the usage of negative terminology that may perpetuate stigma around SUDs in medical journals over a period of 20 years.

METHODS: A search was performed in the PubMed Central (PMC) database to quantify the number of journal articles per year between 1999-2019 that contained the keywords “substance abuse,” “drug abuse,” “alcohol abuse,” “addict,” or “alcoholic.” Another search was performed to analyze usage of the non-stigmatizing replacement terms “substance use disorder” and “alcohol use disorder.” The results of the search were cross-compared over the 20-year period of study to identify trends in the frequency of any stigmatizing or non-stigmatizing term usage as well as the frequency of individual terms.

RESULTS: A total of 284,614 journal articles were identified through the search. In 1999, there were 4063 per 100k articles that contained stigmatizing terminology. Use of these terms increased in 2019 with 18,843 per 100k articles identified. Use of non-stigmatizing replacement terminology remains at low levels, with 2176 articles per 100k identified in 2019. The use of the word “alcoholic” to describe patients with alcohol use disorder has increased every year, starting at 854 per 100k in 1999 and growing to 1971 per 100k in 2019.

CONCLUSIONS: Use of language that negatively affects care of patients with substance use disorders is still prevalent despite the recommendations by the WHONDCP in 2017. Non-stigmatizing terms to describe these patients, such as “substance use disorder” and “alcohol use disorder” remain at low levels. Reform of language used in medical journals that demonstrates respect for patients and promotes evidence-based treatment is needed.

LEARNING OBJECTIVE #1: Evaluate the usage of negative terminology that may perpetuate stigma around substance use disorders in medical journals over a period of 20 years.

LEARNING OBJECTIVE #2: Quantify the use of terminology regarding substance use disorders that demonstrates respect for patients and promotes effective communication.

RETROSPECTIVE CHART REVIEW OF THE USE OF MEDICATION ASSISTED TREATMENT IN PATIENTS WITH ALCOHOL USE DISORDER AT A LARGE COUNTY HOSPITAL

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BACKGROUND: Alcohol use disorder and alcohol related diagnoses are common contributors to hospital admissions. Even though naltrexone has been an FDA approved medication to treat alcohol use disorder since 1993 and evidence shows that it is effective in decreasing alcohol use, it is unknown how often hospitalist providers are prescribing it on hospital discharge. New studies show that initiating medication assisted treatment (MAT) for alcohol use disorder on hospital discharge can decrease 30-day ER visits and readmissions. Currently, there is no standardized protocol at our facility for initiating MAT for patients with alcohol use disorder at hospital discharge. The objective of

this study was to collect baseline data on the current practice of prescribing MAT for alcohol use disorder on hospital discharge. Secondary outcomes included coordination of outpatient discharge care for patients with alcohol use disorder. The data will be used to inform future interventions to increase the prescription of MAT in hospitalized patients with alcohol use disorder at our county health system.

METHODS: Using a search of the electronic health record database, patients were identified during the time period between January to June 2019 if they were admitted with a primary problem including the term “alcohol”. Categories reviewed included diagnosis of alcohol use disorder, admission and discharge diagnoses, discharge medications, scheduled appointments and outpatient referrals. The data analysis involved simple statistics with comparison of means for outcomes listed in the research design.

RESULTS: Data from admissions was collected from Jan 1st, 2019 until July 1st, 2019. Out of 92 admissions reviewed, only 2% (n=2) of patients were prescribed naltrexone on discharge and 1.6% (n=1) were prescribed acamprosate. Nearly 2/3 of patients did not have any appointments scheduled on discharge related to substance use disorder. No patients had psychiatry or psychology referrals placed on discharge. The majority of charts reviewed did not include any documented counseling for patients with medication assisted treatment in the discharge summary.

CONCLUSIONS: For our patients with diabetes, we would never fail to prescribe insulin on hospital discharge. However, for our vulnerable patients with alcohol use disorder, we are not regularly offering to prescribe or coordinate evidence-based treatments which could impact their care. Based on this initial chart review, our team will plan a quality improvement intervention to increase naltrexone and acamprosate prescriptions for patients with alcohol use disorder on hospital discharge, along with improved care coordination for substance use resources.

LEARNING OBJECTIVE #1: Patient Care: Evaluate use of medication assisted treatment prescribed for patients with alcohol use disorder on hospital discharge

LEARNING OBJECTIVE #2: Practice-Based Learning and Improvement: Assess the use of outpatient coordination of care for patients with alcohol use disorder on hospital discharge

SUSTAINED IMPLEMENTATION OF A MULTI-COMPONENT STRATEGY TO INCREASE EMERGENCY DEPARTMENT-INITIATED INTERVENTIONS FOR OPIOID USE DISORDER

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BACKGROUND: There is strong evidence for initiating treatment for opioid use disorder (OUD) in acute care settings, but less is known about how to implement this practice. Our aim was to describe implementation and maintenance of a multi-component strategy for identification and treatment of patients with OUD in three urban, academic emergency departments (EDs).

METHODS: Our intervention was designed collaboratively with interdisciplinary stakeholders to achieve three objectives: 1) increase provider motivation to initiate OUD treatment, 2) increase their ability to do so through tools and resources, and 3) to use prompts to promote timely treatment initiation in appropriate patients. Components included an initiative to encourage all providers to obtain a DEA X-waiver to prescribe buprenorphine, integration of peer recovery specialists into clinical teams, development of treatment guidelines and order sets, and the use of automated alerts to identify patients with OUD and link them to recovery specialists.

We conducted a retrospective analysis of electronic health record data for adult patients presenting to study EDs with OUD-related visits before (3/2017-11/2018) and after (12/2018-7/2020) intervention implementation. We characterized outcomes using descriptive statistics and chi-squared or t-tests to compare across visit types and time periods. To look at the impact of our multi-component intervention on ED buprenorphine prescribing, our primary

outcome, we conducted an interrupted time series (ITS) analysis with simple linear regression before and after implementation in 12/2018.

RESULTS: There were 2665 OUD-related visits during the study period; 28% for overdose, 8% for withdrawal, and 64% for other conditions. Patients were majority male (67%), middle aged (median 38), and publicly insured (75%). 55% were white and 41% were African American. Overall, 13% of patients received medication for OUD (MOUD) during or after their ED visit, with 1.5% of patients receiving buprenorphine in the pre-period compared with 21.1% in the post-period ($p<0.001$). 18% of patients received a naloxone prescription in the pre-period compared to 31% in the post-period ($p<0.001$). In our ITS analysis, there were small increases over time in buprenorphine prescribing in the pre-period followed by an immediate and sustained increase in the use of buprenorphine in greater than 20% of OUD-related ED visits in the post-period.

CONCLUSIONS: A combination of strategies to address provider motivation, promote clinician readiness and capacity, and prompt treatment were associated with increases in ED initiation of OUD treatment that were sustained over time.

LEARNING OBJECTIVE #1: Apply evidence-based treatment and harm reduction strategies for opioid use disorder in acute care settings.

LEARNING OBJECTIVE #2: Illustrate a set of implementation strategies for evidence-based treatment for opioid use disorder in one urban, academic health system.

TRENDS IN ALCOHOL SCREENING BY US PRIMARY CARE PHYSICIANS

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BACKGROUND: Alcohol abuse is a significant health issue facing the US population that is linked to multiple disease processes. The US preventative services task force recommends screening adults 18 years or older for unhealthy alcohol use during primary care visits. This study examines trends in alcohol screening among US family medicine and internal medicine primary care providers.

METHODS: A series of cross-sectional analysis of US primary care providers' delivery of office-based alcohol screening and counseling was examined through the National Ambulatory Medical Care Survey (NAMCS) from 2014-2016. The NAMCS survey is a population-representative sample of US ambulatory providers. In addition to examining alcohol screening, patient demographic characteristics, reason for office visit, evaluation by assigned primary care physician, and regional differences were also evaluated. Statistic modeling with logistic regression was utilized to evaluate differences.

RESULTS: The NAMCS available data for patients 18 years or older seen by a primary care physician (family medicine or internal medicine) included $n=12,978$ visits in 2014, $n=3,637$ visits in 2015, and $n=2,284$ visits in 2016. Alcohol screening and counseling was noted to occur in 1.2%, 4.64%, and 4.10% during primary care office visits in 2014, 2015, and 2016, respectively. No differences in alcohol screening were found by sex, age, or reason for office visit (new problem, routine chronic problem follow-up, flare up for a chronic problem, or preventative care visit). However, being seen by one's assigned primary care physician was predictive of having alcohol screening completed (OR 5.8 [95% CL 1.38, 24.71]). Regionally, patients in the Northeast were much more likely to be screened for alcohol use compared to those in other regions (OR 5.8 [95% CL 1.7, 19.84] compared to the West; OR 5.1 [95% CL 1.44, 18.61] compared to the Midwest; OR 2.6 [95% CL 0.52, 13.49] compared to the South).

CONCLUSIONS: As few patients make more than four visits to their primary care provider a year, this study demonstrates the ongoing need for alcohol screening among US primary care patients, with less than 5% of patients having alcohol screening during office visits to a primary care physician. Likelihood of screening increased with patient's being evaluated by his/her assigned primary care physician and being regionally located in the Northeast.

LEARNING OBJECTIVE #1: The goal of this study was to evaluate US patient's receipt of alcohol screening for prevention and identification of alcohol use disorders.

LEARNING OBJECTIVE #2: Given the low percentage of alcohol screening during primary care office visits, healthcare systems must consider other workflows for alcohol screening rather than sole reliance on the primary care provider to administer alcohol screening to patients during ambulatory office visits.

WHOLE PERSON CARE-LOS ANGELES KIN THROUGH PEER PROGRAM DECREASES ACUTE CARE FOR ADULTS WITH SERIOUS MENTAL ILLNESS

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BACKGROUND: The Kin Through Peer (KTP) program, funded by Whole Person Care-Los Angeles (WPC-LA) through the Los Angeles County Department of Mental Health (LAC-DMH), connects patients with serious mental illness (SMI) to long-term social support from a community health worker (CHW) who serves as a surrogate "kin." KTP CHWs provide linkages to mental health services, basic needs assessments, and critical peer support to reduce acute care utilization and improve health outcomes among adults with SMI. Clients are referred to KTP when CHWs identified a lack of social support and 6+ psychiatric inpatient admissions in the past 12 months due to SMI. We evaluated the program's impact on medical and psychiatric acute care, and primary and specialty care 12 months pre- and post-program enrollment.

METHODS: Patient demographic characteristics, 12-month pre- and post-enrollment service use, and chronic health conditions were collected from the participating three Medicaid Managed Care health plans [Los Angeles County Department of Health Services (LAC DHS), LA Care, and Health Net] and LAC-DMH. Each visit type [inpatient, emergency department (ED), primary care, and specialty visits] was analyzed using generalized linear mixed models with logistic function for post-12 months of enrollment adjusting for gender, age, homeless status, race/ethnicity, program enrollment length, Charlson comorbidity score, alcohol/substance use, mental health conditions and pre-enrollment utilization. Adjusted differences in pre-enrollment vs. post-enrollment rates for any visit were calculated.

RESULTS: From November 2017 through December 2018, 511 patients met KTP eligibility criteria and had administrative data in the pre- and post-enrollment periods. Among these patients, mean age was 41 years, 64% were male, 33% Hispanic/Latino, 28% African American, 55% homeless. At enrollment, mean Charlson comorbidity score was 1.88, 7% had a diagnosis of alcohol use, 34% other substance use, and 31% used both. Mean program enrollment was 219 days. At 12 months, ED visits decreased from 89.3% to 72.7%, medical inpatient visits decreased from 39.7% to 29.1%, and psychiatric inpatient visits decreased from 84.0% to 67.4% ($p<0.0001$). There were no significant differences in primary or specialty care use.

CONCLUSIONS: In the first year after KTP enrollment, acute care utilization among clients dropped significantly for medical and psychiatric inpatient visits as well as for ED visits.

LEARNING OBJECTIVE #1: To examine patient-centered healthcare within a community health worker framework (aligns with learning objective 1)

LEARNING OBJECTIVE #2: To evaluate the efficacy of medical and social service integration for preventing morbidity and mortality (aligns with learning objective 6)

Scientific Abstract - Quality Improvement and Patient Safety

A CASE-SERIES COMPARING CRP IN HOSPITALIZED RA PATIENTS WHO WERE VERSUS NOT UNDERGOING ANTI-INFLAMMATORY THERAPY BEFORE SARS-COV-2 INFECTION

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BACKGROUND: Evidence is scant concerning host response to SARS-CoV-2 infection in patients undergoing long-term anti-rheumatic therapies. To address this gap in our healthcare system we used a consecutive admission case-series approach to compare baseline surrogate inflammatory biomarkers and clinical outcomes of COVID-19 patients with rheumatoid arthritis (RA).

METHODS: Under IRB exemption data were abstracted from electronic medical records of consecutively admitted RA patients with RT-PCR confirmed SARS-CoV-2 infection. Demographics, baseline laboratory test results and administrative data were archived for analyses using JMP Pro 15.2 (SAS, Cary, NC). Principal analysis compared characteristics, putative biomarkers, and outcomes among patients undergoing versus not undergoing anti-rheumatic treatment at presentation to emergency department. Continuous data were summarized with median [IQR] compared using Kruskal-Wallis Test. Discrete data were summarized as counts (proportions) compared with Pearson or Fisher's chi-squared test. Two-tailed $p < .05$ was considered significant.

RESULTS: Of 860 COVID-19 patients admitted between March 14 and October 31, 2020, respectively 13 and 5 at presentation were versus were not undergoing anti-rheumatic treatment with prednisone (39%), methotrexate (28%), hydroxychloroquine (11%), methylprednisolone (6%), mycophenolate mofetil (6%), and/or azathioprine (6%). COVID-19 directed pharmacologic treatment was similar ($p > .05$). Similar intergroup baseline data were pooled (65 [52-78] years, 56% female, 67% White, 17% Black, 17% Other); BMI (25.4 [22.7-27.7] kg/m^2 ; temperature (99.6 [98.8-101.0] $^{\circ}\text{F}$); SpO₂ (90, [88-94] %); prothrombin time 10.8 [10.4-11.5] seconds; hemoglobin 12.5 [11.1-13.9] gm/dL , serum glucose 119 [96-147] gm/dL ; lactate dehydrogenase, 301 [161-471] U/L ; ferritin, 638 [155-1380] ng/mL ; D-dimer 1.13 [0.47-2.73] mg/mL . C-reactive protein (1.6 [1.1-10.1] versus 9.4 [6.5-19.3] mg/dL) was lower ($p = .01$) in RA patients undergoing mono- or combination anti-rheumatic therapy before CoV-2 infection. There was no difference in number of comorbidities (5 [3-7]). Chronic condition prevalence included hypertension (72%), hypothyroidism (44%), diabetes (33%), deficiency anemias (33%) and coagulopathy (33%). Differential SARS progression (intubation or ICU admission) (39%), hospital length of stay (8.3 [4.7-19.7] days) and hospital mortality (17%) were not evident.

CONCLUSIONS: Our case-series reports preliminary evidence suggesting suppression of baseline CRP in RA patients hospitalized with COVID-19 who were undergoing anti-inflammatory therapy before CoV-2 infection. Differential CRP damping could not be attributed to specific mono- or combination anti-inflammatory therapy.

LEARNING OBJECTIVE #1: To describe differential suppression of CRP levels in RA patients who were versus not undergoing anti-inflammatory therapy prior to CoV-2 infection.

LEARNING OBJECTIVE #2: To assess utility of CRP as a marker of CoV-2 evoked immune response in RA patients.

A CLUSTERED RANDOMIZED TRIAL OF INDIVIDUAL AUDIT FEEDBACK AND PEER COMPARISON FEEDBACK ON OPIOID PRESCRIBING

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BACKGROUND: Prescribing opioids, particularly the number of pills, is associated with greater likelihood of future patient opioid dependence. Nudges targeted to clinicians are a low-cost strategy that could reduce unnecessary

opioid prescribing. In particular, clinician-focused peer comparison feedback has been effective in influencing prescribing for other medications. However, peer comparison feedback has not been well-tested for opioid prescribing, alone or compared against other feedback approaches such as individual audit feedback.

METHODS: We conducted a 6-month pragmatic, four-arm factorial randomized trial among 48 emergency department (ED) and urgent care (UC) practice sites within Sutter Health System. 438 clinicians were cluster randomized by practice site. Interventions were delivered to clinicians monthly by email. Peer comparison feedback included the number of pills per opioid prescription and proportion of encounters with an opioid prescription in the prior 3 months, relative to that of practice site peers. Individual audit feedback included the number of prescriptions with >30 pills in the prior 3 months, indicating potential outlier prescriptions. The primary outcome measure was the change in the number of pills per prescription. Secondary outcomes included changes in the proportion of pills and milligrams of morphine equivalents (MME) per prescription.

RESULTS: The sample included 263 ED and 175 UC clinicians and 294,962 patient encounters, with a mean (SD) age of 49 years (19), 56% female, 9% Black, and 21% Hispanic. At baseline, there were 15.1 pills (3.9) and 76.3 MME (23.0) per prescription, and 9.3% of encounters with an opioid prescription. In adjusted analyses compared to usual care, there was a significant decrease in pills per prescription among clinicians receiving peer comparison feedback alone (-0.9 pills per prescription; 95% CI -1.5 to -0.3, $P = 0.002$) and receiving both peer comparison and individual audit feedback (-1.4 pills per prescription; 95% CI -2 to -0.8, $P < 0.001$), but not among clinicians receiving individual audit feedback alone (-0.4 pills per prescription; 95% CI -1.0 to 0.2, $P = 0.24$). There was also a significant decrease in MME per prescription for peer comparison feedback alone (-3.4 MME per prescription; 95% CI -6.6 to -0.3; $P = 0.03$) and combined with individual audit feedback (-4.3 MME per prescription; 95% CI -7.5 to -1.1; $P = 0.009$), but not for individual audit feedback alone. There were no significant changes in the proportion of encounters with an opioid prescription.

CONCLUSIONS: Peer comparison feedback was effective, alone and together with individual audit feedback, for significantly reducing the number of pills and MME per prescription. This is one of the largest trials ever conducted testing the impact of nudges on opioid prescribing, which provides promise for low-cost strategies to change clinician practice.

LEARNING OBJECTIVE #1: Self-reflect on opioid prescribing norms

LEARNING OBJECTIVE #2: See peer comparisons and individual feedback as QI interventions

ADHERENCE TO GUIDELINES FOR SAFER OPIOID PRESCRIBING AND MONITORING AMONG PATIENTS IN AN URBAN SAFETY-NET GERIATRICS CLINIC

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BACKGROUND: Older adults may use opioids for acute or chronic pain and symptom palliation. Even though rates of opioid misuse and opioid use disorder in older adults are lower than in younger adults, older patients may experience more opioid-related adverse events than younger patients due to physiologic changes, comorbidities, and polypharmacy. National and state agencies have promulgated safer opioid prescribing guidelines to reduce adverse events, misuse, and diversion. This study assessed adherence with guideline-based safer opioid prescribing among older adults at an ambulatory safety-net geriatrics practice.

METHODS: We conducted a retrospective chart review using the electronic health record (EHR) of a random sample ($n = 100$) of eligible subjects: patients age 65 or older who received primary care at an urban geriatrics clinic and were prescribed at least one opioid medication in the outpatient setting from 3/19/2016-3/18/2020. We collected information regarding demographics,

comorbidities, average daily morphine milligram equivalents (MME) prescribed, risky co-prescribed medications (benzodiazepines, GABA-analogues) and documentation of guideline-based care including Patient Provider Agreements (PPAs), Prescription Drug Monitoring Program (PDMP) checks, pill counts, and urine drug tests.

RESULTS: The mean age was 80.3 (± 7.4) years. Most patients identified as Black (n=68) and spoke English (n=74); over half (n= 56) resided in low-income communities. About 1/3 of patients (n=34) had cancer during the review period. Seventeen patients initiated opioids during their last year of life. Ten patients had a family history of substance use disorder (SUD) while 22 patients had a personal history of SUD. A high average daily MME (>50 MME/day) was seen in 9 patients; five of these patients received medication-assisted treatment for opioid use disorder. Thirty-seven patients had a Charlson Comorbidity Index score of 9 or greater, indicating significant multi-morbidity. Twenty-five patients were co-prescribed benzodiazepines and 38 patients were co-prescribed GABA analogues. Naloxone was prescribed to 17 patients while only 3 patients had documentation of naloxone availability. A PPA was documented as signed for 30 patients; only 3 patients had the PPA available for review in the EHR. The PDMP was documented as checked with every opioid prescription in only 2 patients. Five patients had pill counts and 31 patients had a urine drug test during the 4 years of review.

CONCLUSIONS: Older adults at high risk for opioid-related adverse events received opioid prescriptions with infrequent documentation of risk-reducing guideline-based care. This study highlights actionable areas to improve opioid-related risk reduction practices in this high-risk population.

LEARNING OBJECTIVE #1: Evaluate adherence to guidelines for safer opioid use among patients at a geriatrics clinic.

LEARNING OBJECTIVE #2: Identify areas for improvement in opioid prescribing and monitoring in older adults.

A POPULATION HEALTH OUTREACH EFFORT FOR ASTHMA CONTROL IN A SAFETY NET HEALTH SYSTEM

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BACKGROUND: Asthma is a common respiratory disease that has become increasingly prevalent with some surveys indicating 8.2 percent of the U.S population having asthma(1). Disparities in asthma outcomes exist with disproportionately higher rates of poor outcomes seen in Black and Latino patients. These disparities have been linked to low asthma controller use driven by language barriers, systems issues, and social factors(1)(2). Community Health Workers (CHWs) have played a vital role in the delivery of asthma-related services through bridging cultural and linguistic barriers. They also facilitate linkage to care thus helping to improve outcomes(3). Alameda Health System (AHS) is a public safety net system in California. Our project identifies an intervention to improve asthma control in an urban, multi-lingual safety net system using a team of CHWs.

METHODS: The Asthma Medication Ratio (AMR) is a clinical performance metric that relates to asthma outcomes. The AMR describes the number of asthma controllers dispensed to a patient divided by the total of asthma reliever medications and controller medications dispensed. A value >0.5 is reflective of appropriate asthma control(4).

Phase one: CHWs called AHS patients with an AMR of <0.5. CHWs asked patients to identify triggers, review medication use, facilitate medication refills, and identify barriers to treatment adherence. Patients whose symptoms were not well controlled, were scheduled for follow up with their provider. Patients reporting severe symptoms were transferred to a nurse for triage.

Phase two: CHWs continued the same calls as phase one and also sent the patient's provider a message with a summary of the patient's asthma symptoms and suggestions for treatment changes. **RESULTS:** The AMR changed from a baseline of 59.6% (August, 2019) to 58.99% (February, 2020) after phase one. The AMR increased from 58.86% (March, 2020) to 65.09% (October 2020) after phase two.

CONCLUSIONS: The AMR improved after adopting our intervention. We noted this impact after phase two of the outreach. We anticipated a delayed impact on outcomes due to the metric drawing on pharmacy dispense data. Since we changed the intervention during phase two of outreach, it is hard to

disaggregate the effects of outreach vs. outreach plus provider messaging. Next steps include further data analysis by race/ethnicity and initiating home visits.

LEARNING OBJECTIVE #1: Patient outreach by CHWs may lead to improved asthma outcomes.

LEARNING OBJECTIVE #2: Delivery of direct patient-related feedback to providers may improve asthma outcomes.

ARE SOME COVID-19 READMISSIONS PREVENTABLE? A CASE SERIES FROM TWO NEW YORK CITY HOSPITALS

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BACKGROUND: Hospital readmissions are costly and potentially harmful, and some are considered preventable. Factors that affect readmissions after hospitalization for COVID-19 and their preventability are unknown. We examined COVID-19 hospital readmissions at two New York City hospitals to determine the main factors contributing to readmissions and their potential preventability.

METHODS: This retrospective study was conducted at two New York City hospitals. To identify potentially- preventable readmissions, we performed detailed case reviews for all adult patients hospitalized for COVID-19 between March 3, 2020 (date of first case) and discharged no later than April 27, 2020 who were readmitted to either of the two hospitals within 30 days of discharge. We used the Hospital Medicine Reengineering Network (HOMERuN) framework to determine preventability. This framework followed previously published approaches considered standard in defining preventability for adverse drug events and care transition gaps. Two physicians (one faculty member and one resident in internal medicine) independently reviewed each case. Any disagreements about the main factors contributing to readmissions or their potential preventability were re-reviewed together and adjudicated by three faculty physicians. They achieved consensus in all cases.

RESULTS: Among 53 readmissions following hospitalization for COVID-19, 38 (72%) were deemed not preventable and 15 (28%) were potentially-preventable. Non-preventable readmissions were mostly due to disease progression or complications of COVID-19 (31/38, 82%), occurring after discharge. These non-preventable readmissions did not have issues with oxygenation upon initial discharge. Main factors contributing to potentially-preventable readmissions were premature discharge (9/15, 60%) and issues with initial disposition (5/15, 33%). Six premature discharges involved borderline oxygenation upon discharge—all were readmitted for worsening hypoxemia. Three premature discharges involved unresolved, active medical issues that received less attention than COVID-19- specific issues. Issues with initial disposition included unanticipated inability to obtain home care and unwillingness of patients or their families to go to a skilled nursing facility in the context of the pandemic.

CONCLUSIONS: Although most readmissions following a COVID-19 hospitalization were deemed not preventable and were consequences of the natural progression of the disease, over one-fourth of readmissions were potentially-preventable. Clinicians should be cautious about discharging COVID-19 patients when key clinical measures are unstable or when arrangements for post-discharge disposition have not been confirmed.

LEARNING OBJECTIVE #1: Identify contributing factors for readmissions in the management of COVID-19 patient upon hospital discharge. (Patient Care)

LEARNING OBJECTIVE #2: <![endif]>Understand how system resources may influence the preventability of readmissions in COVID-19. (Systems-Based Practice)

BARRIERS TO ACUTE CARE DISCHARGE FROM AN URBAN CENTER BEFORE AND DURING THE COVID-19 PANDEMIC

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BACKGROUND: Timely discharge of medically-ready patients from hospitalization can reduce strain on hospital resources and limit patient exposure to iatrogenic harm, although the circumstances may differ during COVID-19. This study analyzed differences in barriers to discharge and average hospital length of stay (LOS) before vs. during COVID-19. The population was a subset of acute care patients at Johns Hopkins Hospital (JHH) preparing for discharge from medicine, surgery, and neurology units and identified to have a barrier to appropriate discharge.

METHODS: The JHH Department of Care Coordination and Utilization Management collected barriers to discharge and discharge disposition data for two six-week periods: before COVID-19 was pervasive (Feb 1-Mar 15, 2020) and when the prevalence of COVID-19 had risen (Apr 1-May 15, 2020). This analysis included 64 patients in the baseline period and 68 patients in the COVID-19 period who were medically ready for discharge but experienced delays due to barriers. We used ANOVA tests and two-sample unequal variance t-tests to examine LOS differences.

RESULTS: Average LOS for the subset of acute care patients with barriers to discharge was significantly longer before COVID-19 (42.5 vs 28.1 days, $p < 0.05$). For both periods, "High Cost/Complex Care Needs" was the most common barrier (40.6% before vs 42.6% during COVID-19) and "Use of Restraints" was the longest average LOS barrier. The second and third most common barrier to discharge differed between periods: "Patient/Family" (21.9%) and "Unfunded/Uninsured" (18.8%) before COVID-19 vs "Insurance Company" (20.6%) and "COVID-19" (11.8%) during COVID-19. For both periods, "Skilled Nursing Facility," "Self-Care," and "Home Health Services" were the most common discharge dispositions (32.3%, 17.7%, 14.5% before and 35.8%, 23.9%, 16.4% during COVID-19, respectively). Despite no statistically significant LOS difference for discharge barriers and dispositions between periods, the discharge disposition with the longest average LOS during COVID-19, "Rehab," had LOS <40 days while the five discharge dispositions with the longest average LOS before COVID-19 all had LOS >40 days.

CONCLUSIONS: For this subset of acute care patients with identified barriers to discharge, the three most common barriers and discharge dispositions were the same before and during COVID-19. However, there were differences in other discharge barriers and average LOS was shorter during COVID-19. This decrease may have been influenced by various changes in care patterns and regulatory factors during the COVID-19 pandemic. Further assessment of barriers could elucidate causality and discharge strategies.

LEARNING OBJECTIVE #1: Systems-Based Practice: Analyze how barriers to discharge and disposition plans affect hospital length of stay

LEARNING OBJECTIVE #2: Practice-Based Learning and Improvement: Identify how COVID-19 may have influenced discharge barriers and dispositions to inform hospital discharge planning during a pandemic

CHARACTERISTICS OF PATIENTS RECEIVING HOME-ADMINISTERED CONTINUOUS PARENTERAL ANTIBIOTICS VIA A DISPOSABLE ELASTOMERIC PUMP AT A COUNTY HOSPITAL IN HOUSTON, TEXAS

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BACKGROUND: Outpatient parenteral antibiotic therapy (OPAT) is an option for patients who require parenteral antimicrobials but otherwise do not require hospital admission. An OPAT program at Lyndon B. Johnson (LBJ) hospital, a 215-bed county hospital in Houston, TX, has implemented a disposable elastomeric continuous infusion pump (SMARTeZ®) since 12/2018. The pump requires only one exchange a day and eliminates the need

for frequent antibiotic (ABX) administration. This may facilitate patient discharge in resource-limited county hospitals. It also improves the pharmacokinetics of ABX whose efficacy depends on duration of ABX exposure rather than peak concentration, such as beta-lactams. Our study described the clinical characteristics of patients at LBJ hospital who received home-administered continuous intravenous (IV) ABX therapy via the pump.

METHODS: We retrospectively analyzed patients enrolled in LBJ hospital's OPAT program from 12/2018 to 12/2020 who received continuous infusion IV ABX at home. From chart review, we extracted patient characteristics, including type of infection and IV ABX treatment, and outcome variables, including cure from infection, completion of IV ABX therapy, 30-day hospital readmission (HR) and emergency department (ED) visit post-discharge, peripheral intravenous central catheter (PICC) line issues, and ABX side effects.

RESULTS: We identified 457 patients from our OPAT program during the study period. A total of 60 received ABX at home via the pump, with two initiating therapy outpatient. Among the 60 patients, 31.7% were treated for osteomyelitis or septic arthritis, 25% for neuro-, oto-, or ocular syphilis, 18.3% for endocarditis or endovascular infections, 8.3% for skin or soft tissue infections, 6.7% for abdominal infections, and 6.7% for urinary tract infections. Administered IV ABX included nafcillin (45%), penicillin G (31.7%), piperacillin/tazobactam (10%), cefazolin (10%), and cefepime (3.3%).

91.7% of patients were cured from infection, and 88.3% completed IV ABX therapy. The patients who discontinued IV ABX early, primarily due to ABX side effects and complications of IV therapy, were switched to oral ABX. 11.7% of patients experienced 30-day HR post-discharge, with one case being due to complications of IV treatment. 35%, 16.7%, and 10% experienced 30-day ED visit post-discharge, PICC line issues, and ABX side effects, respectively.

CONCLUSIONS: Our study revealed that patients who received IV ABX via continuous pump had a high cure rate with a relatively low incidence of side effects and 30-day HR. Home continuous ABX infusion via the disposable elastomeric pump can be a good option to facilitate patient disposition and optimize therapy. Further studies with a comparator and cost-analysis are warranted.

LEARNING OBJECTIVE #1: Discuss the clinical and financial advantages of OPAT.

LEARNING OBJECTIVE #2: Discuss clinical characteristics that should prompt consideration of home-administered continuous antibiotic infusion via a disposable elastomeric pump as a viable treatment option.

CHARACTERIZING RESIDENT AND ATTENDING PATTERNS OF ANTIBIOTIC ORDERING SPEED IN SEVERE SEPSIS AND SEPTIC SHOCK

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BACKGROUND: Recognizing heterogeneity in the delivery of healthcare, and the 'bright spots' within the heterogeneity, creates new opportunities to improve medical care and education using positive deviance methods. In this initial study of patients with severe sepsis or septic shock, we quantified the relative impact of the resident and attending physicians in the antibiotic ordering time (AOT).

METHODS: We studied all patients with severe sepsis or septic shock over 3 months in 2020 at the University of Kansas Hospital. First, we measured the heterogeneity in care by using a random effects analysis to calculate the I^2 values for the residents and for the attendings who had at least two cases. Residents included both those in emergency medicine (EM) and those rotating from other services.

For regression analysis, we restricted analysis to those patients whose care was directed by an EM resident and attending physician who had each cared for at least three cases during the 3 months.

For each resident and attending, we calculated the mean time to order antibiotics for the cases under their care. Then for each individual patient, we assigned a weight for the role of the patient's resident and attending physicians. The weight was the physicians' mean times adjusted by removing the AOT for

the individual patient. We then did backwards multiple linear regression of the AOT with independent variables being the resident and attending weights.

RESULTS: Among 169 patients of any resident type supervised by EM attendings, we found ‘considerable’ heterogeneity with I^2 of 91%. Among 149 cases managed by EM residents, we found considerable heterogeneity with I^2 of 80%. Limiting to 126 patients that were cared for by 19 EM residents and 21 attendings, the mean AOT was 98 minutes. Neither the attendings’ nor the residents’ weights significantly contributed to the variation in patients’ AOTs.

CONCLUSIONS: In this initial analysis, there was considerable heterogeneity in mean AOT across both resident and attending physicians. Within each resident and attending category, some providers on average demonstrated quicker AOTs compared to peers. Considering the practice environment is constant, the heterogeneity in mean AOT suggests differences in practice patterns. These results support the role of positive deviance in identifying and disseminating best resident and attending practices.

LEARNING OBJECTIVE #1: Learn how to quantify heterogeneity in health care delivery in order to guide practice-based learning and improvement.

LEARNING OBJECTIVE #2: Learn when positive deviance may be used for practice-based learning and improvement.

DEVELOPMENT AND VALIDATION OF AN AUTOMATED WRONG-PRN MEDICATION ERROR MEASURE: PRELIMINARY RESULTS

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BACKGROUND: Medications that should have been ordered pro re nata (PRN) have been inadvertently ordered at scheduled times, with some errors resulting in serious adverse outcomes. However, there is a lack of understanding of how often and why these errors occur (1). A previously validated automated measure, the Wrong-Patient Retract-and-Reorder (RAR) measure, has been successfully used to quantify and evaluate near-miss wrong-patient orders (2,3). We developed and validated an automated measure to identify near-miss Wrong-PRN orders applying the RAR approach.

METHODS: We developed a Wrong-PRN RAR measure to identify medication orders that are retracted (canceled) within 30 minutes, then reordered within 10 minutes by the same clinician for the same patient, with a change from PRN to scheduled or vice versa. Between June 2019 and October 2020, a convenience sample of clinicians who placed these orders were contacted within 6 hours of the event. Phone interviews were conducted to verify that the event was an error and to identify the reason for the change. Two clinicians reviewed the interview narratives and classified the events as True Positives (TPs) or False Positives (FPs). Positive predictive value (PPV) was calculated as TP/(TP+FP) with exact binomial confidence interval (CI). Interviews were qualitatively analyzed based on a well-established classification of human error (4). Disagreements were discussed by reviewers to resolution. The rate of Wrong-PRN orders at our large multi-center hospital system was then estimated using this preliminary measure.

RESULTS: To date, interviews were conducted for a total of 50 events. 39 cases were classified as errors for a PPV of 78.2% (95% CI, 64.0%-84.5%). TPs were due to execution errors (e.g., data entry errors) in 66.7% of cases and planning errors (e.g., knowledge deficits) in 28.2% of cases. Events were classified as FPs if changes were made because of new clinical information or patient preference. Applying the measure to all medication orders placed in 2019 (N=6,187,363) revealed 1,904 Wrong-PRN events or 31 per 100,000 orders, with 72.8% ordered as standing when PRN was intended. We captured 323 events related to opioid prescribing, with 88.2% ordered as standing when PRN was intended.

CONCLUSIONS: Preliminary results suggest the Wrong-PRN RAR measure can accurately estimate Wrong-PRN errors with a high PPV of 78.2%.

Qualitative analysis demonstrated these errors are more often execution failures than planning failures. The Wrong-PRN RAR measure can be used to evaluate interventions aimed at decreasing the incidence of these events.

LEARNING OBJECTIVE #1: Describe an automated measure used to identify PRN order errors using the RAR (retract and reorder) method.

LEARNING OBJECTIVE #2: Understand the rate and types of wrong PRN events using this preliminary Wrong-PRN RAR Tool.

DEVELOPMENT OF A MULTICOMPONENT INTERVENTION TO DECREASE RACIAL BIAS AMONG HEALTHCARE STAFF

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BACKGROUND: Perceived discrimination contributes to lower quality of care for black compared to white patients. Some perceived discrimination comes not from physicians and nurses (MD/RNs), but from non-MD/RNs, such as receptionists and licensed practical nurses.

METHODS: Utilizing the evidence-based Burgess Model for racial bias intervention development, we developed an online intervention with five, 30-minute modules: 1) history and effects of discrimination and racial disparities in healthcare, 2) what is implicit bias and how it may influence interactions with patients, 3) strategies to handle stress at work, 4) strategies to improve communication and interactions with patients, and 5) personal biases. Modules were designed to increase understanding of bias, enhance internal motivation to reduce bias, enhance emotional regulation skills, and increase empathy in patient interactions. Intervention recruitment materials were distributed to non-MD/RN staff in six primary care clinics. Effectiveness of the intervention was assessed using outcomes of implicit and explicit racial bias measured using the Implicit Association Test and Symbolic Racism Scale, respectively, as well as several other scales measured pre/post intervention. Acceptability was assessed through quantitative and qualitative feedback from participants.

RESULTS: There were 57 non-MD/RN staff who enrolled. Out of these, 23 completed pre- and post- intervention assessments and were included in the study. The majority who did not complete the intervention were white. Age of participants was 43.2. The majority were black, with less than college education. Implicit bias d-score was 0.22 (slight pro-white bias) and -0.06 (no pro-white bias) pre-and post-intervention, respectively (p=0.012). Explicit bias score was 36.6 and 35.3 pre- and post- intervention, respectively (p=0.070). Participant rating of each module, scored on a scale from 1 (strongly disagree) to 5 (strongly agree), for questions including whether “the presentation was well organized,” “it was made clear how to apply the presented content in practice,” and “this module was worth the time spent” was ≥ 4.1 for all modules. When asked whether participants would “use stress management strategies,” “use strategies to control [their] own biases when interacting with patients,” and “display empathy when interacting with patients,” all scores for each response averaged ≥ 4.1 . When asked “How likely are you to recommend this online course to [others],” 29% responded they would definitely recommend and 60.5% responded they would probably recommend the training.

CONCLUSIONS: There was a decrease in implicit pro-white bias after the intervention. Intervention materials were highly rated, and participants reported they would engage in skills they were taught during the intervention.

LEARNING OBJECTIVE #1: Learn about an intervention that has the potential to lower perceived discrimination for patients

LEARNING OBJECTIVE #2: Understand that physicians and nursing staff are not the only source of perceived discrimination for patients

DO WE REALLY NEED THOSE LABS: A STUDENT-LED INVESTIGATION OF CROSS-DISCIPLINARY ATTITUDES ON DAILY LAB ORDERING IN ACADEMIC INPATIENT MEDICINE

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BACKGROUND: Over-ordering of daily labs affects patient safety through hospital-acquired anemia, patient discomfort, frontline staff burden, and unnecessary downstream testing resulting in the delivery of low-value care. Routine ordering of unnecessary tests occurs for many reasons and can additionally increase cost of care. At our center, previous interventions have targeted lab ordering, but have struggled to remain sustainable. Our student-run project, as part of a high value care curriculum, set out to understand current state practice and local culture to inform future high-value care and quality improvement interventions to target over-ordering of daily labs.

METHODS: We employed mixed methods to assess lab ordering behaviors and attitudes at an urban quaternary academic medical center. Electronic medical record (EMR) data was gathered to assess the number of daily labs (BMP, CMP, and CBC) ordered on a general medicine unit from June-October 2020. We surveyed internal medicine (IM) attendings, residents, physician assistants (PA), nurse practitioners (NP), registered nurses (RN), and patient care associates (PCA) to understand cross-professional beliefs and attitudes about daily lab testing.

RESULTS: An average of 2.2 labs were collected per patient day. This was an increase from the 1.3 labs per patient day found in a similar patient population from March 2016 to August 2017 after the last daily lab reduction intervention. A widely distributed survey yielded 127 frontline staff responses: 29 (22.8%) attending physicians, 43 (33.9%) resident physicians and fellows, 12 (9.4%) PAs, 10 (7.9%) NPs, 14 (11.0%) RNs, and 19 (15%) PCAs. Of the 94 ordering providers (MD, DO, PA, NP), 73% thought they were unnecessary. No attending physicians designated daily lab testing as necessary, in contrast to 10% of NPs, 33% of PAs and 25% of residents. Only 29% of ordering providers agreed that daily testing improved patient care and safety; moreover, 89% believe it has potential harms. Of the residents, NP, and PAs, 68% cited worry over attending reaction and 97% cited training/habit as a reason for ordering unnecessary labs.

CONCLUSIONS: Analysis of prior interventions on unnecessary lab testing has demonstrated a strong need for sustainable interventions to improve patient care and reduce costs. Our multidisciplinary survey highlights a major discrepancy between attendings and other ordering providers on the necessity of daily tests. These results reveal the potential impact of planned PDSA (plan-do-study-act) cycle interventions including planned educational sessions, the initiation of monthly audit and feedback email, and attending-led rounding discussions on necessary labs.

LEARNING OBJECTIVE #1: To describe the current state of daily labs ordered per patient in the context of prior interventions to reduce lab burden as a means to identify areas of improvement for future quality initiatives.

LEARNING OBJECTIVE #2: To assess interdisciplinary attitudes on daily laboratory testing to develop a sustainable quality improvement intervention.

EFFECTIVENESS OF QUALITY IMPROVEMENT COACHING: A SYSTEMATIC REVIEW

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BACKGROUND: A culture of improvement is an important feature of a high-quality health care system. However, healthcare teams need support to translate quality improvement (QI) activities into practice. One method of support is external consultation from a QI expert. The literature suggests QI coaching positively impacts clinical outcomes. However, the impact of coaching on process outcomes, such as adoption of evidence-based clinical care activities, is unknown. We investigated the effect of QI coaching on practice- or clinical team-level improvement activity behaviors and process outcomes.

METHODS: Searches were conducted in MEDLINE, Embase, CINAHL Complete from inception through October 2019, and limited to English-language. Eligible studies addressed the process of care outcomes, used an EPOC study design, and included adoption of targeted processes of care. Two reviewers assessed study and intervention characteristics for study quality, strength of evidence, and risk of bias (via the Cochrane Effective Practice and Organization of Care ROB tool). We grouped interventions by provider action complexity by process of care activity. We did not perform meta-analyses due to study design and outcome heterogeneity but synthesized the data narratively supported by a vote-counting method based on direction of effect.

RESULTS: We identified 1,753 articles, of which 19 cluster-randomized trials were eligible (range 32- 186 practices; ROB 5 low, 10 unclear, 4 high). All but one took place in primary care. Overall, interventions targeted multiple simultaneous processes of care activities requiring disparate clinical behaviors (e.g., ordering a lab test, complicated patient counseling), that were usually linked by a common goal (e.g., improving disease management). A median of 5.73 implementation strategies (range 3 to 9) were delivered by the coach over 6 to 36 months. The most common coach-delivered implementation strategies were to develop a formal implementation plan (n = 18 studies), audit and provide feedback (n = 17), and develop/distribute educational materials (n = 14). We found very low to low certainty that coaching probably has a beneficial effect on composite process of care outcomes (across 7 studies) and ordering of labs and vital signs (n=5); possibly has a beneficial effect on changes in organizational process of care (n=5), appropriate documentation (n=4), and delivery of appropriate counseling (n=2). Heterogeneity across interventions components, outcome measures and practice settings was noted.

CONCLUSIONS: QI coaching is a complex intervention that has the potential to expand the capacity for improvement activities at the team and practice levels. Future research that standardizes coaching interventions will better support future comparisons and implementation efforts.

LEARNING OBJECTIVE #1: To be able to articulate the effect of QI Coaching within the context of practice-based learning and quality improvement.

LEARNING OBJECTIVE #2: To be able to articulate the effect of QI Coaching within a Systems-Based Practice setting.

ESTABLISHING A SHARED UNDERSTANDING DURING COVID-19: INCOMING INTERNS FIND AN EXPERIENTIAL PATIENT SAFETY ORIENTATION EFFECTIVE PREPARATION FOR DAY 1

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BACKGROUND: First Night-onCall (FNOC) was designed in 2017 to introduce incoming interns to the institutional safety culture and expectations in order to create a shared mental model of patient safety. Due to COVID-19, adaptations to FNOC 2020 included properly donning/doffing PPE and engaging in simulated patient encounters with full PPE, and addressing interns' COVID-19 patient care concerns. We describe the 2020 program and incoming intern performance.

METHODS: FNOC 2020 included pre-work (online modules on common clinical coverage issues), an in-person immersive simulation, and debriefing. During the 3hr in-person portion of FNOC, new interns, in a Group-OSCE (GOSCE) format were challenged to evaluate a decompensating hypotensive remote standardized patient and activate a rapid response team (escalation),

recognize a mislabeled blood culture bottle, conduct an effective patient handoff, and then don/doff PPE and engage in a mannequin-based team simulation in full PPE. The entire experience was debriefed with faculty, addressing COVID-19 patient care concerns, and interns received a resource guide. To maximize safety and feasibility, a group of 40 interns was scheduled for each 3hr block. Half completed the GOSCE portion while the other half completed the PPE portion, and after 70mins the groups switched. Remote standardized patients and nurses assessed interns using behaviorally-anchored checklists.

RESULTS: In June 2020, 215 incoming interns across 17 residency programs completed FNOC. Our needs assessment revealed that only 26% of incoming interns reported any formal patient safety training and only 16% reported having seen and cared for a COVID-19 patient. During FNOC, performance was variable across the group activities: 75% of groups called a rapid response team but only 6% contacted the senior resident for the decompensating patient, and only 30% of groups recognized the label error for blood cultures and alerted the nurse. Post FNOC, more than 91% of interns reported increased comfort in speaking to a supervisor, escalating a situation, reporting a medical error, and checking 2 patient identifiers. There were also changes in comfort related to COVID-19 care: caring for a COVID-19 patient shifted from 22% to 80% and donning/doffing PPE shifted from 61% to 93% post-FNOC. Program evaluation revealed that almost all interns agreed/strongly agreed that FNOC was an effective, fun, and engaging way to learn patient safety and improve readiness-for-internship.

CONCLUSIONS: Group simulations like FNOC can be rapidly adapted to the educational needs of incoming interns in order to provide an engaging, feasible, safe, and meaningful orientation experience that is well-received by learners. This type of educational experience can also develop and evolve a shared mental model, and provide a useful framework for effective on-boarding of novice healthcare providers.

LEARNING OBJECTIVE #1: Summarize components of an effective patient safety orientation.

LEARNING OBJECTIVE #2: Identify assessments to capture resident performance.

EVALUATING THE SHARED DECISION MAKING PROCESS SCALE IN PATIENT-PROVIDER CONVERSATIONS ABOUT CANCER SCREENING AND MEDICATION DECISIONS

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BACKGROUND: Shared decision making (SDM) is a recommended model for engaging patients in cancer screening decisions as well as treatment of common conditions such as high cholesterol. The Shared Decision Making (SDM) Process scale, a short, patient-centered measure, evaluates if 4 main constructs were present during the conversation between the patient and provider: discussion of options, the pros and cons of each option, and preferences. The SDM Process scale has been validated for surgical decisions; here we extend the validity of the SDM Process scale in cancer screening and medication decisions.

METHODS: Primary and secondary data analyses were conducted using data from 6,174 patients across 3 cancer screening topics (breast, colon, prostate) and 4 medication topics (menopause, depression, high blood pressure, high cholesterol). Each study contained the SDM Process scale (range 0-4; higher values indicate greater SDM occurred). To establish construct validity, we examined whether higher SDM Process scores were associated with higher decision quality, higher SURE scores (a measure of lack of decisional conflict), and lower decision regret using meta-analysis across studies for both cancer screening and medication topics.

RESULTS: Average SDM Process scores ranged from 1.2 for breast cancer screening topic to 2.5 for high blood pressure medication topic with no evidence of floor or ceiling. There was not a significant relationship between

SDM scores and decision quality for cancer screening ($d=-0.04$, CI(-0.27, 0.18), $p=.684$) or medication decisions ($d=-0.09$, CI(-0.40, 0.22), $p=0.578$). Overall, there was a moderate, positive effect between SDM Process scores and SURE scale scores in cancer screening ($d=0.61$, CI(0.38, 0.84), $p<.001$) and medication decisions ($d=.36$, CI(.29, .44), $p<.001$). Higher SDM Process scores were associated with lower decision regret in both cancer screening ($d=-0.23$, CI(-0.36, -0.12), $p<.001$) and medication decisions ($d=-0.30$, CI(-0.40, -0.20), $p<.001$). Significant heterogeneity was found in most analyses.

CONCLUSIONS: The results provide evidence of the validity of the SDM Process scale as a measure of SDM for cancer screening and medication decisions. Low SDM Process scores indicate gaps in SDM that should be improved to ensure patients are engaged and making informed medical decisions.

More work is needed to examine the lack of relationship between decision quality and SDM process in these settings.

LEARNING OBJECTIVE #1: Be able to identify the 4 main constructs of the Shared Decision

Making Scale used to measure the quality of patient-provider conversations about cancer screening and medication decisions.

(ACGME Core Competencies: Patient Care)

LEARNING OBJECTIVE #2: Understand the relationship between the SDM Process scale and decisional conflict, decision regret, and decision quality.

(ACGME Core Competencies: Interpersonal and Communication Skills)

EVALUATION OF A PHARMACIST-GUIDED HYPERTENSION MANAGEMENT PROGRAM THROUGH NURSE BLOOD PRESSURE VISITS

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BACKGROUND: While multidisciplinary team-based care has repeatedly demonstrated positive outcomes for improving blood pressure (BP) control, not every patient with uncontrolled hypertension is able to see a pharmacist. To increase access to pharmacist interventions without requiring a comprehensive pharmacist visit, the pharmacist-guided, nurse BP visit hypertension management program was developed. The primary objective of this study was to compare the change in BP between usual care and pharmacist-guided care. Secondary objectives included comparing the proportion of patients achieving blood pressure <130/80 mmHg at first follow-up visit, the percentage of nurse BP visits resulting in an intervention, and the average time for a provider to develop a plan.

METHODS: This was a retrospective, pre-post study conducted at Cleveland Clinic. Included patients were 18-79 years, had a prior diagnosis of hypertension, and a systolic BP greater than or equal to 130 mmHg or diastolic BP greater than or equal to 80 mmHg at a nurse BP visit. Patients were excluded if they had hypertensive urgency/emergency. All patients were included based on inclusion/exclusion criteria between August 1, 2018-January 31, 2019 for usual care and February 1, 2019-July 31, 2019 for pharmacist-guided care. Intervention was defined as medication adjustment, addressing adherence, ordering lab to guide therapy, or placing pharmacy consult for disease state management. Time to develop a plan was calculated in the electronic record when charts were sent to and from providers. The primary and secondary objectives were analyzed using independent student's t-test, Chi-square test, and descriptive statistics.

RESULTS: The study included 219 patients, 125 in usual care and 94 in pharmacist-guided care. The median age was 60 years, 45% male, and 28% white race and there was no significant difference between groups. At baseline, the mean systolic BP was 136 mmHg for usual care and 135 mmHg for pharmacist-guided care and had no statistical difference between groups ($p=0.64$). Compared to usual care, pharmacist-guided care resulted in a greater reduction in systolic BP (mean difference 5.45 mmHg; 95% CI 0.83-10.08) and diastolic BP (mean difference 3.43 mmHg; 95% CI 0.51-6.35); more patients achieving controlled BP at first follow-up visit (14% vs 32%, $p=0.018$); and more interventions (39% vs 73%, $p<.001$). There was no statistically significant difference between usual and pharmacist-guided care regarding time for provider to develop a plan.

CONCLUSIONS: Pharmacist-guided care through nurse BP visits is an innovative way to increase access to pharmacist interventions to improve BP control without requiring a comprehensive pharmacist visit.

LEARNING OBJECTIVE #1: Explain how involving a pharmacist in nurse BP visits improves BP control

LEARNING OBJECTIVE #2: Describe the most common interventions utilized by pharmacists to help overcome clinical inertia in patients with uncontrolled hypertension

EVALUATION OF PROPHYLACTIC ANTIBIOTIC REGIMENS FOR SPONTANEOUS BACTERIAL PERITONITIS AT DISCHARGE BASED ON LOW PROTEIN ASCITIC FLUID CRITERIA

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BACKGROUND: Cirrhosis represents a significant burden to patients and healthcare systems often necessitating frequent readmission, longer lengths of stay, and significant morbidity. Ascites, primarily the result of positive sodium balance and disordered splanchnic circulation, occurs in approximately 60% of cirrhotic patients within 10 years of initial diagnosis and is a marker of poor prognosis. The development of spontaneous bacterial peritonitis (SBP) is associated with a 17% mortality rate and 1 year recurrence rate of 68% without prophylactic antibiotic administration. Prophylactic antibiotic administration has been demonstrated to reduce first time diagnosis rate from 61% to 7% and recurrence rate to 20%. Long term administration of antibiotics is recommended for patients with a diagnosis of SBP or those who have ascites with albumin content <1.5g/dl and serum sodium <130mEq/l, and/or BUN >=25mg/dl, and/or total bilirubin >=3mg/dl, and/or serum creatinine >1.2mg/dl, and/or Child-Pugh Score >=9.

METHODS: We conducted an IRB-approved, retrospective analysis of all patients from a single tertiary referral center who received paracentesis with albumin content <1.5g/dl and serum sodium <130mEq/l, and/or BUN >=25mg/dl, and/or total bilirubin >=3mg/dl, and/or serum creatinine >1.2mg/dl during the calendar years 2016-2020. We evaluated the cohort's discharge medication regimens for the inclusion of either ciprofloxacin or trimethoprim-sulfamethoxazole and subsequent readmission with diagnosis of SBP and/or in hospital mortality. Frequency and descriptive statistics were used to generate measures of prevalence in the population of interest.

RESULTS: This preliminary analysis compares medication regimens in 497 patients who met criteria for prophylactic antibiotic administration. A total of 60 (12%) patients received either ciprofloxacin or trimethoprim-sulfamethoxazole at discharge. Of the 497 patients who met criteria, 89 (18%) had a diagnosis of SBP, 65 (13%) during the index admission, and 24 (5%) on a subsequent admission. Of the 24 diagnosed with SBP on a subsequent admission 12 (2%) died.

CONCLUSIONS: SBP is a frequent complication of decompensated cirrhosis with ascites and requires prompt identification given its high risk of mortality. We found that 12% of patients who met criteria were given appropriate antibiotic therapy at discharge. In hopes to reduce readmission, and improve mortality, we encourage clinicians to remain vigilant when it comes to patients with decompensated cirrhosis with ascites and place qualifying patients on prophylactic antibiotics at discharge.

LEARNING OBJECTIVE #1: A physician's medical knowledge is the core of their practice. Through evidence based practice and continued education, we strengthen our commitment to patient care and well-being.

LEARNING OBJECTIVE #2: A critical portion of medical advancement is identifying areas of weakness and improvement upon those. We assessed an area in patient care, in hopes to improve our hospital, practice patterns, and patient outcomes.

FACILITATORS AND BARRIERS TO THE IMPLEMENTATION OF TEAM-BASED, QUALITY IMPROVEMENT COACHING: A QUALITATIVE EVIDENCE SYNTHESIS

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BACKGROUND: Health care teams benefit from guidance on how to achieve quality goals. Coaching from a trained expert in quality improvement (QI) enables the adoption of evidence-based interventions into clinical practice by building and catalyzing organizational capacity for sustained improvement processes. Yet, we know little about how to implement QI coaching. We examined the facilitators and barriers to implementing QI coaching in a large health care system.

METHODS: Content experts external to the core team provided input that shaped eligibility criteria, search terms, and analytic approach. Searches were conducted in MEDLINE, Embase, CINAHL Complete from inception through October 2019, and limited to English-language. We included primary qualitative studies designed to evaluate determinants of uptake of QI coaching by a health care delivery team. We employed a best-fit framework approach using 5 domains (Context, QI Coach, Team, QI project, Patient) drawn from the Consolidated Framework for Implementation Research (CFIR) and the socioecological framework to guide abstraction and analysis. We used thematic synthesis to identify facilitators and barriers by CFIR domain and matrix analysis to analyze data. Risk of bias was assessed using the Critical Appraisal Skills Programme tool.

RESULTS: Sixteen studies were included in our review. We found multiple terms used to describe QI coaches. QI coaching was employed to improve cardiovascular health, electronic health record use, chronic disease management, and improvement of general QI capacity. Key barriers by domain included: 1) Context (any level of organization outside of team being coached): lack of practice engagement, lack of data resources or time; 2) QI coach: not providing desired support, lack of clinical or technical knowledge; 3) Team (unit receiving coaching): lack of QI knowledge, resistance to change, limited engagement with data; 4) QI project (improvement activity on which team was coached): mismatch of team and project, inability to access QI data. Key facilitators by domain were: 1) Context: open-minded practice culture, relationship with the coach, resources; 2) practice engagement, knowledge of QI tools and strategies; 3) Team: open attitude, instrumental support, relationship with the coach; 4) QI project: fit of QI project and team, high-quality improvement materials. No barriers or facilitators were found at the patient level. Our approach is limited by heterogeneity from drawing from across scholarly fields and the choice of guiding framework.

CONCLUSIONS: We found that QI coaching is a complex intervention that requires alignment with both big picture and local level contextual factors. A clear understanding of potential barriers and facilitators may help QI coaches develop an awareness of methods to mitigate encountered barriers.

LEARNING OBJECTIVE #1: Describe the barriers and facilitators of QI coaching within a practice-based learning and improvement environment

LEARNING OBJECTIVE #2: Describe how QI coaching can be implemented within a systems-based practice

FRAILITY, SELF-REPORTED GAPS IN CARE COORDINATION, AND PREVENTABLE ADVERSE EVENTS: THE REGARDS STUDY.

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BACKGROUND: Older adults who are frail may have complex healthcare needs which are often managed by multiple healthcare providers. Having

multiple providers may increase risk for gaps in care coordination and adverse events which could be preventable through better care coordination. It is unknown whether those who are frail are, in fact, at higher risk of gaps in care coordination and preventable adverse events, compared to those who are not frail.

METHODS: We conducted a cross-sectional analysis of community dwelling adults aged ≥ 65 years from the Reasons for Geographic And Racial Differences in Stroke (REGARDS) study who attended an in-home study examination in 2013-2016 and completed a survey on experiences with healthcare in 2017-2018 ($n=5,024$). Using 5 frailty indicators adapted from the Fried criteria (low body mass index, exhaustion, slow walk, weakness, and history of falls), participants were categorized into 3 mutually exclusive groups: not frail (0 indicators), intermediate frail (1-2 indicators), and frail (3-5 indicators). Participants' reports of gaps in care coordination were measured using previously validated questions, assessing up to 7 gaps. Participants reported any of 4 types of adverse events that they thought could have been prevented with better communication among their providers: a drug-drug interaction, a repeat test, an emergency department visit, or a hospital admission. We adjusted for 17 potential confounders.

RESULTS: Among 5,024 participants (mean age 73.5 years, 55.7% female, 32.2% black) 47.7%, 48.5% and 3.8% were not frail, intermediate-frail, and frail, respectively. The prevalence of ≥ 1 gap in care coordination was 36.3%, 40.1%, and 47.9% among participants who were not frail, intermediate-frail and frail, respectively. The prevalence of ≥ 1 adverse event was 7.0%, 11.3% and 20.0% among participants who were not frail, intermediate-frail and frail, respectively. The adjusted risk ratio (RR) with 95% confidence interval (CI) for ≥ 1 gap in care coordination among those intermediate-frail and frail versus not frail was 1.10 (1.01, 1.20) and 1.36 (1.13, 1.64), respectively. The adjusted RR (95% CI) for ≥ 1 adverse event among those intermediate-frail and frail versus not frail was 1.60 (1.28, 2.01) and 2.47 (1.64, 3.73), respectively. Among participants intermediate-frail or frail, the adjusted RR (95% CI) for having ≥ 1 adverse event associated with having ≥ 1 versus 0 gaps in care coordination was 1.41 (1.11, 1.81).

CONCLUSIONS: Among older adults, frailty appears to be associated with an increased risk for gaps in care coordination and adverse events attributable to poor care coordination.

LEARNING OBJECTIVE #1: Determine whether older adults with frailty are at higher risk for gaps in care coordination or preventable adverse events compared to their counterparts without frailty

LEARNING OBJECTIVE #2: Among older adults with frailty, determine whether gaps in care coordination are associated with preventable adverse events

FRAMING THE (VIDEO)CALL TO ACTION IN PRIMARY CARE WITHIN VISN 6

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BACKGROUND: The COVID-19 pandemic has dramatically increased the adoption of telehealth as a means to mitigate possible exposure and transmission of the SARS-COV-2 virus. The vast majority of the increase in telehealth within the Veterans Health Administration (VHA) has been via phone rather than video-visits. Given that video communication has been associated with improved patient satisfaction and comprehension, video telehealth remains an underutilized part of the telehealth "toolkit" within the VHA. As part of a mixed methods quality improvement (QI) initiative to understand and improve video telehealth in our region, we evaluated primary care visit modality stop codes during a six-month period in the Veterans Integrated Service Network 6 (VISN 6) region. This work is classified as non-research by the Durham VA IRB.

METHODS: Primary care visit stop codes for Face to Face (F2F), phone, and VA Video Connect (VVC) within VISN 6 from 6/28/20-12/27/20 were pulled from the Clinical Data Warehouse into Microsoft Power BI analytic software for analysis. VISN 6 includes four VA Medical Centers in North Carolina (Durham, Asheville, Fayetteville, Salisbury) and three in Virginia (Hampton, Richmond, Salem). Sites have been de-identified and randomly assigned letters

A-G. Qualitative interviews with key stakeholders to identify barriers to video telehealth utilization are underway.

RESULTS: Across the seven sites, the average number of total visits during this time period was 105,016 per site. The average percent of VVC visits was 4.8% with a range from 0.7% to 16.7%. The average percent of phone visits was 65.9% with a range from 42.1% to 80.5%. The average percent of F2F visits was 29.3% with a range from 15.1% to 56.3%. See table for full results.

CONCLUSIONS: The significant variability in video telehealth utilization ranging from less than 1% at several sites to nearly 17% underscores the importance of identifying and addressing site-specific barriers preventing increased video telehealth adoption. This project has prompted qualitative interviews with key stakeholders at both high and low performing sites to explore site-level variability of video visit uptake and is guiding QI work within the VISN. As long as the pandemic continues to force health systems to limit in-person care, QI efforts within telehealth must remain a priority.

LEARNING OBJECTIVE #1: Learners will understand the importance of using data to inform practice-based learning and QI efforts.

LEARNING OBJECTIVE #2: Learners will appreciate the use of data to inform QI work within a large health system as part of systems-based practice

HBV SCREENING PRACTICES AT UNIVERSITY OF WASHINGTON AFFILIATED PRIMARY HEALTH CARE CLINICS

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BACKGROUND: Globally, an estimated 257 million people are chronically infected with hepatitis B virus (HBV), the majority of whom reside in low-and-middle-income countries. The Centers for Disease Control and Prevention (CDC) recommends HBV screening in all people born in countries with a $\geq 2\%$ prevalence of chronic HBV; however, how closely primary care providers adhere to this recommendation is not clear. This study assessed adherence to CDC HBV screening guidelines for foreign-born persons at all University of Washington (UW) affiliated primary care clinics.

METHODS: We queried the electronic medical record system (EMR) to identify people eligible for HBV screening based on CDC country prevalence guidelines. Patients aged ≥ 18 years who established care at any of the UW primary care clinics in the year 2016, and had at least one additional follow-up visit through the end of 2019, were included in the study. Country of origin and primary language were used to identify people from countries with an HBV carrier rate $\geq 2\%$. The presence of a hepatitis B surface antigen (HBsAg) test completed anytime during the follow up period was used to identify patients who had successfully been screened for chronic HBV. Age, sex, race, clinic and insurance status were extracted from the EMR. Descriptive statistics were used to compare patients who had and had not received HBV screening. Wald Chi-square test was used to identify correlates and calculate relative risk ratios (RR) of HBV screening.

RESULTS: We identified 2506 people from HBV endemic countries across 42 clinics. Of these, 753 (30%) underwent HBsAg screening and 51 (6.8%) were HBsAg positive. Among women of reproductive age (18-44 years, $n=979$), 298 (30%) were screened for HBsAg, and 9 (3%) were HBsAg positive. Patients screened for chronic HBV were more likely to be African-born (RR 1.3, 95% confidence interval [CI] 1.19-1.41, $p<0.001$), had no insurance (RR 1.39, 95% CI 1.23-1.56, $p<0.001$), and were seen at one of our safety-net public hospital affiliated clinics (RR 2.52, 95% CI 2.25-2.81, $p<0.001$).

CONCLUSIONS: Eight years after the revised CDC HBV screening guidelines, less than one-third of eligible foreign-born patients were screened for chronic HBV infection within our primary care clinic system. The prevalence of HBV infection among those who were screened (6.8%) is consistent with that of high HBV prevalence countries. Assuming the same prevalence across those not screened, twice as many cases were potentially missed than diagnosed. Urgent efforts are needed to scale up and consistently implement HBV screening among people from HBV-endemic countries to prevent the transmission and long-term complications of chronic HBV infection.

LEARNING OBJECTIVE #1: to use the electronic medical record system to identify population groups from high hepatitis B prevalent countries

LEARNING OBJECTIVE #2: to identify the gap and missed opportunity on hepatitis B screening

IDENTIFYING DELAYS IN OUTPATIENT FOLLOW-UP OF ELEVATED SERUM POTASSIUM TEST RESULTS

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BACKGROUND: Delays in follow-up of abnormal test results is a common problem in the outpatient setting and a major patient safety concern. Developing automated algorithms using the electronic health record (EHR) database to search for evidence of inadequate follow-up of test results has shown promise in reducing these delays in care. Hyperkalemia is a common abnormal test result in the outpatient setting and is associated with increased all-cause mortality. This study's aim was to identify the prevalence of moderately elevated serum potassium results without adequate follow-up, and to develop an automated trigger tool to improve patient safety in the ambulatory setting.

METHODS: We conducted a retrospective cohort study between December 2018 and December 2020 to identify the prevalence of moderately abnormal serum potassium results (5.5 – 5.9 mEq/L) at three VHA divisions. We excluded tests ordered from the Emergency Department, Dialysis Clinic or Inpatient settings. Next, we applied two criteria to detect evidence of appropriate test result communication: a) The presence of either a follow-up serum potassium lab order or potassium result within 21 days; b) clinical note search for specific text phrases that identified communication of abnormal results. We compared the results from this algorithm to a gold standard of chart review evidence of test result communication. We reviewed clinical notes from a random sample of 210 results and documented the first date of chart evidence of result communication to the patient.

RESULTS: Among the 389,943 Veterans seen at three VHA sites over two years, we identified 1,395 instances of moderately elevated serum potassium. Our algorithm identified 556 (39.9%) with no evidence of a repeat lab test order or result within 21 days and 251 (18.0%) with no evidence of chart documentation of communication within 21 days. Of 60 cases reviewed that triggered positive for missing or delayed communication, 54 were confirmed on chart review to have missing communication. Of 150 cases that the trigger tool detected communication to the patient, 140 on chart review were found to have evidence of communication to the patient. This trigger tool thus yielded the following performance per sensitivity analysis: positive predictive value 90% (95% CI 79% - 96%), negative predictive value 93% (95% CI 88% - 97%), sensitivity 84% (95% CI 73% - 92%), and specificity 96% (95% CI 91% - 98%).

CONCLUSIONS: An automated trigger tool accurately detected missing or delayed communication to patients with moderate hyperkalemia. Given the prevalence of elevated potassium results, this tool may be useful for patient safety monitoring efforts at the level of health systems, clinics, or even individual clinicians.

LEARNING OBJECTIVE #1: Identify the prevalence of delays in outpatient follow-up of moderately elevated serum potassium levels.

LEARNING OBJECTIVE #2: Development and validation of an automated electronic algorithm, using both lab and clinical notes, to identify whether follow-up of elevated potassium results occurred.

IMPACT OF POSSIBLE TARDIVE DYSKINESIA (TD) ON PHYSICAL ABILITY, FUNCTIONING, AND OVERALL HEALTH STATUS IN PATIENTS AWARE OF THEIR TD STATUS

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BACKGROUND: Tardive dyskinesia (TD) is a persistent and potentially disabling movement disorder associated with exposure to dopamine receptor blocking agents including antipsychotics and antiemetics. Data from the real-world RE-KINECT study were analyzed to better understand the impact of TD on wellbeing and health state in patients who are aware of their TD movements.

METHODS: RE-KINECT included 204 adults with ≥ 3 months of antipsychotic exposure, ≥ 1 psychiatric disorder, and abnormal movements confirmed by a clinician as possible TD. Baseline data were analyzed in 82 patients with possible TD who subsequently completed ≥ 2 postbaseline visits and were aware of their symptoms. Patient-reported assessments included: impact of possible TD (“none”, “some”, or “a lot”) on physical abilities (talking, eating, breathing); Sheehan Disability Scale (SDS), with higher scores representing worse impact on functioning in work/school, social life, and family/home life (range, 0 [no impact] to 30 [maximum impact]); and the EQ-5D 5-Level visual analog scale (EQ-5D-5L VAS), with lower scores representing worse overall health (range, 0 [worst possible health] to 100 [best possible health]). Patients were also asked to indicate which psychiatric/medical condition(s) were most worrisome and required the most time to manage.

RESULTS: Of the 82 patients who were aware of their possible TD, self-reported impact of TD on physical activities was as follows: talking (none=62.2%, some=28.0%, a lot=9.8%); eating (none=65.9%, some=26.8%, a lot=7.3%); breathing (none=90.2%, some=8.6%, a lot=1.2%). Patients with “a lot” of self-reported TD impact tended to have worse functioning, as indicated by higher SDS total scores (mean SDS scores by impact level): talking (a lot=15.9, some=11.7, none=10.5); eating (a lot=15.3, none=11.4, some=9.6); breathing (a lot=26.1, none=11.4, some=8.4). Patients with “a lot” of self-reported TD impact also tended to have worse overall health, as indicated by lower EQ-5D-5L VAS scores (mean EQ-5D-5L VAS scores by impact level): talking (a lot=54.6, none=71.4, some=72.9); eating (a lot=48.6, none=71.1, some=73.5); breathing (a lot=39.9, some=65.7, none=70.8). Mental health was ranked highest by aware patients as the most worrisome condition, followed by movement disorders. Mental health and movement disorders required the most time to manage.

CONCLUSIONS: In RE-KINECT patients who were aware of their possible TD, “a lot” of negative impact on physical abilities was associated with greater functional impairment and diminished health status. Mental health and movement disorders were the most worrisome conditions and required most time management. The results indicate the importance of asking patients and/or caregivers how TD affects their daily lives and monitoring treatment in areas of most concern.

LEARNING OBJECTIVE #1: Understand the impact of TD on physical activities, functional ability, and overall health status

LEARNING OBJECTIVE #2: Describe how these impacts may be affected by patients' awareness of their TD symptoms

INTERNAL MEDICINE RESIDENTS' PERCEPTION OF GOALS OF CARE CONVERSATION VIA TELEMEDICINE

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BACKGROUND: Goals of Care (GOC) discussions are an important component of End of Life (EOL) planning. In the era of COVID-19 pandemic outpatient visits have transitioned to telemedicine making an already challenging conversation potentially more difficult

METHODS: As part of our quality improvement project aimed at increasing GOC conversations among internal medicine residents at the Orlando VA Medical Center, we anonymously surveyed our residents regarding their perceptions of GOC conversations via telemedicine in June 2020. The survey included 8 questions regarding resident perceptions of GOC discussion with patients who have high mortality and morbidity (high care assessment – CAN score of >95 has a 90-day rate of 22.6% for hospitalization or death) via telemedicine.

RESULTS: Twenty six of 35 (74%) residents completed the survey. Total of 92% felt GOC were extremely or very important for patients with CAN score > 95. Main obstacles included not enough scheduled clinic time (96%), patients and family having difficulty understanding poor prognosis (35%), and family disagreements (23%) (table 1). Only 42% felt extremely or somewhat comfortable having GOC discussion telephonically with slight improvement to 53% feeling extremely or somewhat comfortable if video was present. When asked about how telemedicine has affected their ability to complete GOC, 58% said it made it more difficult and quoting comments such as “Too sensitive topic to discuss if it not face to face,” “Difficult to connect and achieve rapport,” “Lack of empathy and personal touch” as reasons. Interestingly, 34% reported that it made no difference, which suggests adequate comfort with telemedicine, a further 8% cited telemedicine made it easier for GOC conversations for reasons such as “Easier to have family members involved” and “Less no-shows to GOC appointments.”

CONCLUSIONS: IM residents perceive GOC as an important part of outpatient discussions in those with CAN score >95 and feel insufficient time as the main obstacle, but 58% are uncomfortable with GOC conversations via telemedicine. We need to identify whether it is telemedicine itself or the conversation that makes it uncomfortable. A possible survey could be done later on in the year to determine if perceptions have changed after a few months of telemedicine. Physicians need to equip themselves to become comfortable in having GOC via telemedicine

LEARNING OBJECTIVE #1: To determine obstacles faced by residents when having GOC conversations

LEARNING OBJECTIVE #2: To determine how telemedicine has affected residents communication and perceptions regarding GOC conversations

I-PREP: INPATIENT PRE-EXPOSURE PROPHYLAXIS REFERRAL, EDUCATION, AND PRESCRIBING

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BACKGROUND: Despite multiple studies supporting the safety and efficacy of pre-exposure prophylaxis (PrEP) for the prevention of HIV infection, many patients who are at high risk of HIV transmission are not treated with PrEP. HIV risk counseling and the initiation of PrEP have historically been limited to outpatient settings. Inpatient providers frequently encounter patients with active HIV risk factors who are not regularly connected to outpatient care and therefore may be less likely to have access to PrEP. Inpatient admissions represent an underutilized opportunity to counsel patients about HIV risk factors and initiate PrEP. The goal of this quality improvement initiative was to increase HIV PrEP prescribing and referrals to an outpatient PrEP clinic among hospitalized patients with active HIV risk factors.

METHODS: We developed workflows for inpatient PrEP screening, counseling, and initiation at an urban safety-net hospital in San Francisco, California. Inpatient providers screened patients for PrEP eligibility based on risk factors, medical contraindications, and patient interest. Interested patients were referred to an interdisciplinary HIV team for counseling, patient engagement, and care navigation. Patients who wanted to start PrEP were initiated inpatient or were linked to PrEP clinic or a primary care clinic for outpatient follow-up. Multiple PDSA efforts, including a formal survey assessing providers' knowledge, comfort, and perceived barriers to inpatient PrEP prescribing allowed for the tailoring of these efforts to achieve better implementation.

RESULTS: Prior to initiating this study, zero patients were referred to our hospital's outpatient PrEP clinic from inpatient providers. Over the first 9 months of the intervention, 39 inpatients were referred to the PrEP clinic and either received in-depth counseling from the HIV team prior to discharge or initiated PrEP before discharge. This initiative reached particularly vulnerable populations at risk for HIV: 79% were experiencing homelessness, 62% were people who inject drugs, and 57% identified as Black or Latinx.

CONCLUSIONS: PrEP counseling and initiation can be successfully incorporated into standard inpatient care. Utilizing inpatient admissions to engage at-risk patients in HIV prevention efforts may reduce disparities in HIV outcomes. More research is needed to evaluate patient-level barriers to

inpatient PrEP initiation as well as the longitudinal impact of initiating PrEP during a hospitalization compared to outpatient initiation.

LEARNING OBJECTIVE #1: Demonstrate that PrEP screening, counseling, and initiation can be incorporated into standard inpatient care in an urban safety net hospital in San Francisco, California.

LEARNING OBJECTIVE #2: Recognize that utilizing inpatient admissions to engage vulnerable patients in HIV prevention efforts may reduce disparities in HIV outcomes.

NEWS THAT WON'T BREAK THEIR HEARTS: DE-PRESCRIBING INAPPROPRIATE ASPIRIN USE IN PATIENTS IN THE AMBULATORY SETTING

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BACKGROUND: Cardiovascular disease accounts for 24% of deaths making it the leading cause of death worldwide. Aspirin has been widely used for both primary and secondary prevention of CAD. Aspirin has profound benefits in patients with ACS, stable angina, stroke or TIA, PAD, or carotid disease, PCI, or CABG. Meta-analysis based on three landmark trials showed a 22% reduction in nonfatal MI with aspirin use in high-risk patients older than 40. However, many adults are on aspirin without a clear indication. Aspirin has a significant bleeding risk (58%) with the most common being gastrointestinal bleeding and intracranial bleeding being rare. To mitigate the risks associated with inappropriate aspirin use, our project focused on identifying and deprescribing aspirin in patients in our resident clinic.

METHODS: Our on-going Quality Improvement project encompasses all patients over 40 who were prescribed aspirin and visit Cleveland Clinic affiliated resident outpatient clinics between November 2020-March 2021. Our initiative aims at de-prescribing inappropriate aspirin, which is defined as individuals who do not meet the ACC/AHA 2019 guidelines for aspirin use for primary prevention, which includes those between 40-70 years old not at increased risk of bleeding. We used Medication

Reconciliation to identify individuals using aspirin. Resident physicians received education on the latest guidelines for aspirin use. After conducting a PDSA cycle and understanding that patients also consumed OTC Aspirin, we inquired each patient irrespective of documentation, regarding their aspirin use. Patients were then counseled on discontinuing regular aspirin use and medication reconciliation was updated accordingly.

RESULTS: Our quality improvement initiative is still in its infancy. At this time, 137 patients were included in chart review of aspirin use. 51 (37%) patients were prescribed aspirin. 24 patients (47%) were prescribed aspirin for primary prevention, and 25 (53%) patients were prescribed aspirin for secondary prevention. Of the patients prescribed aspirin for primary prevention, 8 (33%) were inappropriately prescribed. Of the patients prescribed aspirin for secondary prevention, 0 were inappropriately prescribed. Common reasons for inappropriate prescribing for primary prevention included older age and low ASCVD risk score.

CONCLUSIONS: Low cost, ease of availability, and providers' lack of knowledge of current aspirin guidelines may lead to patients continuing aspirin inappropriately. Our project aims to reduce the number of patients that are taking aspirin inappropriately by educating residents on aspirin guidelines and updating medication reconciliations in the ambulatory setting.

LEARNING OBJECTIVE #1: To recognize the importance of regular medication reconciliation as a harm-reduction strategy in discontinuing potentially harmful medications.

LEARNING OBJECTIVE #2: Describe the risks and benefits of aspirin for primary prevention and determine when it is appropriate to stop low dose aspirin for primary prevention.

PATIENT SAFETY ROOM OF HAZARDS: DIFFERENCES IN HAZARD IDENTIFICATION AMONG DIFFERENT HEALTHCARE STAFF

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BACKGROUND: Hospital adverse events are common. While studies have used simulated rooms to assess healthcare students' skills in detecting safety hazards, few have explored the use of these rooms with hospital staff members. We sought to determine differences in safety hazard identification among physicians, nurses, and other staff members.

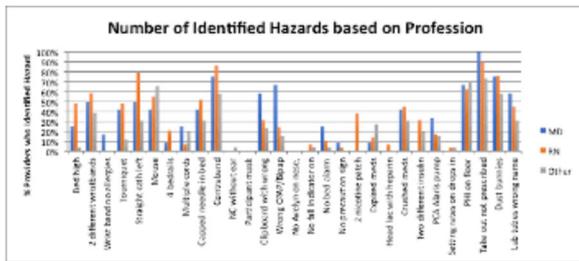
METHODS: Healthcare workers were invited to a simulated hospital room with intentionally placed safety hazards and asked to identify any observed hazards. Responses were transcribed and compared between physicians (MD), nurses (RN), and other staff members (Other). Data were analyzed using Chi square analysis with ad hoc testing using SPSS statistical software.

RESULTS: In total, 12 physicians, 29 nurses, and 26 other staff members participated in this study. Different professions identified different numbers of total hazards (Chi square =13.35, $p = 0.001$) with nurses identifying more hazards than other professions on ad hoc testing. (RN: 9.59, MD: 9.17, Other: 6.35). While nurses tended to identify errors associated with labeling/equipment (RN: 79.3%, MD: 50.0%, Other: 30.8%, $p = 0.001$), physicians and others identified visual hazards such as IV lines extending across a mannequin's body (MD: 83.3%, Other: 46.2%, RN: 13.8%, $p < 0.001$; Figure 1). All professions also had difficulty identifying hazards associated with absence of items (e.g. no precaution sign: MD: 8.3%, RN: 3.4%, Other: 0%) or hazards requiring two step logical thinking (e.g. IV heparin for patient with head laceration: MD: 0%, RN: 6.9%, Other: 0%).

CONCLUSIONS: Physicians, nurses, and other staff members identified different numbers of total hazards, and only a few participants identified hazards associated with absence of items or two step logical thinking. These findings suggest that skills in identifying safety hazards vary across healthcare professional groups. Additionally, participants identified visual/physical hazards more readily than hazards that could not be visualized. Future studies should target identification of hazards not easily recognized by all professions.

LEARNING OBJECTIVE #1: Evaluate differences in safety hazards identified among different professions

LEARNING OBJECTIVE #2: Appreciate interdisciplinary potential of safety hazard training among different professions



PERCEIVED BARRIERS TO COVID-19 TESTING AMONG HOSPITAL WORKERS

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BACKGROUND: Access to COVID-19 testing is a critical factor to reduce health care worker infection and protect the workforce. It is unknown what barriers to COVID-19 testing have contributed to the failure of widespread implementation of routine COVID-19 testing for hospital staff.

METHODS: All employees of an academic medical center were invited to participate in a 20-item survey developed to evaluate experiences during the COVID-19 pandemic, including interest in COVID-19 PCR testing, receipt of COVID-19 PCR testing, and exploration of reasons why HCWs may not have wanted or received COVID-19 testing. All survey responses were linked with Human Resources data at the

individual level for detailed sociodemographic information. Log binomial models were constructed to evaluate associations between individual characteristics and wanting COVID-19 testing and content analysis of all qualitative survey answers was performed to determine discrete themes among those who did not want COVID-19 testing.

RESULTS: A total of 2501 surveys (37% response rate) represented all job categories: 31% patient care and supports, 27% nursing and nursing supports, 25% administration/research/facilities staff, 15% physicians, 2% executives. Of all respondents, 55% (n=1396) reported wanting COVID-19 testing, and of those who wanted it, 63% (n=873) were tested. The most common reason (44%) for not pursuing COVID testing was concern about testing guidelines, followed by worry about sick time (13%). Worry about using up sick leave was associated with increased interest in testing (RR 1.21, CI 1.12-1.30), but not in receiving testing (RR 0.97, CI 0.89-1.05). Themes for not wanting testing included financial concerns, changing information on testing criteria, altruism, mistrust, and stigma.

CONCLUSIONS: While hospital administration created universal access to COVID testing during the first wave of the pandemic, only half of all hospital employees reported wanting COVID testing.

Financial and social barriers were significantly associated with both who wanted and received testing, and in qualitative analysis for low interest in seeking out COVID testing. Study themes suggest that insufficient workplace policies to ensure sick leave and varying information about testing shortages created perceived barriers to testing engagement among hospital employees. Hospital and workplace policies can be constructed to address disparities in COVID testing due to financial concerns, including elimination of cost sharing and provision of extended sick leave policies. Improved communication from hospital administration and public health officials are necessary to increase health care worker interest in COVID testing, which may extend to interest in vaccinations

LEARNING OBJECTIVE #1: To understand perceived barriers to COVID testing among all employees of a health care system with near universal access to testing

LEARNING OBJECTIVE #2: To identify workplace policies to encourage frontline workers to receive COVID-19 testing

PRELIMINARY PREVALENCE ESTIMATE OF DIAGNOSTIC ERROR IN PATIENTS HOSPITALIZED ON GENERAL MEDICINE: ANALYSIS OF A RANDOM STRATIFIED SAMPLE

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BACKGROUND: Measuring diagnostic error (DE) in hospitalized patients is challenging due to (1) lack of non-standardized and low sensitivity data collection instruments and, (2) low positive predictive value when measuring DE in non-stratified random samples. To account for these limitations, we estimated the prevalence of DE in acute care using a validated and standardized chart review tool in an enriched, stratified cohort identified via certain trigger events in the EHR (e-triggers).

METHODS: Our population was defined as patients who were hospitalized on the general medicine service from July 2019 to March 2020 with lengths of stay (LOS) of 21 days or less. We used random, stratified sampling to assemble a cohort of patients based on a priori selected e-triggers. DE was ascertained independently by two clinician reviewers who conducted structured chart reviews using the SaferDx and DEER taxonomy adapted for acute care. All cases were adjudicated until consensus was reached. We calculated the prevalence of DE for each stratum and then calculated the unbiased prevalence estimate for our cohort and corresponding 95% confidence intervals.

RESULTS: The distribution of e-triggers, error prevalence per strata, corresponding examples, and the estimated prevalence for the overall population are shown in Table 1.

CONCLUSIONS: At a large academic medical center, the prevalence of DE among patients with LOS of 21 days or less was 22.4%.

LEARNING OBJECTIVE #1: Demonstrate methods to estimate the prevalence of diagnostic error in acute care

LEARNING OBJECTIVE #2: Contrast variable levels of diagnostic error risk based on clinical events found in electronic health record that are associated with DE.

PRE-VISIT PLANNING IN INTERNAL MEDICINE SUB-SPECIALTY ACADEMIC PRACTICES: A FRAMEWORK FOR IMPROVING PNEUMOCOCCAL VACCINATION RATES IN PERSONS UNDER THE AGE OF 65 YEARS

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BACKGROUND: The Center for Disease Control and Prevention (CDC) supports the role of primary and subspecialty clinicians in counseling patients under the age of 65 years to receive pneumococcal vaccination if they are at an increased risk of pneumococcal infection. Despite the ready availability of pneumococcal vaccines, the rates among adults with chronic and immunocompromised conditions remains low, while burden of invasive pneumococcal disease is high. Our quality improvement initiative aimed to improve vaccination rate for patients less than 65 years old and at increased risk of pneumococcal disease by utilizing a modified pre-visit huddle for subspecialty practices in a large academic health center.

METHODS: Our quality improvement initiative incorporated a clinician education webinar, pre-visit nursing call to address vaccination status, pre-visit counseling and interdisciplinary pre-visit huddles. An evidenced based educational webinar was presented to interdisciplinary team members in medicine subspecialty practices. Subsequently, nurses performed pre-visit counseling for eligible patients, focusing on motivational interviewing, to confirm vaccination status, discuss vaccination needs, and update clinical records. The nurses would then discuss these findings at the pre-visit huddles to inform clinicians of pending vaccination needs.

RESULTS: The total number of patients deemed eligible for the initiative was 482. All patients were under the age of 65, and 59% were female, 41% were male. Of eligible patients, 34% identified as Asian (8%) or Black or African American (26%), while 36% identified as White. Of the 482, approximately 90 were removed from initiative due to telemedicine visits, new patient visits or cancelled appointments. Majority of the pre-visit patients (36%) were amenable to receiving a vaccine while 5% previously received vaccination, 17% deferred vaccination and 9% were unreachable. After 10 weeks of the initiative, 40% had documented pneumococcal vaccination, up from 28% at baseline. This resulted in a 43% increase in pneumococcal vaccination rate.

CONCLUSIONS: While the CDC recommends pneumococcal vaccination for patients at increased risk of infection under the age of 65, the rates remain low. Our rapid cycle quality improvement initiative resulted in a 43% increase in vaccination rate in this cohort. Our quality improvement initiative incorporated a clinician education webinar, pre-visit nursing call addressing vaccination status, pre-visit counseling, and interdisciplinary pre-visit huddles. The significant increase in vaccination rate provides a framework of a multidisciplinary approach to pre-visit planning in sub-specialty practices and could be utilized for other vaccination efforts.

LEARNING OBJECTIVE #1: Identify patients at increased risk for pneumococcal infection through an evidence based educational webinar.

LEARNING OBJECTIVE #2: Improve pneumococcal vaccination rates among patients at increased risk for pneumococcal infection by utilizing inter-professional pre-visit counseling and huddle.

PUTTING OUR BEST FOOT FORWARD: IMPROVING INPATIENT CARE OF DIABETIC FOOT INFECTIONS (DFIs)

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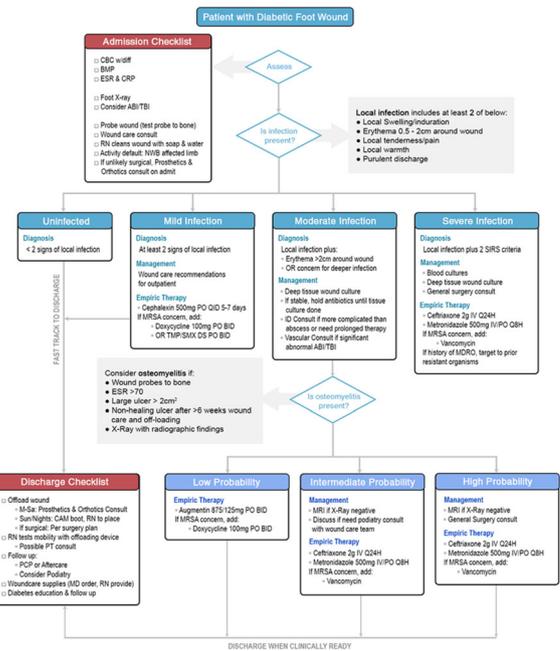
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BACKGROUND: DFIs are common causes of diabetes-related admissions, and optimal inpatient management requires complex multidisciplinary coordination. We suspected that wide practice variations existed leading to worse outcomes. We aimed to standardize inpatient DFI care to improve quality of care.

METHODS: Planning began through a rapid process improvement (RPI) workshop with multidisciplinary experts. A pre-intervention survey was administered to resident and attending physicians (n=45) to identify knowledge gaps. A retrospective analysis was done to identify a benchmarking cohort of DFI patients to determine pre-intervention length-of-stay, readmission, antibiotic use, and prosthetics & orthotics (P&O) consultation.

RESULTS: There was wide variability in practice and lack of adherence to best practices. Over 50% of survey respondents denied probing-to-bone to evaluate for osteomyelitis on admission, and only 11% reported always consulting P&O for an offloading shoe. There was confusion about appropriate surgical consultation; only 18% correctly identified an appropriate consult to orthopedics. Similar variability was demonstrated in the benchmarking cohort, with only 67% of patients receiving a P&O consult prior to discharge. In response to this data, a standardized care pathway was created to guide evidence-based care for patients admitted to internal medicine with DFI (Figure 1).



CONCLUSIONS: Through RPI methods and survey data, we identified barriers to the implementation of evidence-based management of DFIs at our institution, which led to the development of a care pathway. Further research is needed to determine if the care pathway has had an impact on quality metrics, such as readmission rates and length of stay.

LEARNING OBJECTIVE #1: Identify barriers in the translation of evidenced-based guidelines to the inpatient management of diabetic foot infections at a single institution

LEARNING OBJECTIVE #2: Develop an innovative care pathway to address complex multidisciplinary coordination and gaps in provider knowledge

QUALITY OF CARE IN US SAFETY-NET HOSPITALS: A SYSTEMATIC REVIEW

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BACKGROUND: The past several decades have seen unprecedented growth in attempts to measure hospital quality, particularly as health systems and payers increasingly promote value-based care where performance on quality measures is linked to payment. Over the same period, there has been growing concern of whether safety-net hospitals (SNHs) that serve comparatively higher proportions of uninsured or underinsured patients are able to perform as well on quality metrics relative to other hospitals. Some have contended that SNHs perform less well on quality measures and are more likely to be disproportionately penalized in pay-for-performance programs; at the same time, others argue that any quality differences between SNHs and non-SNHs are small and of little clinical relevance. To inform this debate, we performed a systematic review of the evidence on SNH performance on quality measures compared to non-SNHs over the past twenty years.

METHODS: In a systematic search of PubMed, we collected peer-reviewed articles on SNH quality published between 2000-2020. We divided articles into two groups according to the type of quality assessed: 1) quality measures associated with payment and 2) other quality measures. We further divided group 1 according to different policies designed to link performance to payment, defined by their inclusion in the Centers for Medicare and Medicaid Services Hospital Value-Based Purchasing program. We then summarized results of the studies based on how SNHs were defined, and the magnitude of difference in quality between SNHs and non-SNHs.

RESULTS: Of 80 included articles, 45 articles examined quality measures associated with payment and 35 articles examined other quality measures. Studies defined SNHs in a variety of different ways, including the proportion of Medicaid patients served (n=36), Medicare Disproportionate Share Hospital Indices (n=18), among others (n=26). Studies that examined similar quality measures but applied different definitions to identify SNHs resulted in differing conclusions. Overall, SNHs typically performed less well on hospital-acquired infection rates and some measures of mortality and readmissions. SNHs performed as well or better than non-SNHs on a subset of complication rates after surgery and measures of patient experience. All differences were of small magnitude relative to the standard deviations of their distributions.

CONCLUSIONS: Quality in SNHs is similar to non-SNHs across several measures. While there is some evidence of poorer performance on a small set of measures, results differed depending on how SNHs were defined. These findings have important implications for policy initiatives designed to link payment to quality and further support quality improvement in SNHs nationally.

LEARNING OBJECTIVE #1: Understand the different definitions used to identify safety-net hospitals in the US.

LEARNING OBJECTIVE #2: Describe the current evidence on how safety-net hospitals perform on quality measures compared to non-safety-net hospitals.

SELF-MEASURED BLOOD PRESSURE MONITORING (SBPM) DURING THE COVID-19 PANDEMIC

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BACKGROUND: Many primary care clinics have switched to a model that favors telemedicine due to COVID-19. This change may leave chronic medical conditions unaddressed for prolonged periods of time. One survey showed that healthcare providers identified diabetes, COPD, hypertension, and mental health as the most impacted conditions due to reduction in access to care during COVID-19. [1] Adoption of telemedicine may also widen disparities in access to care for vulnerable populations in management of chronic disease. [2] Self-measured blood pressure (SMBP) monitoring has been shown to improve blood pressure (BP) control compared to clinic monitoring and is one strategy that may be used to address gaps in care. [3] Our project aimed to pilot an approach in management of hypertension using telemedicine visits and SMBP in the Highland Adult Medicine Clinic in Oakland, CA.

[1] Yogini V. Chudasama, ^a Clare L. Gillies, et al. Impact of COVID-19 on routine care for chronic diseases: A global survey of views from healthcare professionals:[PMC] 2020 Jun 23.

[2] Nouri S, Khoong EC, et al, Addressing Equity in Telemedicine for Chronic Disease Management During the Covid-19 Pandemic; NEJM Catalyst. May 4, 2020.

[3] McManus RJ, Mant J2, Franssen M, et al. Efficacy of Self-Monitored Blood Pressure, With or Without Telemonitoring, for Titration of Antihypertensive Medication (TASMINH4): An Unmasked Randomized Controlled Trial. Lancet 391 (10124), 949-959 2018 Mar 10.

METHODS: Diabetic patients followed by a multidisciplinary chronic disease team in the Highland Adult Medicine Clinic with a pre-pandemic BP of >139/89 were included in the pilot. Patients were provided a home BP cuff and taught how to correctly measure their BP. They were instructed to self-monitor their BP and keep a daily log. Patients completed 1-2 telephone visits with a nurse or pharmacist for BP review and titration of medications if necessary. Patients were then scheduled for an in-person BP check to confirm if SMBP measurements were accurate.

RESULTS: 81 patients were invited to the pilot and 40 patients completed the pilot. 75% of patients who completed all visits achieved the BP goal of <140/90. There was a differential effect of BP control noted by race/ethnicity. 64% of patients who identify as Black/African American achieved the BP goal compared to 84% of Latinx patients.

CONCLUSIONS: Blood pressure control was achieved in the majority of patients who completed the pilot. There was a differential impact noted by race and ethnicity that was unexpected. A low completion rate of the pilot may be one driver for this disparity as many patients were fearful of coming to the clinic in person. More analysis is needed to understand the drivers of this difference.

LEARNING OBJECTIVE #1: Use of a multidisciplinary team to facilitate patient education on hypertension management and promote SMBP can improve BP control.

LEARNING OBJECTIVE #2: Stratifying data by race and ethnicity is integral to exposing a differential effect of an intervention that appears successful when looking at aggregated data.

TELEMEDICINE ON-BOARDING IN THE ERA OF COVID-19: AN EXPERIENTIAL VIRTUAL ORIENTATION FOR NEWLY-HIRED PROVIDERS

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BACKGROUND: Newly-hired providers need to be oriented to the standards and expectations at their new institution. In response to COVID-19, we used our experience of onboarding 90 providers over 3 years, to transform our in-person experiential orientation to a virtual-only format and expanded the communication focus to include telemedicine. We describe the virtual orientation and newly-hired provider performance.

METHODS: The 2hr virtual onboarding Zoom experience began with a 20min orientation and introductions, followed by 75mins dedicated to 3 Zoom-OSCEs, and ended with a 25min faculty-led debrief. Encounters were designed to assess how providers addressed a medical error, managed a COVID-19 case, and responded to a struggling learner. During each encounter, participants interacted remotely with Standardized Patients (SPs) or Learners (SLs), who used behaviorally-anchored checklists to electronically evaluate provider performance on communication, telemedicine, and case-specific skills. Following each encounter, participants completed a brief self-assessment while SPs/SLs completed the checklist, then the 2 discussed the encounter and the SL/SP provided confidential and actionable feedback. Zoom's breakout room feature made it possible to seamlessly manage simultaneous encounters. After the orientation, participants completed a program evaluation, received an institutional resource guide, and an individualized actionable feedback report based on their performance. Results were not shared with clinical supervisors.

RESULTS: 38 faculty members (32 inpatient, 6 outpatient) from 4 clinical sites participated. Results are presented as the mean % of items well done (WD) on a scale of "not done," "partially done," or "well done." Participants

scored >80% WD for communication across all cases, but performed lower in the education and counseling subdomain (54-68%). Telemedicine performance across the 2 patient cases (65% WD) reveals a need for additional education. Providers particularly struggled with confirming patient identifiers (19% WD) and optimizing technical aspects of the virtual encounter (23% WD). For the COVID-19 case, 5/6 outpatient providers made no attempt to perform a physical exam. The virtual experience was well-received: 32 participants completed the evaluation and all agreed/strongly agreed that the event was engaging, fun, well-designed, gave a sense of institutional culture, effectively reinforced good communication skills, was an effective format to practice telemedicine skills, improved readiness to begin new professional role, would recommend the program, and 94% felt that the 2020 virtual format was an effective way to learn.

CONCLUSIONS: Our findings indicate that a virtual-only format to deliver an experiential onboarding program for setting local standards is valuable to newly-hired providers, and has potential to be extended to onboard other learners.

LEARNING OBJECTIVE #1: Summarize components of effective virtual onboarding.

LEARNING OBJECTIVE #2: Identify strategies to capture/improve telemedicine performance.

THE APPROPRIATENESS OF PLATELET FACTOR 4/HEPARIN ANTIBODY TESTING IN SUSPECTED HEPARIN-INDUCED THROMBOCYTOPENIA

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BACKGROUND: Heparin-induced thrombocytopenia (HIT) is a potentially life-threatening complication of heparin use caused by immunoglobulin G antibody-platelet factor 4 (PF4)/heparin immune complex formation and subsequent platelet activation. The 4Ts scoring system is used to determine probability of HIT and included in diagnostic algorithms. 4Ts score is used before PF4 enzyme-linked immunosorbent assay (ELISA) test or serotonin-release assay. Low scores allow to exclude HIT with high level of certainty and avoid high-cost studies. We evaluated the appropriateness of PF4 ELISA use by reviewing medical records and calculating 4Ts score. We also reviewed medical notes for documentation of 4Ts score, and if changes in management or medication(s) occur.

METHODS: The study was done at Mount Sinai Hospital in Chicago, IL, a community tertiary care hospital. We reviewed all inpatient laboratory requests for PF4 ELISA test from 02/01/2018 to 02/01/2020. Eighty patients with suspected HIT found and their electronic medical records were reviewed.

RESULTS: 25 patients (31.3%) had a low probability of HIT, 53 patients (66.3%) had an intermediate probability, and 2 patients (2.5%) had a high probability of HIT. Only in 10 patients (12.5%) 4Ts score was documented. In 10 patients (12.5%) PF4 ELISA test was positive. In 3 cases of positive PF4 ELISA 4Ts score showed low HIT probability, and in 7 patients (60%) pretest probability was intermediate. There was only one case of strongly positive PF4 ELISA with 4Ts score of intermediate probability and fondaparinux was appropriately started. From 9 patients with weakly positive PF4 ELISA low 4Ts score was observed in 3 patients and intermediate 4Ts in 6 patients. In aforementioned 3 patients one was switched to fondaparinux, in the other one heparin was stopped, and in the third case platelet count improved without heparin discontinuation. From 6 patients with weakly positive PF4 ELISA and intermediate HIT probability, half was switched to fondaparinux or argatroban, in one patient heparin was discontinued, and in others no changes were made. Overall in group of patients with low probability of HIT in 6 patients (24%) no changes were made, in 16 patients (64%) anticoagulation was stopped, 3 patients (12%) were switched to non-heparin anticoagulants. In group of patients with intermediate HIT probability no changes were made in 22 patients (41.5%). In 16 patients (30.2%) anticoagulation was stopped, and 15 patients (28.3%) were switched to non-heparin anticoagulants. In patients with high probability of HIT one was switched to fondaparinux and in the other one just heparin was discontinued.

CONCLUSIONS: The data suggests that in one out of three cases testing was done inappropriately.

Majority of patients were not appropriately evaluated prior to testing or pre-test probability was not documented. Often management was not appropriately adjusted based on pre-test probability or even after the results were available.

LEARNING OBJECTIVE #1: Patient Care

LEARNING OBJECTIVE #2: Systems-Based Practice

THE ART OF THE SCREEN: FINDING GAPS IN THE COLON CANCER SCREENING CASCADE

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BACKGROUND: Colorectal cancer (CRC) screening is known to prevent cancer and save lives. Despite this, only 68% of eligible adults in the U.S. receive screening. The adherence rate of CRC screening at our institution's resident run clinic is even lower at 54%. This chart audit was done to identify reasons for low CRC screening adherence and subsequently design appropriate interventions.

METHODS: Patients aged 50-85 who were due for colorectal cancer screening were identified using electronic medical record (EMR). Of the 428 patients identified, seventy were randomly selected. Their charts were reviewed for patient age, sex, race, and insurance coverage. Office notes were reviewed from January 2019 through December 2020 to determine whether the patient had been seen in clinic during this period, whether they had been counseled on CRC screening, and if a screening test was ordered.

RESULTS: Seventy patients were included in the study. These patients were 46% male, with mean age of 61 years. 30 patients (43%) were African American, 17 (25%) were Caucasian and 22 (32%) had no race reported. All patients had at least one office visit during the study period, and patients had an average of 4.2 visits over the 2-year period. 56% of patients were counseled on colorectal screening. A screening test was ordered for 37 patients (54%): 29 colonoscopies and 8 fecal immunochemical tests (FIT). Patient refusal was the documented reason for non-adherence in 29% (20/69) patients.

50% of African American patients and 70% of Caucasian patients received counseling on CRC screening. A CRC screening test was ordered for 53% of African American patients (16/30) and 65% of Caucasian patients (11/17).

CONCLUSIONS: This study showed a breakdown in the CRC screening cascade at the level of primary care visit. While all patients attended at least one visit with their provider, only about half received counseling on screening and had a screening test ordered. Most patients were ordered a colonoscopy rather than a stool test. Intervention at the provider level could include training residents to enhance knowledge and counseling skills about various screening options.

African Americans were counseled less on colon cancer screening compared to Caucasians. A major limitation is that race was not documented in 32% of patients. The findings still suggest disparity and should prompt further investigation. Implicit bias may play a role if African American patients are perceived as being less interested in or less likely to complete CRC screening. It is critical to translate these findings into strategies to improve CRC screening rates in our clinic population.

LEARNING OBJECTIVE #1: To understand risk factors for non-adherence to Colorectal cancer screening (PBLI)

LEARNING OBJECTIVE #2: To increase patient awareness of different screening tests (PC)

THE IMPLEMENTATION OF A CLINIC-BASED OPIOID REVIEW BOARD TO ADDRESS HIGH RISK OPIOID PRESCRIBING IN PRIMARY CARE

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BACKGROUND: Opioid prescriptions for chronic pain increased in the 1990's despite limited data on safety, and contributed to increases in opioid use disorder and overdose deaths during this time period. In response, federal guidelines were released that emphasized a risk-benefit approach to opioid prescribing for chronic, non-cancer pain. However, healthcare systems and clinics had little guidance on how to enact these guidelines. We describe the creation of an opioid review board (ORB) within a primary care clinic aimed towards reducing high-risk opioid prescribing and increasing use of sublingual (SL) buprenorphine-naloxone for opioid dependence.

METHODS: Conducted at OHSU Internal Medicine Clinic, an urban, academic primary care practice with over 14,000 patients. We implemented an interprofessional review board to set clinic policy on opioid prescribing and review patients on high-dose opioids or opioid and benzodiazepine co-prescription. The ORB included faculty providers, a clinical pharmacist, a patient access specialist, a medical assistant, a clinical social worker, and a medical resident. The board met monthly to set policy for safe opioid prescribing, disseminate policy updates and best practices and review patient cases.

Cases were selected for review prior to each monthly meeting and included patients prescribed MEDD > 90 or co-prescribed opioids and benzodiazepines. Two members reviewed the patient's chart in detail and then presented the patient case at our monthly meeting with the patient's PCP. The primary outcome of the ORB process was approval or disapproval by majority vote for continued prescribing. ORB decisions and specific recommendations, such as guidance for opioid or benzodiazepine tapers, were conveyed directly to the patients PCP and documented in the patient chart.

RESULTS: From February 2017 – July 2020, the ORB completed 46 patient reviews. During this time period, the number of patients on chronic opioids decreased from 664 to 458 (-31.0%); the total number of patients with morphine equivalent daily dose (MEDD) > 90 declined from 128 to 41 (-68.0%); and the number of patients on SL buprenorphine-naloxone increased from 34 to 117 (+344%). Out of the 46 patients reviewed, 45.6% began a taper or switched to SL buprenorphine-naloxone within 3 months of review.

CONCLUSIONS: Through implementation of clear policies on opioid prescribing and with oversight of an ORB, our clinic decreased high dose opioid prescribing, reduced opioid and benzodiazepine co-prescribing, and increased the number of patients on SL buprenorphine-naloxone. Documented ORB decisions facilitated provider-patient conversations and supported our providers in safe opioid prescribing.

LEARNING OBJECTIVE #1: Evaluate how the implementation of an opioid review board can affect high dose opioid prescribing in a primary care clinic.

LEARNING OBJECTIVE #2: Recognize the indication for use of buprenorphine-naloxone in opioid dependence and its role in safe opioid prescribing.

TRANSITIONING CARE FROM INPATIENT TO OUTPATIENT WITH TELEHEALTH: A PILOT TO EXAMINE READMISSIONS

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BACKGROUND: Unique, unutilized opportunities exist for pairing telehealth with transitions between inpatient to outpatient care. Telehealth use has been beneficial in transitions of care for specific disease processes such as heart failure and COPD. Our project identified patients at increased risk of readmission after hospital discharge by using a 30-day readmission risk score built into the electronic medical record. The objective was to determine if coordinating a telehealth visit with a post-discharge clinic visit impacted 30-day readmission rates.

METHODS: This occurred at Barnes-Jewish Hospital (BJH), a tertiary care facility, with the continuity clinic for internal medicine residents, the Primary Care Medicine Clinic (PCMC). Patients actively following in the PCMC and

admitted to a high-risk cardiology unit, 9200, or hospital medicine unit, 7900, were eligible from August to December 2020, regardless of primary diagnosis. Case management identified established clinic patients with a moderate or high risk of readmission. Patients were scheduled a telehealth visit within 2 business days of discharge and an in-person clinic visit within 14 days. Telehealth visits were a phone call or video visit standardized with a note template prompting evaluation for symptoms, follow-up on tests, status of home health services, medication reconciliation, and answering questions about the care plan. The telehealth visit confirmed a clinic visit was scheduled and transportation in place. The clinic visit reassessed the patient's health status, medication list, needed testing, and care plan. Comparison of 30-day readmission rates was qualitative. This intervention was paired with other readmission reduction interventions on the inpatient floor.

RESULTS: The 30-day readmission risk was 28% for pilot patients, with an observed readmission rate of 20% (8 of 40). Eligible, non-participating patients had a lower 30-day readmission risk of 22%, but a higher observed readmission rate of 29% (39 of 129). The preliminary data showed a trend towards reduced readmission in pilot patients as compared to eligible patients who were not enrolled, with a delta of 15%.

CONCLUSIONS: These preliminary results are reason for optimism, especially considering the broad medical diagnoses included. Coordination of appointment scheduling between the inpatient and outpatient team was initially a challenge the team overcame, and some patients did not go to their appointments due to being in the hospital. Due to the multifactorial nature of readmission and small sample sizes, larger studies are necessary to accurately determine the role of a telehealth check coordinated with a post-discharge clinic visit. Given the impact of hospitalizations and readmissions, including patient health, individual safety, and system cost, the role of telehealth in transitions of care is bright.

LEARNING OBJECTIVE #1: Explore the role of telehealth in transitions of care

LEARNING OBJECTIVE #2: Investigate the impact of a post-discharge phone call on 30-day inpatient readmission rates

UTILIZATION OF PROCALCITONIN TO GUIDE ANTIBIOTIC DISCONTINUATION IN RESPIRATORY TRACT INFECTIONS IN A COMMUNITY HOSPITAL

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BACKGROUND: Antibiotic overuse leading to increasing antibiotic resistance has been a growing concern. Patients presenting with acute respiratory tract infections (RTI) are often started empirically on antibiotics and continued for days, unless confirmatory results are reported by microbiological testing. No studies exist in literature that assess the appropriate utilization of negative procalcitonin test for antibiotic discontinuation. This study assesses utilization of a negative PCT (<0.25 ng/ml) to guide antibiotic discontinuation in patients with pneumonia in a community hospital.

METHODS: Retrospective observational study including adult patients admitted to our community hospital in 1 year (July 2019-June 2020) with diagnosis of community acquired pneumonia and started on empiric antibiotic therapy and had procalcitonin levels checked. Our hypothesis was that PCT is not being appropriately used for discontinuation of antibiotics and that rate of discontinuation of antibiotics will be less despite a negative PCT. Statistical analysis was performed using XLSTAT. Categorical variables were represented by frequencies and proportions and compared using Chi-square and z test for two proportions.

RESULTS: 516 charts were reviewed. After excluding missing data, 176 patients were included. 100 patients had negative PCT. Antibiotics were discontinued in 16% of patients with negative PCT, compared to 58% (p<0.0001), in whom antibiotics were continued without any other indication (including UTI, severe COPD exacerbation, COVID pneumonia) despite a

negative PCT. The difference between the percentage of antibiotic discontinuation in our PCT guided treatment sample (9%, n=16/176) was also found to be statistically significant ($p < 0.001$) compared to percentage of antibiotic discontinuation in population using data from a meta-analysis of 7 RCTs (42%, n=698/1658).

CONCLUSIONS: Previous studies have shown that procalcitonin guided treatment aids in decreasing antibiotic exposure. In lower respiratory tract infections, clinicians order PCT test to aid in differentiating viral versus bacterial etiology and ultimately help guide antibiotic therapy. Our data analysis reveals that despite negative PCT, thus indicating a likely viral etiology, clinicians are not consistently making changes to empiric antibiotic use. This study addresses need for further recommendations from antibiotic stewardship programs regarding procalcitonin-guided antibiotic use and prevent unnecessary ordering of PCT test.

LEARNING OBJECTIVE #1: Procalcitonin is a serum inflammatory marker that increases in bacterial infections and is utilized as an adjunct to help differentiate viral versus bacterial pneumonia.

LEARNING OBJECTIVE #2: Procalcitonin-guided management is associated with significantly lower antibiotic exposure and mortality.

VALIDATION OF OUR NEW PREDICTIVE MODEL FOR FALLS AMONG INPATIENTS USING JAPANESE OFFICIAL CLASSIFICATIONS OF ADLS: A PROSPECTIVE OBSERVATIONAL STUDY

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BACKGROUND: Bedriddenness ranks of Ministry of Health, Labour and Welfare (MHLW) is Japanese official classification of ADLs. This easy-to-use classification has been widely used under the Japanese Nursing-care Insurance systems. In our previous retrospective study, we developed and validated an easier-to-use predictive model for falls of adult inpatients using age, sex, emergency admission, admission to Neurosurgery, use of hypnotic medication, history of falls, independence of eating, and bedriddenness ranks, which showed AUC of 0.79.

Considering prospective multicenter study is preferable to confirm the reliability of our predictive model, we report our prospective double-center observational study.

METHODS: All the inpatients of age ≥ 20 years who were admitted to Yuai-kai Foundation and Oda Hospital, an acute care hospital in Japan, and Saga City Fuji-Yamato Spa. Hospital, a hybrid type hospital of acute and chronic care in Japan, between October 2018 and September 2019 were enrolled. The eight variables collected on admission for the predictive model, which were described above, were extracted from the hospital's health records. In hospital episodes of fall during hospitalization were extracted from incident reports of each hospital.

We performed univariate logistic regression analyses on the presence or absence of fall events with calculating p values (based on Mann Whitney test and chi-squared test). Subsequently, we estimated the probability of falls and calculated the scores using our predictive model with estimating the sensitivity and specificity. Then, we assessed the predictive performance by AUC, and the calibration by shrinkage coefficient. Finally, we performed subgroup analyses in each hospital using the same methods.

RESULTS: During the study period, 3,757 inpatients were eligible, with the incidence of 141 falls (3.8%). The median age was 77 years, 48.3% were men, the median length of hospital stay was 9 days. Univariate logistic regression analyses showed that fall group had significantly older age and higher proportions of emergency hospitalization, admission to Neurosurgery, use of hypnotic medication, history of falls, and independence of eating ($p < 0.001$). Each grade of bedriddenness ranks showed significantly different incidence of falls ($p < 0.001$). AUC and the shrinkage coefficient of our predictive model calculated using all the eligible subjects were 0.78 and 0.944, respectively.

Subgroup analyses showed AUC calculated using the patients of Oda hospital (n=3,148, incidence rate of falls: 3.1%) and Fuji-Yamato Spa. Hospital (n=609, incidence rate of falls: 7.2%) were 0.80 and 0.64, respectively.

CONCLUSIONS: Our predictive model for falls of inpatients using MHLW bedriddenness ranks showed good accuracy by the validation in this prospective double-center observational study.

LEARNING OBJECTIVE #1: Our predictive model for falls showed good accuracy in the validation.

LEARNING OBJECTIVE #2: Our predictive model is convenient and easy to use even in busy clinical situations because it requires only eight variables.

VETERANS' AMBULATORY CARE EXPERIENCE DURING COVID-19 (VACEC): THE PSYCHOSOCIAL RAMIFICATIONS OF THE COVID-19 PANDEMIC AND THEIR IMPACT ON VETERANS' MENTAL HEALTH

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BACKGROUND: The COVID-19 pandemic has caused widespread disruption to patients' lives. In addition to SARS-CoV2 being a deadly virus, the pandemic has had psychosocial effects such as increased social isolation and worsening of mental health conditions. This study aimed to characterize veterans' perceptions of changes in their healthcare and the psychosocial impact caused by the pandemic.

METHODS: We interviewed 40 veterans with PC appointments scheduled at a large VA medical center between March 1 and June 30, 2020. Data were collected using a semi-structured telephone interview, designed to elicit structured responses and narrative comments related to their healthcare experience since the start of COVID-19 pandemic. Quantitative data were summarized using descriptive statistics, and a matrix analysis was employed to characterize the veterans' comments.

RESULTS: Out of 37 full and 3 partial interviews, none of our veterans reported contracting a serious case of COVID-19. Many of our veterans, however, reported changes to their everyday lives and mental health. In response to open-ended questioning, 6 (15%) veterans reported worsening of existing mental health conditions or the development of new mental health concerns. 12 (30%) veterans felt anxiety over being exposed to or exposing others to the virus. In addition, 8 (20%) veterans reported feeling more socially isolated and 3 (7.5%) reported being less physically active. 7 (17.5%) veterans reported that telehealth was insufficient to meet their healthcare needs. For example, one veteran said, "The biggest difficulty has to be with my mental health. I am going to group therapy and it is over the phone now. It's hard to connect and get all that I usually do out of the program. I would participate more if it were in person." Many veterans also spoke of ongoing stress related to occupational instability and financial uncertainty. Other quotes will enhance the findings.

CONCLUSIONS: While none of our participants had experienced COVID-19 at the time of the interviews, a substantial proportion of the veterans reported the exacerbation and development of mental health concerns even without direct questioning. Participants attributed this to multiple psychosocial stressors related to the pandemic, including less opportunities for social engagement, increased occupational stress and financial uncertainty, and general anxiety concerning the virus. Notably, a substantial proportion of the veterans did not feel that telehealth was meeting their primary and mental healthcare needs. Given the ongoing nature of this pandemic and the high prevalence of mental health conditions among veterans who use VHA primary care, this represents an opportunity to improve the virtual care experience.

LEARNING OBJECTIVE #1: To assess the impact of the COVID-19 pandemic on the mental health of veterans who obtain primary care at a VA medical center.

LEARNING OBJECTIVE #2: To use veterans' report of their healthcare experience to inform changes to healthcare delivery in the context of the ongoing COVID-19 pandemic.

Scientific Abstract - Research

ANALYSIS OF LATEST 2020 CDC HEPATITIS C UNIVERSAL SCREENING RECOMMENDATIONS AND THE HEPATITIS C TESTING TRENDS IN OUR HOSPITALHimmat S. Brar⁴; Jannat Kang¹; Anna L. Seidenburg³; Sushma Edara³; Pradeep Bathina¹; Sarah Glover²¹Internal Medicine, The University of Mississippi Medical Center, Jackson, MS²Gastroenterology, The University of Mississippi Medical Center, Jackson, MS³The University of Mississippi Medical Center, Jackson, MS⁴Internal Medicine, The University of Mississippi Medical Center, Jackson, MS. (Control ID #3538475)

BACKGROUND: Hepatitis C is a leading cause of morbidity and mortality from liver disease, costing US health system billions of dollars annually. HCV can cause an acute infection, which may clear completely without treatment and chronic infection, which if left untreated, can be life-threatening. As HCV infection is often asymptomatic, most adults are unaware of having it which can have serious health consequences with increased risk of transmission to others.

Historically, the highest prevalence of chronic HCV in the US has been among people born during 1945–1965 (baby boomers). However, recently, new HCV infections have occurred primarily among young adults. The rate of acute HCV increased approximately fourfold from (0.2 per 100,000 population) in 2005 to 1.0 per 100,000 in 2017, in the age group 20–39 years.

Due to the changing epidemiology, CDC changed the 2012 guidelines which recommended screening all people born during 1945–1965 to newer guidelines which recommend screening all adults at least once in their lifetime and all pregnant women during each pregnancy. This report highlights the trends at our hospital in support of these new CDC screening guidelines.

METHODS: We performed a retrospective observational study of all patients who received the Hepatitis C antibody test at UMMC from January 1, 2020 to December 31, 2020. Patient Cohort Explorer was used to obtain de-identified patient data from EPIC. We obtained the number of encounters and patients on whom the HCV antibody test was performed.

RESULTS: Hepatitis C antibody test was ordered in 4,588 patients during this period. 3,868 (84.3%) patients were positive for Hep C Ab. Of the total patients, 2,468 (53.8%) were female and 2,120 (46.2%) were male. 2,839 (61.9%) were African-Americans, 1,463 (31.9%) were Caucasians and 286 (6.2%) were of other ethnicities. 1,485 (32.4%) patients were within the age group 55–75 years (born between 1945–1965) whereas 2,953 (64.4%) were less than 55 years (born after 1965) and 150 (3.3%) were greater than 75 years (born before 1945). The median and mode age was 62 and 27 years, respectively. The majority of cases, 1,688 (36.8%) were in the age group 25–45 years.

CONCLUSIONS: CDC first published hepatitis C screening guidelines in 1991 which have evolved over time. In 2012, due to high prevalence among persons born during 1945–1965, CDC recommended at least one-time testing of all baby boomers, even in the absence of risk factor. Following a decade of sharp increase in acute hepatitis C infections, particularly among young adults, the rates of newly reported chronic infections among baby boomers and millennials are now equal, which supports the need for expanded hepatitis C testing recommendations. The new CDC recommendations include screening of all adults aged ≥ 18 years once in their lifetime and of all pregnant women during each pregnancy.

LEARNING OBJECTIVE #1: the need for immediate implementation of new CDC universal Hepatitis C screening recommendations

LEARNING OBJECTIVE #2: awareness about the changing trends of Hepatitis C infection

A RETROSPECTIVE CHART REVIEW ANALYZING THE RELATIONSHIP BETWEEN BLOOD PRESSURE RECHECKS AND POLYPHARMACYCallie Bartkowiak²; Meghan Gwinn¹; Danielle Heidemann¹¹Internal Medicine, Henry Ford Hospital, Ferndale, MI²Wayne State University School of Medicine, Detroit, MI. (Control ID #3530086)

BACKGROUND: Hypertension (HTN) affects nearly 80 million people in the United States. A patient's blood pressure (BP) measurement may influence the number of antihypertensives prescribed. Providers often do not recheck BP when a patient's measurement is elevated despite research supporting that remeasuring may result in a significant decrease in BP. We hypothesized that patients who have BP remeasured in clinic would have lower BP values and thus less antihypertensive medication. In our academic general internal medicine (GIM) clinic, providers are encouraged to manually repeat BP if elevated on vitals taken by medical assistants using an automated cuff at check-in. Our aim was to determine if repeating BP in patients with uncontrolled HTN is associated with a reduced number of antihypertensive medications. Our secondary aims were to assess the frequency at which BP is rechecked and to determine if there were disparities in provider or patient factors in whom BP was repeated.

METHODS: We performed a retrospective chart review on patients between the age of 18–85 with a hypertension diagnosis who were seen at our urban academic GIM clinic between 01/01/2019 and 12/31/2019. Individuals with ESRD and HF were excluded. We collected data including age, BP readings, provider type (resident or senior staff), gender, race, time of appointment, BMI, and comorbidities.

RESULTS: A total of 2259 patients met the inclusion criteria. The mean age was 59.8 years, BMI was 33.2, first systolic BP was 153.7 mmHg, and first diastolic BP was 89.3 mmHg. A total of 1301 (58%) patients were seen by a trainee, 1307 (57%) were seen in the morning, 1287 (57%) were female, and 1885 (83%) were black. A total of 929 (41%) patients had their BP rechecked. The mean antihypertensives prescribed in the group with BP rechecked was 2.3 medications, compared to 2.4 medications in those whose BP was not rechecked (p-value= 0.3241). There was no significant difference between provider or trainee rechecking BP (p-value=0.3425), race of patient (p-value=0.9863), and age of patient (p-value=0.0896). Morning appointments (p-value=0.0009), Males (p-value=0.0445), less obese patients (p-value=0.0188), and patients with COPD (p-value=0.0170) were more likely to be rechecked. When comparing the first and second BP measurement, 82.56% systolic and 72.23% of diastolic measurements improved with an average of a 10.7 systolic decrease and a 5.1 diastolic decrease.

CONCLUSIONS: Rechecking BP in patients with uncontrolled HTN was associated with a decrease in BP. However, rechecking BP was not associated with a reduction in antihypertensive medications in patients with uncontrolled BP. Numerous factors were associated with a decreased likelihood of BP remeasurement including high BMI, female patients, and later appointment times.

LEARNING OBJECTIVE #1: Rechecking BP in patients with uncontrolled HTN leads to decreased BP readings in clinic.

LEARNING OBJECTIVE #2: Rechecking BP in clinic is not associated with a reduction in antihypertensive medications in patients with uncontrolled HTN.

ASSESSING HEALTHCARE TRANSITION MILESTONES IN COLLEGE YOUTH WITH TYPE 1 DIABETESRebecca K. Tsevat¹; Elissa R. Weitzman^{2,3}; Lauren E. Wisk⁴¹Internal Medicine and Pediatrics, University of California Los Angeles David Geffen School of Medicine, Los Angeles, CA²Pediatrics, Harvard Medical School, Boston, MA³Adolescent/Young Adult Medicine, Boston Children's Hospital, Boston, MA⁴Internal Medicine, University of California Los Angeles David Geffen School of Medicine, Los Angeles, CA. (Control ID #3534964)

BACKGROUND: Successful healthcare delivery for adolescents and young adults (AYA) depends upon their ability to transition from pediatric to adult models of care. AYA with chronic diseases face unique challenges, including the responsibility of navigating changing healthcare needs in college and beyond. In this study, we examined the ability of college youth with type 1 diabetes (T1D) to achieve certain transitional milestones and ascertained predictors of a successful healthcare transition (HCT). We hypothesized that older participants and those covered on a parent's insurance plan would be more likely to achieve these milestones.

METHODS: Data are from 138 respondents to a multi-national, web-based study of college youth with T1D recruited via social media platforms and direct outreach. As part of the study, participants completed a series of questions addressing the HCT process. Descriptive statistics and multivariable regression were used to evaluate HCT measures as a function of sociodemographic variables, adjusting for confounders.

RESULTS: Participants were from 85 universities across 30 states and Canada. The average age was 20.5 years (SD=1.5); 80.4% were female, 82.6% were white non-Hispanic, and 87.0% were covered on a parent's insurance plan. Nearly two-thirds (65.9%) had a discussion with their provider about changing healthcare needs as they transitioned into adulthood, half (50.5%) of whom had made a plan to address these needs. Nearly two-thirds (64.5%) had a discussion about transitioning to an adult provider, of whom nearly three-fourths (73.0%) had received help with finding one. Less than one-third (29.7%) had a discussion with their provider about obtaining new health insurance as an adult. Females were more likely than males to have discussed transitioning to an adult provider (70.3% vs. 40.7%, $p=0.004$). Those covered on a parent's insurance (vs. other) plan were more likely to have had help with finding an adult provider (76.3% vs. 44.4%, $p=0.04$). Older participants ($p=0.025$) and those not covered on a parent's insurance plan (61.1% vs. 25.0%, $p=0.002$) were more likely to have discussed obtaining health insurance than their counterparts. These effects persisted after adjustment.

CONCLUSIONS: This study reveals that improvement is needed with regard to college youth with T1D becoming autonomous managers of their own care. Gaps were found in their experience of discussing changing healthcare needs, locating adult providers, and obtaining health insurance. Those who were younger, male, and not covered on a parent's insurance plan experienced more of these lapses, which may render them susceptible to poor health outcomes and loss of insurance. Efforts to improve the HCT process should focus on these subgroups in particular to advance healthcare delivery for college youth with T1D.

LEARNING OBJECTIVE #1: Evaluate progress in achieving healthcare transition milestones among college youth with T1D.

LEARNING OBJECTIVE #2: Recognize subgroups of college youth with T1D who are at risk for lapses in transitional care.

ASSESSING THE QUALITY OF EVIDENCE UNDERLYING AMERICAN SOCIETY OF HEMATOLOGY VENOUS THROMBOEMBOLISM GUIDELINES

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BACKGROUND: Clinical practice guidelines play a crucial role in enabling clinicians to deliver high-quality, evidence-based care. Venous thromboembolism (VTE) is a leading cause of morbidity and mortality in the United States, and as such, it is vital that guidelines on prophylaxis, diagnosis, and management of VTE are based on high-quality evidence. We examined the strength of evidence supporting the American Society of Hematology (ASH) VTE management guidelines to characterize the confidence in current guidelines and identify areas for future research.

METHODS: We examined guidelines included in the seven categories of the Clinical Practice Guidelines on VTE published by the ASH as of April 2020: (1) Prophylaxis for Medical Patients, (2) Prevention in Surgical Hospitalized Patients, (3) Diagnosis, (4) Anticoagulation Therapy, (5) Heparin-Induced Thrombocytopenia (HIT), (6) Pregnancy, and (7) Pediatrics. Guidelines were labelled as a "strong" or "conditional" recommendation and assigned a level of the quality of evidence from 1 (low quality) to 4 (high quality) by the guideline authors, based on the McMaster University GRADE approach. We abstracted the level of evidence and strength of recommendation assigned to each guideline. We then calculated the percent of recommendations supported by each level of evidence, and further assessed the percent of recommendations supported by each level of evidence stratified by strength of recommendation.

RESULTS: As of April 2020, the ASH published 203 VTE guidelines contained within seven categories. The majority (124/203; 61%) were supported by very low evidence, while only 5 of the 203 guidelines, or 2%, were

supported by high evidence. Of the 203 guidelines, 164 (81%) were considered conditional recommendations, while 39 (19%) were considered strong recommendations. Of the 164 guidelines considered conditional recommendations, the majority (116/164; 71%) were backed by very low evidence. Of the 39 guidelines considered strong recommendations, only 2 (5%) were backed by high evidence. In four categories, over half of the recommendations were supported by the lowest grade of evidence: pediatric guidelines (100% of recommendations with lowest grade evidence), anticoagulation (88%), management of surgical patients (77%) and prophylaxis for medical patients (53%).

CONCLUSIONS: Overall, we found that the majority of the ASH's VTE guidelines were considered "conditional" recommendations and most were supported by low quality evidence. Nearly a third of all "strong" recommendations were supported by low or very low levels of evidence. Our findings suggest significant gaps in the available evidence and multiple areas for future research, especially in the VTE guidelines for pediatrics, anticoagulation, and surgical patients.

LEARNING OBJECTIVE #1: Assess the quality of evidence underlying practice guidelines for the management of venous thromboembolism

LEARNING OBJECTIVE #2: Recognize the patient communities for whom venous thromboembolism guidelines are predominantly based on low quality evidence

CHANGES IN WOMAC PAIN AND FUNCTION ARE ASSOCIATED WITH CLINICALLY IMPORTANT CHANGES IN HEALTH-RELATED QUALITY OF LIFE: POOLED ANALYSIS OF 4 TANEZUMAB PHASE 3 TRIALS

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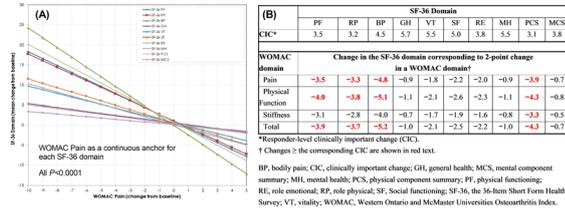
BACKGROUND: Estimating health-related quality of life (HRQoL) improvements associated with symptom improvements can help different stakeholders better understand the potential benefits of new treatments. We assessed relationships between the disease-specific Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC*) domains and the generic measure of HRQoL 36-Item Short Form Health Survey (SF-36) domains to evaluate how improvements in WOMAC pain and functioning translate to HRQoL improvements using pooled data from 4 tanezumab Phase 3 trials (NCT00733902, NCT00744471, NCT00830063, NCT00863304).

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METHODS: We used a repeated measures longitudinal model to estimate relationships between changes from baseline in SF-36 domains (ie, physical functioning [PF], role physical [RP], bodily pain [BP], general health [GH], vitality [VT], social functioning [SF], role emotional [RE], mental health [MH], physical component summary [PCS], and mental component summary [MCS]) and WOMAC Pain and Physical Function domains. Norm-based standardized T scores were used for the SF-36 (mean 50, standard deviation 10), reflecting normative scores for the US general population. Each model included one SF-36 domain (outcome) and one WOMAC domain (predictor).

RESULTS: Estimated mean changes in SF-36 domains had approximately linear relationships with changes in the WOMAC pain and function domains. The strongest relationships were between WOMAC domains and SF-36 BP, PCS, PF, and RP (in this order); the weakest were with SF-36 MCS, MH, and GH (in this order) (eg, FigA). A 2-point change in WOMAC Pain and Physical Function, which may represent meaningful within-patient change, corresponded to clinically important changes in SF-36 PF, RP, BP, and PCS domains (FigB).

Fig. Relationship between changes in WOMAC domains and SF-36 domains



CONCLUSIONS: The relationships between changes in WOMAC domains and SF-36 domains were found to be approximately linear. Meaningful within-patient changes in WOMAC pain and physical function domains were associated with clinically important changes in functional health and well-being (as measured by SF-36 PF, RP, BP, and PCS domains).

LEARNING OBJECTIVE #1: To quantify the relationships between changes in the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) pain and physical function domains and changes in the 36-Item Short Form Health Survey (SF-36) domains

LEARNING OBJECTIVE #2: To investigate the associations between meaningful within-patient changes in the WOMAC domains and changes in the SF-36 domains

CHARACTERIZATION OF COVID-19 DISEASE AMONG PEOPLE WITH HIV IN A SOUTHERN US COHORT

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BACKGROUND: The Deep South is disproportionately impacted by HIV and conditions which are risk factors for severe COVID-19 such as hypertension, diabetes, heart disease, and obesity. We characterized COVID-19 prevalence, risk factors, and disease severity among people with HIV at a large urban HIV clinic in the Southern US.

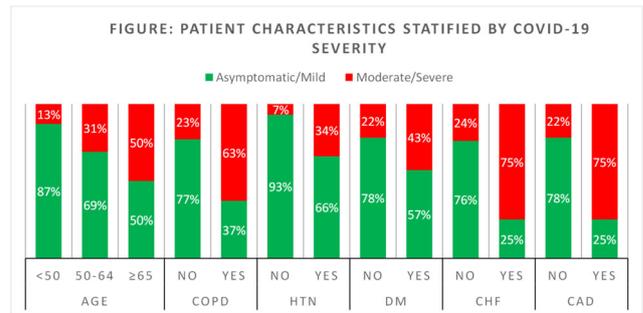
METHODS: Data on patients receiving care from the University of Alabama at Birmingham HIV Clinic during the COVID-19 pandemic was obtained from the electronic health record. COVID-19 diagnoses were determined using positive nasopharyngeal COVID-19 PCR, as well as a clinic list tracking self-reported cases diagnosed elsewhere. We evaluated associations between patient characteristics and COVID-19 diagnosis using logistic regression. Among patients with COVID-19, we stratified frequency and percentage of characteristics by asymptomatic/mild versus moderate/severe disease and compared using Fisher's exact test.

RESULTS: During 03/20-12/27/2020, 104 patients had COVID-19 (3% of clinic population); 44 (42%) were diagnosed at our institution and 60 (58%) elsewhere. In adjusted analyses, COVID-19 diagnosis was associated with age ≥ 65 vs. < 50 years (OR 2.00, 95% CI 1.02-3.89), body mass index ≥ 30 vs. < 25 kg/m² (2.10, 1.18-3.71), hypertension (1.76, 1.09-2.85), and organ transplant (4.02, 1.12-14.4). Among patients with COVID-19, severity of disease was generally mild in 77 (74%); 19 (18%) were hospitalized with moderate and 8 (8%) with severe disease. Characteristics associated with moderate/severe COVID-19 are shown in the Figure. No differences in severity of disease were noted based on HIV parameters (antiretroviral regimen, CD4, plasma HIV-1 RNA).

CONCLUSIONS: The proportion of PWH at our clinic diagnosed with COVID-19 is lower than the prevalence in the general Alabama population (3% vs. 6%), however the proportion hospitalized is higher (26% vs. 12%). While our analyses were limited by a small number of cases, they suggest age and traditional comorbidities play the major role in COVID-19 disease severity rather than HIV-related factors.

LEARNING OBJECTIVE #1: Recognize that HIV patients are at higher risk for hospitalization from COVID-19.

LEARNING OBJECTIVE #2: Identify comorbidities conferring higher risk for hospitalization among HIV patients.



Notes: p-values for age $p=0.009$; sex $p=0.73$; race $p=0.17$; COPD $p=0.027$; HTN $p=0.003$; DM $p=0.057$; CHF $p=0.053$; CAD $p=0.004$. Other comparisons were not statistically significant including CD4, plasma HIV-1 RNA, body mass index, glomerular filtration rate, current smoking, asthma, pulmonary hypertension, solid organ transplant, chronic liver disease chronic HCV, antiretroviral therapy (INSTI, NNRTI, and PI use; tenofovir use).

COMMON MEDICAL SYMPTOMS NOT RECOGNIZED AS ALCOHOL RELATED AMONG INDIVIDUALS WITH AND WITHOUT HIV

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BACKGROUND: Alcohol use impacts morbidity and mortality among people with HIV (PWH) and without HIV (PWOH). Identifying common medical symptoms that might motivate patients to change drinking behavior may present an opportunity to lessen alcohol-related adverse outcomes.

METHODS: We conducted a cross-sectional analysis in the Veterans Aging Cohort Study (VACS) that includes participant surveys and linked electronic health records from 2002 to 2018. The analytic sample included individuals reporting current alcohol use (AUDIT-C >0). The main outcome was presence of symptoms attributed to alcohol use based on responses to, "Do you think your symptoms are caused by drinking alcohol?" (yes/no). Using multivariable logistic regression, we assessed factors associated with symptoms attributed to alcohol. Factors included HIV status, race/ethnicity, age, prior diagnosis of alcohol use disorder (AUD), endorsement of each of twenty symptoms (based on the HIV Symptom Index, considered present if reported to be bothersome over the past 4 weeks), and alcohol use based on AUDIT-C.

RESULTS: Among 2,827 PWH and 2,665 PWOH, 64% were Black, 10% were Latino/Hispanic, and 95% were male. PWH more commonly attributed their symptoms to alcohol than PWOH (13% vs. 10%, $p=0.0002$). In the adjusted logistic regression model, PWH (aOR [95%CI] = 1.82 [1.49, 2.23]), moderate alcohol consumption (AUDIT-C 1 - 5, aOR [95%CI] = 1.44 [1.35, 1.53]), and AUD diagnosis (aOR [95%CI] = 3.49 [2.86, 4.27]) were significantly associated with symptom attributed to alcohol, while age and most reported symptoms were not. Symptoms independently associated with attribution were trouble remembering (aOR [95%CI] = 1.33 [1.04, 1.71]), nausea/vomiting (aOR [95%CI] = 1.35 [1.06, 1.72]) and weight loss or wasting (aOR [95%CI] = 1.35 [1.08, 1.69]).

CONCLUSIONS: Among participants who drink alcohol, a low percentage attributed their symptoms to alcohol. However, PWH were more likely to attribute bothersome symptoms to alcohol than PWOH. Self-reported bothersome symptoms endorsed to be attributed to alcohol provides an opportunity to engage and encourage patients to reduce their alcohol use. Reducing alcohol use could be an alternative to treating patient's symptoms with pharmacotherapy. Treating symptoms non-pharmacologically could be particularly helpful for patients with chronic conditions (such as HIV) who are at increased risk of polypharmacy and its effect (e.g. poorer adherence). However, participants only recognized 3 bothersome symptoms as attributable to alcohol consumption. Education on alcohol-related symptoms is needed to aid in behavioral interventions to enhance motivation to decrease unhealthy alcohol use.

LEARNING OBJECTIVE #1: To improve patient care by engaging patients to reduce alcohol use

LEARNING OBJECTIVE #2: Finding opportunities, and making it a part of general medical knowledge, to treat patient's bothersome symptoms attributed to alcohol

COMPARISON OF CLINICAL CHARACTERISTICS AND OUTCOMES OF HOSPITALIZED PATIENTS WITH SEASONAL CORONAVIRUS INFECTION AND COVID-19

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BACKGROUND: Coronaviruses are large, enveloped, single-stranded RNA viruses found in humans and other mammals. They cause respiratory, enteric, hepatic, and neurologic diseases. The most common coronaviruses in clinical practice are 229E, OC43, NL63, and HKU1, which typically cause common cold symptoms in immunocompetent individuals. The two other strains — SARS-CoV-1 and MERS-CoV — have been linked to sometimes fatal illness. The SARS-CoV-2 virus belongs to the subgenus Sarbecovirus and is more similar to the bat-derived coronavirus strains, bat-SL-CoVZC45 and bat-SL-CoVZXC21, than to known human-infecting coronaviruses, including SARS-CoV-1. Most data on the clinical presentation, diagnostics, and outcomes of patients with COVID-19 have been presented as case series or retrospective cohort studies without comparison to patients with other respiratory illnesses, let alone seasonal coronaviruses (sCoV). This study aimed to compare the clinical characteristics and outcomes of hospitalized patients with COVID-19 and sCoV.

METHODS: In this multicenter retrospective cohort study, we reviewed adult patients admitted to AMITA Health Saint Francis Hospital, Saint Joseph Hospital, Resurrection Medical Center, and Saint Mary and Elizabeth Medical Center from January 1, 2011, to March 31, 2020, with a respiratory infection and positive respiratory viral panel for seasonal coronavirus (sCoV) and adult patients admitted to AMITA Health Saint Francis Hospital from March 1, 2020, to July 31, 202, with symptomatic COVID-19.

RESULTS: We identified 173 hospitalized adult patients with laboratory-confirmed sCoV: 33 (19.1%) with CoV 229E, 40 (23.1%) with CoV HKU1, 13 (7.5%) with CoV NL63, and 87 (50.3%) with CoV OC43. We then matched these patients with a cohort of 173 hospitalized adult patients with laboratory-confirmed COVID-19. The invasive mechanical ventilation rates were not statistically different among patients with COVID-19 and sCoV (36 [20.8%] vs. 23 [13.3%]; $p=.063$ by 2-sided chi-squared), however, a significant higher rate of sCoV patients were extubated compared to patients with COVID-19 (14 [60.9%] vs. 11 [30.6%], $p=0.022$ by 2-sided chi-squared). In accordance, the mortality rate was higher in patients with COVID-19 compared with patients with sCoV (58 [33.5%] vs. 23 [13.3%], $p<.001$ by 2-sided chi-squared).

CONCLUSIONS: While the requirement of invasive mechanical ventilation was not statistically different between patients hospitalized with COVID-19 and sCoV, patients with COVID-19 presented worse extubation rates and higher inpatient mortality rates compared to patients with sCoV. These findings enhance the understanding of the clinical characteristics of COVID-19 in comparison to other human coronaviruses.

LEARNING OBJECTIVE #1: To describe the clinical characteristics of hospitalized patients with seasonal coronavirus infection.

LEARNING OBJECTIVE #2: To understand similarities and differences between COVID-19 and seasonal coronavirus infection.

COMPARISON OF MEDICATION ADHERENCE MEASURES OBTAINED IN THE HYVALUE PRAGMATIC TRIAL

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BACKGROUND: Medication adherence is a major contributor to hypertension control. Antihypertensive medication adherence can be measured using pharmacy fills (PDC), pill counts (PC) and self-report (SR); however, little is known about how they are related. We examined the correlation between PDC, PC and SR measures of adherence using data from a pragmatic clinical trial.

METHODS: The HYVALUE trial is a patient-level, randomized controlled trial that enrolled African American and White participants with uncontrolled hypertension. Three measures of medication adherence were obtained at baseline. The PDC utilized pharmacy fill data to calculate the number of days covered over the preceding 6 months. PC adherence was calculated as the proportion of the actual over the expected number of pills taken since the last refill by counting pills in medication bottles. SR adherence was based on an average of patients' response to three questions on pill taking behavior over the previous 7 days using the Voils instrument. Spearman's correlations assessed the correlation between the three measures.

RESULTS: Of the 960 HYVALUE participants, mean age was 63 years, and 55% were African American. The proportion of participants who were adherent by PDC (PDC > 80%), was 87%, adherence by PC (>80%) was 34%, and by SR (score of 1, all non-adherence questions answered "none of the time") adherence was 61%. No substantial correlation was seen between the three measures. (Table)

Adherence definition	% of subjects with adherence measure	Median (IQR) adherence score	% of patients who are adherent*	Spearman Correlation		
				PDC	PC	SR
Pharmacy Fill (PDC)	93%	0.98 (0.88, 1.00) [†]	86%	1.0	0.10	-0.13
Pill counts (PC)	81%	0.66 (0.39, 0.87)	34%	-	1.0	-0.12
Self-report (SR)	98%	1.00 (1.00, 1.67) [‡]	61%	-	-	1.0

[†] Pharmacy fill and pill counts are on a 0-1 scale where 1 indicates perfect adherence and 0 non-adherence
[‡] Self-report is on a 1-5 scale (average of Likert items) where 1 indicates perfect adherence and 5 non-adherence
 * Adherence defined as >80% for PDC and PC, score =1 for SR

CONCLUSIONS: In a pragmatic clinical trial, measures of medication adherence were not strongly correlated with each other. Our findings suggest these measurements may reflect distinct patient behaviors such as the intent to take a medication (filling the prescription), pill management strategies (using pill boxes) and recollection of recent pill taking behavior. Researchers and clinicians should consider underlying behaviors when interpreting measures of patient adherence to medications and how these behaviors may contribute to clinical outcomes.

LEARNING OBJECTIVE #1: Clinicians will understand the relationship between different medication adherence measures to improve clinical care.

LEARNING OBJECTIVE #2: Researchers will understand the differences in choice of medication adherence measures, particularly for pragmatic clinical trials.

COMPARISON OF RESPIRATORY VIRAL COINFECTION RISK BETWEEN PATIENTS HOSPITALIZED WITH COVID-19 AND SEASONAL CORONAVIRUS

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BACKGROUND: From its discovery, SARS-CoV-2 has become a public health challenge all over the world. Among many questions studied regarding the biological mechanisms underlying SARS development, another important one is the relationship between SARS-CoV-2 and microorganisms such as other viruses, bacteria, and fungi. Accumulating evidence has revealed that the diagnosis, treatment, and prognosis of COVID-19 can be significantly influenced by microbial coinfection. Viral coinfection has been proposed to be linked to the need for a higher level of care, increased length of stay, and the development of acute respiratory distress syndrome. However, the exact coinfection rates of SARS-CoV-2 with other viruses are not well studied. The goal of this study was to compare the rates of viral coinfection between COVID-19 and seasonal coronaviruses.

METHODS: This was a multicenter retrospective cohort study that included 173 adult patients with laboratory-confirmed seasonal coronavirus (sCoV; i.e., CoV 229E, CoV HKU1, CoV NL63, or CoV OC43) and a matched cohort of 173 adult patients with laboratory-confirmed COVID-19 admitted to four hospitals within the AMITA Health system in Illinois. We retrospectively reviewed microbiological investigations, including blood cultures, respiratory tract secretion cultures, multiplex respiratory PCRs performed on a nasopharyngeal swab or respiratory tract secretions, and urinary antigen tests for *Legionella pneumophila* and *Streptococcus pneumoniae*.

RESULTS: Among 173 patients with sCoV, a total of 42 (24.3%) had positive microbiological investigations, whereas, among 173 patients with COVID-19, a total of 31 (17.9%) presented positive microbiological investigations ($p=0.147$ by 2-sided Pearson Chi-square). Within patients with sCoV and positive microbiological investigations, 21 (50%) were found to have at least one other viral respiratory pathogen. In contrast, in patients with COVID-19, only 1 (3.2%) was found to have another viral respiratory pathogen ($p<0.001$ by 2-sided Fisher's exact test). In a binary logistic regression, patients with sCoV were at least three times more likely to present with a respiratory viral coinfection than patients with COVID-19 (odds ratio [OR] 23.76; 95% confidence interval 3.16–178.77; $p=.002$).

CONCLUSIONS: The risk of coinfection of SARS-CoV-2 with other respiratory pathogens is less than that of seasonal coronaviruses; hence, the concomitant use of viral diagnostic panels or targeted therapies for other viruses may not be indicated. The kinetics, exact mechanisms, and the consequences of viral coinfection in COVID-19 continue under investigation, particularly during winter in the northern hemisphere.

LEARNING OBJECTIVE #1: To understand the differences in coinfection rates between COVID-19 and seasonal coronavirus.

LEARNING OBJECTIVE #2: To apply the findings in current clinical practice regarding COVID-19, including the value of viral panels such as the Molecular COVID-19 / Influenza A and B / RSV Panel or the use of targeted therapies such as oseltamivir.

COPING MECHANISMS PROTECTIVE AGAINST PSYCHOLOGICAL STRESS IN RHEUMATOLOGIC PATIENTS DURING COVID-19 PANDEMIC

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BACKGROUND: Stress, a well-known risk factor in onset and course of rheumatologic conditions, can worsen symptom severity and lead to disease flares. Given the increased prevalence of psychological distress in the general population during this unique time of the COVID-19 pandemic, here we examine stress in patients with rheumatologic conditions during the pandemic, and explore the association of reported coping mechanisms utilized with stress and anxiety level.

METHODS: This qualitative study was conducted in April 2020 in New York City with English-speaking patients with a rheumatologic condition on at least one DMARD. Participants were asked open-ended questions regarding their condition and how the pandemic affected them. Data was analyzed thematically, and then grouped by the presence of stress and coping mechanisms. The GAD-7 and the PROMIS scales were also administered. Variables were assessed in multivariable analysis with logistic regression using SAS version 9.3.

RESULTS: 112 patients were interviewed. Reported stressors included rheumatologic disease specific stressors, changes at home or work, finances, and the uncertainty around COVID-19. Patients with stress were younger (46 vs 57 years old, $p=.0004$), on more than one medication (76% vs 40%, $p=.002$), had higher GAD-7 scores (7.9 vs 4.2, $p<.0001$) with positive screen for anxiety (29% vs 5%, $p=.003$), and higher PROMIS anxiety domain scores (62 vs 56, $p<.0001$) with a higher percentage over general population average (58% vs 25%, $p=.0007$).

Coping strategies included support from others, engagement in other activities, avoidance, familiarity with uncertainty due to chronic condition, and usage of other coping mechanism prior to pandemic. There were no differences in baseline characteristics or PROMIS anxiety scores. Patients with coping had lower GAD-7 scores, (4.8 vs 7.5, $p=.003$) and were less likely to screen positive for depression (10% vs 27%, $p=.03$).

CONCLUSIONS: Patients with rheumatologic conditions face both disease-related stressors as well as general stressors during a global pandemic. Lower anxiety scores and less positive screens using GAD-7 were found in patients who volunteered coping mechanisms. Coping mechanisms elicited such as those that increase emotional awareness and social connectiveness are potentially effective interventions in combating stress in these patients. Interventions such as cognitive behavioral therapy and support groups can be considered. Further investigation is needed to identify potential interventions to alleviate stress and build coping mechanisms in our patients with rheumatologic disease in order to improve health outcomes.

LEARNING OBJECTIVE #1: To identify stressors and coping mechanisms in patients with rheumatologic conditions during periods with emerging infectious diseases

LEARNING OBJECTIVE #2: To highlight physician's ability to decrease stressors through honest communication and ensuring easy access, and to augment their coping mechanisms and guiding patients toward interventions including CBT

COVID-19 PROGNOSIS IN PATIENTS WITH UNDERLYING CKD AND KIDNEY RELATED COMPLICATIONS

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BACKGROUND: In December 2019, a novel RNA virus causing COVID-19, a respiratory illness that can lead to diffuse alveolar damage and respiratory failure, was reported. The virus facilitates host cell entry through angiotensin-converting enzyme-2 (ACE2) receptor which is present in many organs including kidneys. Kidney injury, including acute kidney injury (AKI), proteinuria, and hematuria, has been reported in COVID-19 patients. The extent of renal involvement has not been extensively correlated with prognosis and outcomes in COVID-19 patients.

METHODS: Retrospective chart review including patients aged 18 years and older, admitted to a community hospital from March 15, 2020 to April 15, 2020, testing positive for COVID-19. Patient characteristics on admission were collected which included the presence of AKI, hematuria, proteinuria and underlying CKD stage if any. Outcomes included intubation rate, ICU admission, length of stay and inpatient-mortality. Continuous variables were compared using independent t-test.

Chi-square test was used to test relationships between categorical variables.

RESULTS: A total of 212 charts were studied. After removing missing data, 186 patients were included. 22.6% ($n=42$) had moderate-severe underlying CKD (stage 3 or more). 38.7% ($n=72$) of total patients had AKI on presentation. Urinalysis was not done in 51 patients, so of the rest 135 patients, 55.6% ($n=75$) had hematuria and 52.6% ($n=71$) had proteinuria on admission. Inpatient mortality was found to be significantly higher in patients with underlying

moderate-severe CKD compared to those who did not (52.4% vs 31.3%, $p=0.012$). Patients with hematuria on admission had significantly higher rates of intubation (37.3% vs 20%, $p=0.028$) and ICU admissions (44% vs 26.7%, $p=0.037$) compared to those who did not have hematuria on admission. Length of stay was also significantly higher in patients who had hematuria on admission compared to those who did not (10 ± 8 vs 7 ± 6 days, $p=0.042$). AKI and proteinuria on admission resulted in no significant difference in intubation, ICU admission, length of stay, or inpatient mortality. No significant difference in length of stay, intubation, and ICU admission was found in patients with underlying mod-severe CKD compared to those who didn't.

CONCLUSIONS: Early renal involvement and underlying CKD worsen the prognosis of COVID-19 pneumonia and result in higher mortality outcomes. Such patients, especially those with findings of hematuria on admission, need closer monitoring. Furthermore, many COVID-19 patients receive steroids and anticoagulants as part of treatment regimen which will need to be further evaluated as these therapies may contribute to further damage of the kidneys.

LEARNING OBJECTIVE #1: Early renal involvement, especially findings of hematuria on admission, are associated with poor prognosis of COVID-19 pneumonia and such patients need closer monitoring.

LEARNING OBJECTIVE #2: Patients with underlying CKD are at increased risk of inpatient mortality from COVID-19 pneumonia and need closer monitoring.

DOES THE INCLUSION OF INCIDENTAL FINDINGS INFORMATION IN A LUNG CANCER SCREENING DECISION AID AFFECT SCREENING INTENT? A RANDOMIZED CONTROLLED TRIAL

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BACKGROUND: The Centers for Medicare & Medicaid Services requires the use of a decision aid within lung cancer screening shared decision-making encounters. However, it does not require inclusion of information about incidental findings, a common potential harm of screening. We assessed whether inclusion of incidental findings information in a lung cancer screening decision aid affects intent to screen.

METHODS: We conducted a double-blinded randomized controlled trial of individuals eligible for lung cancer screening. Individuals were randomly assigned to view an online video decision aid with incidental findings information (intervention) or without such information (control). The primary outcome was the difference in post-viewing intent to screen measured by a survey item, "I plan to pursue screening for lung cancer with an annual low dose CT scan." For analysis, responses (4-item Likert scale) were dichotomized into those planning to screen (strongly agree, agree) or those not planning to screen (strongly disagree, disagree). We secondarily assessed knowledge and valuing of the benefit or harms of screening (avoiding death from lung cancer, false alarms, false positive biopsies, overdiagnosis, incidental findings, and additional costs) with six pre-post multiple choice knowledge questions, and importance rating (1-5 scale, 1 most important) and ranking (ranked 1-6) exercises.

RESULTS: Of 419 eligible individuals who were approached, 348 (83.1%) completed the survey (173 intervention, 175 control). Mean age was 64.5 years, 48.6% were male, 73.0% white, 76.3% with less than a college degree, and 64.1% with income <\$50,000. Screening intent was heterogenous (strongly agree 12.1%; agree 29.0%; disagree 39.1%; strongly disagree 19.8%). There was no difference between the intervention and control groups in the percentage of those planning to undergo screening (40.5% vs 41.7%, $p=0.81$). The intervention group had a higher post-viewing percent correct for the incidental findings knowledge item than the control group (94.8% vs 73.7%, $p<0.01$). Incidental findings had the fifth highest mean importance rating (4.0 ± 1.1) and the third highest mean ranking (3.6 ± 1.5). There was no difference in mean rating or ranking of incidental findings between intervention and control groups (rating 4.0 vs 3.9, diff 0.1, 95% CI -0.2,0.3 $p=0.51$; ranking 3.6 vs 3.6, diff 0.02, 95% CI, -0.3,0.3, $p=0.89$).

CONCLUSIONS: Including information about incidental findings in a lung cancer screening decision aid resulted in more informed individuals regarding this aspect of screening. However, in formulating screening preferences, incidental findings were less important than other benefits and harms. Including incidental findings information did not affect intent to screen for lung cancer overall.

LEARNING OBJECTIVE #1: To learn how individuals eligible for screening value information about incidental findings

LEARNING OBJECTIVE #2: To learn how screening-eligible individuals value the potential benefit and harms of lung cancer screening

EMERGENCY CORONARY ANGIOGRAPHY IN PATIENTS WITH OUT-OF-HOSPITAL HOSPITAL CARDIAC ARREST WITHOUT ST-SEGMENT ELEVATION: A META-ANALYSIS OF RANDOMIZED TRIALS

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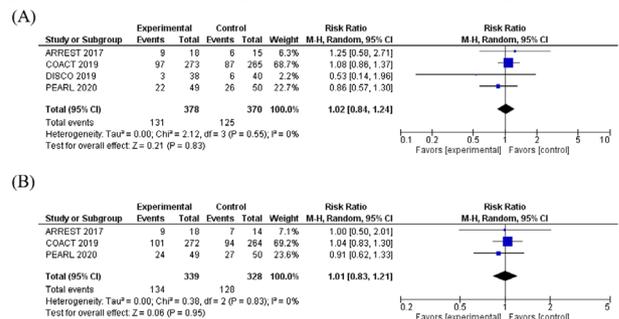
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BACKGROUND: Recent meta-analyses have concluded that early coronary angiography is not beneficial in patients with out-of-hospital cardiac arrest (OHCA), without ST-segment elevation on electrocardiogram after return of spontaneous circulation (ROSC). However, all of the studies included both retrospective studies and randomized control trials (RCTs), resulting in high heterogeneity. Our aim of this study was to investigate the benefit of the procedure by conducting a meta-analysis limiting to RCTs.

METHODS: PubMed and EMBASE were searched in December, 2020 for RCTs investigating the impact of early coronary angiography in patients with OHCA, without ST-segment elevation on electrocardiogram. The primary endpoint was all-cause mortality. The secondary endpoint was neurological outcome defining "good neurological prognosis" as Cerebral Performance Category (CPC) of 1-2, and "poor neurological prognosis" as CPC of 3-5. The Review Manager Version 5.4 (Nordic Cochrane Centre, the Cochrane Collaboration, 2012, Copenhagen, Denmark) software was used to calculate the risk ratios (RRs) with 95% confidence intervals (CIs). Significant heterogeneity was considered present when the I2 index was >50%.

RESULTS: Our search identified 4 eligible RCTs including a total of 748 patients for the primary endpoint and 3 eligible RCTs including a total of 667 patients for the secondary endpoint. There was no decrease in mortality in the group of patients who underwent early coronary angiography (Figure 1A) without heterogeneity ($I^2 = 0\%$). Similarly, early angiography did not contribute to a significant difference in neurological prognosis (Figure 1B) without heterogeneity ($I^2 = 0\%$).

Figure 1: Effect of early coronary angiography on mortality (A) and neurological outcome (B)



CONCLUSIONS: Early coronary angiography did not add any benefit with regard to mortality and neurological outcome in patients with OHCA who successfully regained spontaneous circulation and had no ST-segment elevation on electrocardiogram.

LEARNING OBJECTIVE #1: In patients with out-of-hospital cardiac arrest, early coronary angiography after ROSC is not beneficial with regard to mortality and neurological prognosis if electrocardiogram shows no ST-segment elevation.

LEARNING OBJECTIVE #2: In a meta-analysis, results with low heterogeneity can be obtained by including only randomized control trials.

EVALUATION OF LONG-TERM RENAL FUNCTION POST-COVID

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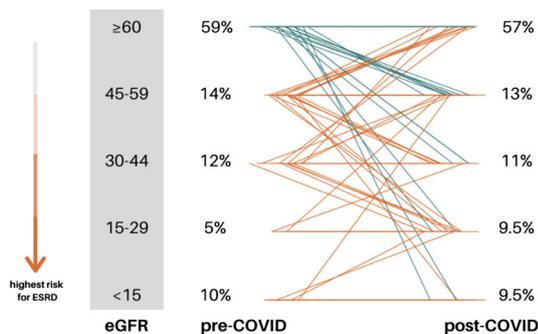
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BACKGROUND: The spread of SARS-CoV-2 has caused mortality and long-lasting morbidity worldwide. Acutely, COVID-19 may elevate risk of blood clots, cardiomyopathy, and acute kidney injury. For many critically ill patients, dialysis has been essential in managing infection. Long-term, the impact of COVID-19 on renal function remains unknown. This longitudinal observational study examines basic renal function indexed by serum creatinine and estimated Glomerular Filtration Rate (eGFR) measured ~10-26 weeks after COVID-19 onset.

METHODS: We queried the NYU Langone COVID Deidentified Dataset for adults with a positive SARS-CoV-2 PCR test and excluded End-Stage Renal Disease (ESRD) patients (3%). The cohort had a creatinine test from a Basic or Comprehensive Metabolic Panel >2 weeks before and >2 weeks after infection (n=501; 54% female; 18%=18-42 years, 39%=43-67 years, 43%=68+ year old). Within-patient pre- vs. post-COVID creatinine change was normalized by the patient's latest pre-COVID creatinine test. To gauge the putative clinical relevance of creatinine change in understanding risk for deterioration to ESRD, renal function stratified by eGFR (ml/min/1.73m²), available only for n=221 (44% of cohort), is illustrated in the figure below.

Individual pre- vs post-COVID eGFR in a non-ESRD cohort (n=221)



RESULTS: Post-COVID creatinine levels were greater (1.327 mg/dL ± 0.06, mean ± SEM) than pre-COVID levels (1.248 mg/dL ± 0.07) representing a post-COVID increase change =0.093 (Cohen's d effect size=0.15, t500=3.3, p<0.001). This creatinine change was captured at a pre-/post-interval=192.5 ± 3.1 days (mean ± SEM), corresponding to 129.5 ± 3.1 days after a COVID-19 infection (min=2 weeks, IQR=10-26 weeks, max=38 weeks).

CONCLUSIONS: In an early COVID-19 epicenter, we show preliminary evidence of sustained creatinine increases in a cohort without ESRD around 3-6 months following COVID-19 onset. Future work should isolate the role of pre-existing risk factors and link potentially new renal dysfunction more directly to COVID-19. Given the long-term follow-up data available in this study, we recommend that primary care providers track renal function in patients following COVID-19 infection to screen for emergent renal disease and adjust any renally dosed medications.

LEARNING OBJECTIVE #1: Identify changes in renal function after recovery from COVID-19 infection

LEARNING OBJECTIVE #2: Depict patterns of long-term renal function changes post-COVID

FACILITY- AND PROVIDER-LEVEL VARIATION OF CARE IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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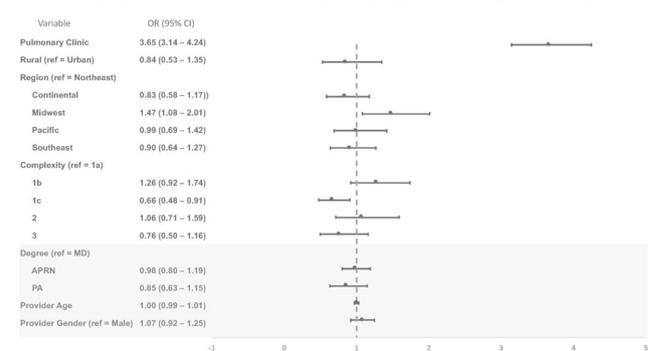
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BACKGROUND: The Global Initiative for Chronic Obstructive Lung Disease (GOLD) recommends at least annual spirometry for patients with Chronic Obstructive Pulmonary Disease (COPD). Identifying facility and provider characteristics associated with guideline compliance can inform strategies to improve COPD care.

METHODS: We identified 3,933 Veterans hospitalized across 121 Veteran Health Administration (VHA) facilities with a COPD exacerbation from fiscal year 2012-2015. Facility-level and patient demographic data were identified using VHA Corporate Data Warehouse and provider-level data were obtained from VHA Survey of Healthcare Experiences of Patients. We then evaluated facility and provider characteristics associated with spirometry completion within one year of COPD exacerbation hospitalization. A random-intercept logistic regression model which adjusted for patient demographics was run to account for potential clustering within facilities.

Facility and provider-level factors associated with spirometry completion within one year of COPD hospitalization



RESULTS: At the facility level, access to a pulmonary clinic was strongly associated with spirometry completion (odds ratio (OR) 3.65 [95% CI 3.14 – 4.24]). Geography was also associated with spirometry completion, with facilities in the Midwest more likely to have spirometry (OR 1.47 [1.08 – 2.01]) compared to the Northeast. Among VA-designated complexity levels, with 1a most complex, 1c facilities were less likely to complete spirometry compared to 1a facilities (OR 0.66 [0.48-0.91]). At the provider level, there was no significant difference among provider type (APRN vs MD: OR 0.98 [0.80 – 1.19]; PA vs MD: OR 0.85 [0.63 – 1.16]), sex (Woman provider OR=1.07 [0.92 – 1.25]), or age (OR for each one year increase=1.00 [0.99 – 1.01]).

CONCLUSIONS: There is significant variation in adherence to GOLD recommendations for spirometry completion at the facility level. None of the provider characteristics we evaluated were associated with significant differences. Facility-level factors may significantly modify the likelihood of patients receiving guideline-recommended COPD care and are thus potentially modifiable; interventions tailored to facilities may improve care for patients with COPD.

LEARNING OBJECTIVE #1: Understand facility-level variations in COPD care

LEARNING OBJECTIVE #2: Determine provider characteristics associated with guideline-compliant care

FACTORS ASSOCIATED WITH THE ACCEPTANCE OF MASS DRUG ADMINISTRATION IN SCHOOL-AGE CHILDREN FOR THE ELIMINATION OF SCHISTOSOMIASIS IN THE PHILIPPINES
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BACKGROUND: Schistosomiasis is a parasitic infection endemic in the Philippines, with an estimated 6.7 million people infected and 28 million people at risk of infection, especially in the poorest regions of the country. Mass drug administration (MDA) of Praziquantel was recognized by the World Health Organization in 2001 as the primary global strategy for Schistosomiasis control, with a target to treat at least 75% of all school-age children at risk of morbidity. In the Philippines, MDA is administered twice a year in schools, with an aim to exceed the WHO treatment targets and attain at least 85% coverage, however the currently reported national coverage rate is far below the WHO target at only 43.5%.

METHODS: This study was conducted in 2019 in the region of Eastern Visayas, a region with one of the highest endemicity rates of Schistosomiasis in the Philippines and MDA treatment rates well below the 75% treatment target. Three hundred and seventy-three written surveys were administered to parents and teachers in the community to assess their knowledge, attitudes, and practices and uncover potential barriers to Schistosomiasis treatment in school-aged children. Thirteen key informant interviews were conducted with local and regional health workers and officials, discussing their perceptions regarding potential barriers to the MDA program, areas about which they feel more information is needed, and ideas about how to improve treatment compliance.

RESULTS: Key informant interviews revealed that the biggest barriers to MDA treatment were poor environmental sanitation, inadequate health education, and a need for coordination between local governmental units. Survey results revealed that the average knowledge score was 63% amongst parents and 73% amongst teachers. Parents who stated they had received prior information about Schistosomiasis had significantly higher knowledge scores than those who denied receiving prior information. Seventy-six percent of parents of parents believed Schistosomiasis is a significant problem in their communities. Twenty-five percent of them believe that side effects from Schistosomiasis treatment are common, and this perception was associated with less favorable opinions towards MDA treatment.

CONCLUSIONS: This study concludes that improved education for providers and patients, governmental collaboration, and environmental sanitation are necessary for the successful prevention of Schistosomiasis morbidity and mortality amongst school-aged children and adherence to WHO guidelines.

LEARNING OBJECTIVE #1: Understand the knowledge, attitudes, and practices regarding Schistosomiasis and MDA amongst parents and teachers in the studied communities, as well as the perceptions of barriers to the MDA program from the perspective of local health workers and administrators.

LEARNING OBJECTIVE #2: In response to the concerns and experiences of community members regarding MDA treatment, develop strategies to provide a basis for enhanced health promotion and education efforts in communities where the disease is endemic.

HER2 OVEREXPRESSION AND CLINICOPATHOLOGICAL FACTORS IN GASTRIC CANCER: A META-ANALYSIS

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BACKGROUND: Gastric cancer is the fifth most commonly diagnosed cancer and a leading cause of cancer deaths due to the advanced stage at diagnosis. In recent years, the advent of targeted therapy has opened new possibilities. The results from the Trastuzumab for Gastric Cancer (ToGA) trial showed significantly improved response in patients with HER2-positive gastric cancer. Human epidermal growth factor receptor-2 (HER2) is a tyrosine kinase expressed in multiple tissues, that promotes cell proliferation and inhibits cell apoptosis.

Unfortunately, frequency of HER2 varies dramatically from 6- 35% with expensive and specialized testing. Furthermore, previous studies regarding the clinical factors and prognostic impact related to HER2-positivity were inconclusive. This meta-analysis was performed to examine the association with HER2 and clinicopathological factors in order to help determine which patients will benefit most from HER2 testing.

METHODS: Electronic databases (Cochrane Library, PubMed, and Embase) were searched with the following terms: “HER2” or “human epidermal receptor-2” and “gastric adenocarcinoma” or “gastric cancer” and “clinicopathological factors.” Inclusion criteria was: 1) primary gastric adenocarcinoma, 2) HER2 was evaluated with immunohistochemistry (IHC) or fluorescence in situ hybridization (FISH), and 3) clinical factors were provided. Information gathered from each study included: author, country of origin, publication year, patient demographics (gender/age), and clinicopathological results. Quality of each study was determined with the Newcastle-Ottawa scale.

RESULTS: 268 studies were retrieved based on the search strategy. After review, a total of 37 studies were included. 12 countries were represented, with majority from Asia. When the data was pooled, associations were found between HER2 positivity with gender, age, differentiation, Lauren’s classification, tumor invasion, lymph node metastasis, and distant metastasis. There was no significant correlation with TMN stage.

Age OR 0.64 (0.54 – 0.76) Gender OR 1.58 (1.36 – 1.84) Differentiation OR 3.06 (2.27 – 4.09)

Lauren’s classification OR 4.48 (3.38 – 5.99)

TMN OR 0.90 (0.77 – 1.07)

pT stage OR 1.18 (1.02 – 1.38)

Lymph node metastasis OR 1.52 (1.23 – 1.85)

Distant metastasis OR 1.80 (1.02 – 3.158)

CONCLUSIONS: This meta-analysis was conducted primarily to understand the relationship between HER2 and clinicopathological factors. Our results correlate with prior studies that indicate HER2 was linked with high tumor grade and intestinal histological type. But our meta-analysis showed a significant association with HER2 and male gender, deeper tumor invasion, and positive lymph node and distant metastasis.

LEARNING OBJECTIVE #1: Medical knowledge - increase and synthesize information regarding HER2-positive gastric cancer

LEARNING OBJECTIVE #2: Practice-based learning - helps determine which gastric cancer patients will benefit most from HER2 testing

IDENTIFYING PATIENTS AT RISK FOR FIBROSIS IN A PRIMARY CARE NAFLD COHORT

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BACKGROUND: Non-alcoholic fatty liver disease (NAFLD) and advanced fibrosis risk are underdiagnosed and underassessed in primary care. Using natural language processing (NLP) to create a primary care nonalcoholic fatty liver disease (NAFLD) cohort, we assessed advanced fibrosis risk with non-invasive measures including the Fibrosis-4 Index (FIB-4) and NAFLD Fibrosis Score (NFS) and evaluated risk score agreement.

METHODS: In this retrospective cohort study of adults with radiographic evidence of hepatic steatosis, we calculated patient-level FIB-4 and NFS scores and categorized them by fibrosis risk. Risk category and risk score agreement was analyzed using weighted kappa, Pearson correlation, and Bland-Altman analysis. A multinomial logistic regression model was developed to evaluate the associations between clinical variables and discrepant FIB-4 and NFS results.

RESULTS: The cohort included 767 patients with hepatic steatosis, with 71% having either a FIB-4 or NFS score in the indeterminate or high-risk category for fibrosis (Table). Advanced fibrosis risk assessment categories disagreed in 43% and FIB-4 and NFS scores would have resulted in different clinical decisions in 30% of the sample. The weighted kappa statistic for FIB-4 and NFS category agreement was 0.41 (95% CI: 0.36 – 0.46) and the Pearson correlation coefficient for log FIB-4 and NFS was 0.66 (95% CI: 0.62, 0.70). The multinomial logistic regression analysis identified Black race (OR 2.64, 95% CI 1.84-3.78) and A1c (OR 1.37, 95% CI 1.23-1.52) with higher odds of having a higher NFS risk category than FIB-4.

CONCLUSIONS: In a primary care NAFLD cohort, many patients had high non-invasive fibrosis risk scores and FIB-4 and NFS fibrosis risk scores were often in disagreement. The choice between FIB-4 and NFS for fibrosis risk assessment can impact clinical decision making and may contribute to racial disparities of care.

LEARNING OBJECTIVE #1: 1. Recognize the scope of NAFLD underdiagnosis and the high prevalence of indeterminate and high-risk advanced fibrosis scores in this primary care cohort.

LEARNING OBJECTIVE #2: 2. Compare non-invasive advanced fibrosis risk assessments in a primary care NAFLD cohort.

INCREASED COVID-19 MORTALITY RISK: A SYSTEMATIC REVIEW OF CLINICAL OUTCOMES IN PATIENTS CO-INFECTED WITH COVID-19 AND STAPHYLOCOCCUS AUREUS

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BACKGROUND: Endemic to the hospital environment, *Staphylococcus aureus* is a leading bacterial pathogen that causes deadly infections such as bacteremia and endocarditis. In past viral pandemics, it has been the principal cause of secondary bacterial infections, significantly increasing patient mortality rates. Our world now combats the rapid spread of COVID-19, leading to a pandemic with a death toll greatly surpassing those of many past pandemics. However, the impact of co-infection with *Staphylococcus aureus* remains unclear. We aimed to systematically review the literature in order to describe the clinical outcomes of COVID-19 and *Staphylococcus aureus* co-infection.

METHODS: Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, searches were conducted in PubMed, Scopus, Ovid MEDLINE, CINAHL, ScienceDirect, medRxiv, and the WHO COVID-19 database. Original research articles that were in English, included patients infected with both COVID-19 and *Staphylococcus aureus*, and provided a description of clinical outcomes for patients were eligible. For the final articles that were selected, the following data was extracted: type of staphylococcal species, onset of co-infection, patient sex, age, symptoms, hospital interventions, and clinical outcomes.

RESULTS: Searches generated a total of 779 articles, and of those, a total of 26 studies were eligible for this review. In total, there were 68 co-infected patients. In addition to COVID-19 infection, 63.8% of patients were infected with methicillin-sensitive *Staphylococcus aureus* (MSSA), and 36.2% were infected with methicillin-resistant *Staphylococcus aureus* (MRSA); a single patient was infected with both strains of *Staphylococcus aureus*. 60.3% were diagnosed with hospital-acquired MSSA or MRSA (HA-MSSA or HA-MRSA) infection. 57.4% of patients were male, and mean patient age was 60.4 years (SD = 15.7). Fever, cough, and shortness of breath were the most frequently reported symptoms. Aside from antibiotics, the most common hospital interventions were corticosteroids (25.7%) and intubation with mechanical ventilation (61.8%). There were a total of 43 deaths (63.2%) reported.

CONCLUSIONS: Co-infection with COVID-19 and *Staphylococcus aureus* has been shown to considerably increase the risk of patient mortality during hospital admission. Unfortunately, the most common treatments for COVID-19 in our study are significant risk factors for bacterial infection. Our findings emphasize the imperative of COVID-19 vaccination to prevent hospitalization for COVID-19 treatment and the subsequent susceptibility to hospital-acquired *Staphylococcus aureus* co-infection.

LEARNING OBJECTIVE #1: Review the current evidence base to identify risk factors and outcomes of COVID-19 and *Staphylococcus aureus* co-infection in hospitalized patients.

LEARNING OBJECTIVE #2: Apply outcomes knowledge of COVID-19 and *Staphylococcus aureus* co-infection to improve patient care practices.

INFLAMMATORY MARKERS AS A PREDICTION TOOL FOR 28-DAY INPATIENT MORTALITY IN PATIENTS WITH COVID-19: SIGNIFICANCE OF D-DIMER, C REACTIVE PROTEIN (CRP) AND FERRITIN IN PATIENTS WITH COVID-19

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BACKGROUND: SARS CoV-2, the etiologic agent of Coronavirus disease 2019 (COVID-19), is a novel emerging virus causing a rapid spread across the world. To date, the precise pathophysiology of viral-mediated multi-organ failure remains poorly understood. There are several theories, none of which have been validated. Various inflammatory markers have been studied as potential predictors for disease severity in patients with COVID-19.[1,2]

METHODS: We performed a retrospective cohort analysis of all adult patients at a large acute care teaching hospital located in Queens County, New York. All data were collected from the electronic health record (Allscripts) and was compiled in REDCap software for data encryption. All patients >18 years of age with confirmed SARS-CoV-2 infection who required admission to the hospital between March 15, 2020, and April 1, 2020, were included in the investigation. Pregnant patients were excluded from the study. Missing values are eliminated and 328 patients were included in the analysis. P-values were generated using non-parametric tests as these variables were not normally distributed. We compared the median values of peak D-dimer in D-dimer units (ddu), CRP, and ferritin in 2 groups of patients; those who survived beyond 28 days after the date of hospital admission (Group 1) and those with 28-day in-hospital mortality (Group 2). Data were analyzed using R version 4.0.2.

RESULTS: Compared to mean, median values are more accurate, given the non-normality of the variables. Group 2 (n=87) had a significantly higher median peak D-dimer of 11630 ng/ml in ddu (CI = 3349-30820) compared to Group 1 (n= 241) with median peak D-dimer of 1390 ng/ml (CI= 426-4120) (p<0.001). Similarly, Group 2 had a higher admission CRP (median= 16.1mg/dl, CI= 8.41-29.3) and peak CRP (median= 20.9 mg/dl, CI= 11.2-33.4) compared to Group 1 (p<0.001). Peak ferritin was also significantly elevated in Group 2 (median= 1906 ng/ml, CI= 832-3053) compared to Group 1 (median= 886 ng/ml, CI= 477-1975) (p= 0.003).

CONCLUSIONS: Our study suggests that median D-dimer levels were approximately 8 times, and median CRP and ferritin level at least 2 times higher in Group 2 compared to Group 1, which supports findings from Zhou et al. and Wang L et al.[3,4]. Measurements of inflammatory markers like D-dimer, CRP and ferritin on admission may help clinicians in monitoring, predicting the severity of COVID-19 and 28-day inpatient mortality and help guide the management decisions.

LEARNING OBJECTIVE #1: To determine the correlation of various inflammatory markers with 28-day in-hospital mortality

LEARNING OBJECTIVE #2: To highlight the importance of use of inflammatory marker in monitoring and predicting 28-day mortality

LESSONS IN HINDSIGHT FROM FRONTLINE PHYSICIANS CARING FOR PATIENTS IN COVID-19 EPICENTERS

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BACKGROUND: Anecdotal reports from physicians early in the COVID-19 pandemic reveal unintended consequences for patients. Motivated by personal unintended consequence in patient care and desire for equitable outcomes in future waves of the pandemic, we conducted a qualitative survey exploring physician perspectives and lessons learned in hindsight.

METHODS: Survey questions were developed iteratively and piloted among members of the Health Equity Commission. The confidential survey was emailed to a convenience sample through local and SGIM listservs; it contained demographic questions, geographic location and mode of patient care during the pandemic. Open-ended questions explored participants' perspectives on advice they would give in retrospect and foresight regarding long-term sequelae of the pandemic. Broad areas covered included physician education, discharge planning, unintended consequences for patient care and

mental health issues to anticipate. Thematic content analysis was used to analyze free-text responses.

RESULTS: We received 55 surveys from physicians aged 30-66 years (median 40); 45 (82%) worked in an epicenter. Respondents represented 13 states, 41 (75%) were women, 31 (56%) identified as white, 52 (95%) worked as generalists in internal medicine, pediatrics, and family medicine, and 32 (58%) cared for patients on COVID-only floors, with the remaining caring for outpatients including through telemedicine. Three themes emerged from our data analysis: 1) Novelty of COVID led to unintended consequences for patients; 2) Learning from others would improve patient care; 3) Mental health sequelae will be profound and pervasive. Unintended consequences motivated participants to emphasize relying on their strong foundation of medicine training. One participant demonstrated confidence to advocate for patients stating, "Don't forget your medicine training...don't just follow protocols if they make no sense for your patient." Participants suggested creating "recovery institutions" to avoid discharging patients to crowded environments. Physicians were frustrated by lack of information: "We should have prepared ourselves in January we were seeing so much come out of China." Some suggested we "share information between hospital all around our country." Finally, participants anticipated a sharp increase in mental health issues including substance misuse, survivor guilt, grief and loneliness. The most frequently cited diagnoses included anxiety (30), depression (27) and PTSD (16). One participant suggested we "deploy widely in communities to identify now who needs help."

CONCLUSIONS: Participants highlighted challenges, unintended consequences and lessons learned across epicenters in the first wave of the COVID-19 pandemic. Their insights elucidate opportunities to effect change in policies using a health equity lens to improve health outcomes in this and future pandemics.

LEARNING OBJECTIVE #1: Identify unintended consequences for patients in the COVID pandemic

LEARNING OBJECTIVE #2: Recognize opportunities for systems change

LESSONS IN HINDSIGHT FROM FRONTLINE PHYSICIANS IN COVID-19 EPICENTERS

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BACKGROUND: Anecdotal reports of unintended consequence surfaced early in the COVID-19 pandemic. Motivated by personal front-line experience and desire for improved experiences in future pandemic waves, we conducted a qualitative exploration of physician perspectives and lessons learned in hindsight.

METHODS: We developed survey questions iteratively and piloted them among members of the Health Equity Commission. A convenience sample of physicians on local and SGIM listservs were emailed the confidential survey. The survey asked participants demographic questions, including role in the pandemic, and geographic location. Eleven open-ended questions explored their perspectives on advice they would give in hindsight. Broad areas covered included outcomes of health system policies, personal/institutional factors that influenced workforce well-being amid the crisis, and mental health issues to anticipate. Free-text responses were analyzed through thematic content analysis.

RESULTS: We received 55 surveys from physicians aged 30-66 years (median 40); 45 (82%) worked in an epicenter. Respondents represented 13 states, 41 (75%) were women, 31 (56%) identified as white, 52 (95%) worked as generalists in internal medicine, pediatrics, and family medicine, and 32 (58%) participants cared for patients on COVID-only floors, with the remaining caring for outpatients including through telemedicine. Three themes emerged from our data analysis: 1) Communication can make or break morale; 2) Leadership should include frontline workers in policy-making; 3) Mental health sequelae will be profound and pervasive. Trust in communication was a big factor for our participants during the crisis. Lack of transparency stoked resentment and anger. After experiencing conflicting messaging on PPE, one participant stated: "I pretty much lost all faith in my institution at that point.

Don't lie- if things are bad and you are struggling just say that and outline a plan to do better." Some physicians felt disconnected from leadership and as if they were being treated like "pawns." In contrast, another stated, "there was a 'we're all in this together' feel...we trusted our leadership...and they welcomed our feedback." Finally, participants anticipated a sharp increase in mental health issues including formal diagnoses such as depression, PTSD, and substance misuse, along with guilt and burnout. One participant stated, "Doing this for two months is wearing me down physically and mentally; seeing this much death and despair is hard." Participants offered varied coping strategies for themselves and support strategies for communities.

CONCLUSIONS: Participants highlighted challenges, unintended consequences, and lessons learned from various epicenters in the first wave of the COVID-19 pandemic. Their insights elucidate opportunities to effect policy change to improve crisis management in this and future pandemics.

LEARNING OBJECTIVE #1: Identify unintended consequences for physicians in the COVID pandemic

LEARNING OBJECTIVE #2: Recognize opportunities for systems change

LIFE-THREATENING COMPLICATIONS IN RELATIVELY LOWER-RISK PATIENTS HOSPITALIZED WITH COVID-19

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BACKGROUND: While those who are older or who have chronic health conditions are recognized as being at high risk of adverse outcomes from COVID-19, there is widespread belief among many in the lay public that risk in healthier and younger populations is negligible. We describe outcomes of relatively-lower risk (RLR) patients hospitalized with COVID-19 and sociodemographic associations.

METHODS: This retrospective cohort study used data manually abstracted from electronic health records supplemented with billing codes to describe major clinical outcomes of RLR adults with confirmed COVID-19 hospitalized from 3/1-5/15/20 at 3 New York City hospitals. Patients were followed until discharge, transfer out of the hospital system, or in-hospital death. We defined RLR patients based on absence of 17 chronic medical conditions (16 in the Charlson Comorbidity Index plus body mass index (BMI) $\geq 35\text{kg/m}^2$). The primary outcome was occurrence of any life-threatening complication during hospitalization (myocardial infarction, heart failure, septic shock, positive blood culture, renal replacement therapy, disseminated intravascular coagulation, major arrhythmia, venous thromboembolism, intubation or death). Multivariable logistic regression modeled this outcome in relation to age, sex, race/ethnicity, BMI, insurance status, and area-level characteristics (poverty, crowdedness, English proficiency) derived from US census data. We stratified the analyses into those <55 and ≥ 55 years of age to discern the impact of COVID-19 on both younger and older RLR patients.

RESULTS: Of 3766 adults admitted with COVID-19, 963 (25.6%) were RLR. In the RLR ≥ 55 years of age (n=522), 33.3% had one or more life-threatening complications, 22.6% died and 17.4% were intubated. In the RLR <55 years of age (n=441), 15.0% had life-threatening complications, 5.8% died and 11.1% were intubated. Mean length of hospital stay for RLR patients was 8.3 days in those <55 years and 10.2 days in those ≥ 55 years. In multivariable analyses, age (OR 1.03, 95%CI 1.00-1.05; p=0.01), male sex (OR 1.65, 95%CI 1.08-2.53; p=0.02), lack of health insurance (OR 18.05, 95%CI 1.83-177.63; p=0.01) and area-level limited English proficiency (OR 14.95, 95%CI 2.99-74.83, p<0.001) were associated with life-threatening complications in those aged ≥ 55 years. No sociodemographic characteristics were associated with occurrence of life-threatening complications in those <55 years of age.

CONCLUSIONS: Despite being considered RLR, more than one in five patients hospitalized with COVID-19 over age 55 years and one in 20 under age 55 years died. Substantial proportions in both age groups had life-threatening complications, including requiring mechanical ventilation. Public messaging should be unambiguous about these substantial risks in healthy individuals.

LEARNING OBJECTIVE #1: Understand risks of life-threatening complications from COVID-19 in lower-risk patients.(Medical Knowledge)

LEARNING OBJECTIVE #2: Identify sociodemographic predictors of life-threatening complications in that sample.(Patient Care)

NATIONAL PREVALENCE OF ALCOHOL AND OTHER SUBSTANCE USE DISORDERS AMONG EMERGENCY DEPARTMENT VISITS AND HOSPITALIZATIONS: NHAMCS 2014-2018

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BACKGROUND: Acute healthcare utilization and mortality attributed to alcohol use disorders (AUD) and other substance use disorders (SUD) are rising at alarming rates in the US. However, the prevalence and characteristics of emergency department (ED) visits and hospitalizations made by individuals with AUD and SUD are unknown. The objective of this study was to describe the prevalence and characteristics of ED visits and hospitalizations made by adults with AUD or SUD.

METHODS: This was an observational study of the National Hospital Ambulatory Medical Care Survey from 2014-2018, a nationally representative survey of acute care visits with information on the presence of AUD or SUD abstracted from the medical chart since 2014.

RESULTS: From 2014 to 2018, the annual average prevalence of AUD or SUD was 9.4% of ED visits (9.3 million visits) and 11.9% hospitalizations (1.4 million hospitalizations), and both increased over time (30% and 57% relative increase from 2014 to 2018, $p < 0.05$ for both). ED visits and hospitalizations by individuals with AUD or SUD were associated with markers of social disadvantage, including Medicaid (ED visits: AUD: 33.1%, SUD: 35.0%, Neither: 24.4%; hospitalizations: AUD: 30.7%, SUD: 36.3%, Neither: 14.8%) and homelessness (ED visits: AUD: 6.2%, SUD 4.4%, Neither 0.4%; hospitalizations: AUD: 5.9%, SUD 7.3%, Neither: 0.4%). Regarding clinical characteristics, ED visits and hospitalizations among those with AUD or SUD were twice as likely to be associated with coexisting depression (ED visits: AUD: 26.3%, SUD 24.7%, Neither 10.5%; hospitalizations: AUD: 33.5%, SUD 35.3%, Neither: 13.9%); and injury/trauma (ED visits: AUD: 51.3%, SUD 36.3%, Neither: 26.4%; hospitalizations: AUD: 31.8%, SUD: 23.8%, Neither: 15.0%) compared to those with neither disorder.

CONCLUSIONS: In this nationally representative study, 1 in 11 ED visits and 1 in 9 hospitalizations were made by adults with AUD or SUD and increased over time. These estimates are much higher than previous national estimates using claims data. Our results highlight the importance of AUD and SUD treatment in acute care settings and identify opportunities to address AUD and SUD in tandem with other medical concerns, particularly among visits presenting with injury, trauma, or coexisting depression.

LEARNING OBJECTIVE #1: To describe the prevalence and trends of ED visits and hospitalizations made by adults with AUD or SUD in the US from 2014-2018.

LEARNING OBJECTIVE #2: To describe associated patient, clinical, and hospital characteristics of ED visits and hospitalizations made by adults with AUD or SUD in the US from 2014-2018.

OXYGEN REQUIREMENT ON ADMISSION AS A PREDICTOR OF OUTCOMES IN HOSPITALIZED PATIENTS WITH COVID-19

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BACKGROUND: Throughout the COVID-19 pandemic, clinicians have sought to identify risk factors for severe disease. Older age, Charlson Comorbidity Index (CCI), D-dimer and C-reactive protein (CRP) are associated with severe disease. CCI and SaO₂/FiO₂ ratio are associated with mortality, but the changing SaO₂ in time makes it difficult for clinicians to use as a predictor of disease severity. We sought to find objective markers upon hospital presentation to predict COVID-19 outcomes in Veterans.

METHODS: This is a retrospective, single center study of Veterans hospitalized with COVID-19. Demographic and clinical variables were queried for association with supplemental O₂ requirement within 24 hours of admission (AdmO₂), peak disease severity (PDS) and outcomes. PDS was divided into 3 categories based on O₂ need: Mild (0-3L/min nasal cannula (NC)), Moderate (4-6L/min NC or nonrebreather mask), and Severe (high flow NC, non-invasive positive pressure ventilation (NIPPV) and/or mechanical ventilation). We used STATA/IC v16. Two-sample T test and ANOVA compared continuous variables between two groups or more. P-values for categorical variables correspond to Pearson's tests. Linear, logistic, and ordered logistic regression models were used to identify predictors for the studied outcomes.

RESULTS: 82 out of 85 COVID-19 inpatients were included in the final analysis (3 spent several days at other hospitals before admission). Mean age was 69.7 years (SD 14.8), 76 were men, 68.3% White, 26.8% Black and 27% were active smokers. Commonest comorbidities were hypertension (65%), chronic lung disease (50%) and chronic heart disease (CHD) (46.3%). Mean BMI was 28.4 (SD 5.1).

34 patients (41%) needed AdmO₂ and 48 (59%) did not. Age, race, gender and BMI were not associated with AdmO₂. CHD was a risk factor for AdmO₂ ($p = 0.018$). There was no correlation between days of symptoms prior to presentation and AdmO₂ ($p = 0.802$). Mean CRP at admission was higher in AdmO₂ group ($p = 0.01$) while D-dimer did not vary between groups ($p = .17$). The AdmO₂ group required O₂ for more days (15.59 vs 9.43, $p = 0.004$) but no difference between length of stay ($p = 0.06$). AdmO₂ received more therapeutics and NIPPV ($p < 0.001$) but no difference in mechanical ventilation ($p = 0.16$). There was more severe disease in AdmO₂ group ($p < 0.001$). The odds of progressing from mild disease to moderate and from moderate disease to severe were 3.19 times higher in the AdmO₂ group (95% 1.84 to 4.55, $p < 0.001$). AdmO₂ was a risk factor for mortality ($p = 0.013$).

CONCLUSIONS: Our study identified AdmO₂ as a predictor of disease severity, progression of disease, number of days on O₂ and mortality. AdmO₂ can be used as a prognostic indicator to help with resource allocation and timely management. More focused studies are needed to determine how therapeutics can impact the trajectory of illness in these patients. Of note, duration of symptoms before admission did not impact AdmO₂.

LEARNING OBJECTIVE #1: Medical Knowledge

LEARNING OBJECTIVE #2: Practice-Based Learning and Improvement

P2Y12 INHIBITOR MONOTHERAPY VS. ASPIRIN MONOTHERAPY AFTER SHORT-TERM DUAL ANTIPLATELET THERAPY IN ELDERLY PATIENTS UNDERGOING PERCUTANEOUS CORONARY INTERVENTION: INSIGHTS FROM A NETWORK META-ANALYSIS OF RANDOMIZED TRIALS

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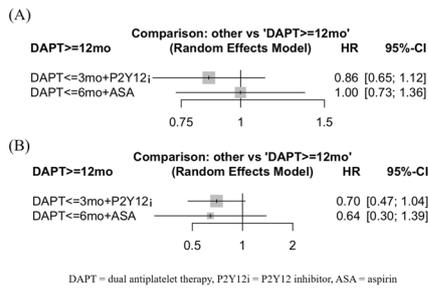
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BACKGROUND: A number of randomized-control trials (RCTs) have reported equal efficacy and greater safety of short-term dual antiplatelet therapy (DAPT) with duration between one month and six months compared with long-term DAPT with twelve-month duration or longer for patients who undergo percutaneous coronary intervention (PCI) with a drug-eluting stent. However, the safety and efficacy of short-term DAPT remain uncertain, especially among elderly patients.

METHODS: We conducted a network meta-analysis of RCTs investigating the impact of duration of DAPT in patients undergoing PCI followed by short-term DAPT (≤ 6 months) group with aspirin (the aspirin group) or short-term DAPT (≤ 3 months) with P2Y12 inhibitor monotherapy group (the P2Y12i

group) compared with the long-term DAPT (≥ 12 months) group. The efficacy endpoint was major adverse cardiovascular events defined in each study varying the composite of all-cause or cardiac death, myocardial infarction, target-vessel revascularization stent thrombosis, or stroke. The safety endpoint was bleeding.



RESULTS: Our search identified 9 RCTs including a total of 10,990 patients. There was no increase in major adverse cardiovascular events in either the aspirin or the P2Y12i group compared with the long-term DAPT group (Figure 1A). P scores were 81.7% in the P2Y12i group, 36.8% in the aspirin group, and 31.5% in the long-term DAPT group. Similarly, there was no significant difference in bleeding events among the groups (Figure 1B). P scores were 72.4% in the aspirin group, 69.3% in the P2Y12i group, and 8.3% in the long-term DAPT group.

CONCLUSIONS: Among elderly patients undergoing PCI, there was no significant difference either in ischemic or bleeding outcomes among short-term DAPT followed by either aspirin or P2Y12 inhibitor monotherapy, and long-term DAPT with duration of 12 months or longer, although potential benefit of reduction in MACE in short-term DAPT and subsequent P2Y12 inhibitor monotherapy was noted by P score.

LEARNING OBJECTIVE #1: Short-term DAPT followed by either aspirin or P2Y12 inhibitor monotherapy, and long-term DAPT for 12 months or longer have similar risk of cardiovascular events and bleeding events for elderly patients.

LEARNING OBJECTIVE #2: The risk of cardiovascular events in short-term DAPT followed by P2Y12 inhibitor monotherapy is potentially low compared to short-term DAPT followed by aspirin.

P2Y12 INHIBITORS IN PATIENTS WITH NON-ST-SEGMENT ELEVATION ACUTE CORONARY SYNDROME: INSIGHTS FROM A SYSTEMATIC REVIEW AND META ANALYSIS OF RANDOMIZED TRIALS

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BACKGROUND: For patients with non-ST-segment elevation acute coronary syndrome (NSTEMI-ACS), prasugrel is recommended in preference to ticagrelor based on a randomized control trial (RCT), however further studies are warranted.

METHODS: PUBMED, EMBASE and Cochrane CENTRAL were searched through November 2020 for RCTs or subgroup analyses of RCTs investigating potent P2Y12 inhibitors (prasugrel or ticagrelor) or clopidogrel in patients with NSTEMI-ACS. The overall risk estimates were pooled using random effects meta analysis. A network meta analysis was performed to rank P2Y12 inhibitors using the P-score.

RESULTS: Our study identified 11 RCTs including a total of 37,268 patients. A network meta analysis showed prasugrel reduced major adverse cardiovascular events (MACE) (HR: 0.84; 95% CI [0.71-0.99]) and myocardial infarction (HR: 0.82; 95% CI [0.68-0.99]), but it did not increase major bleeding (HR: 1.30; 95% CI [0.97-1.74]) when compared to clopidogrel. For MACE, prasugrel had significantly high P-score of 0.97 in comparison to ticagrelor (P-score=0.29) and clopidogrel (P-score=0.24). Ticagrelor reduced the risk of cardiovascular death (HR: 0.79; 95% CI [0.66-0.94]), but it increased major

bleeding (HR: 1.33; 95% CI [1.00-1.77], p=0.049) when compared with clopidogrel. There was no significant difference between prasugrel and ticagrelor for each endpoint, but prasugrel had higher P-scores than ticagrelor for all endpoints except cardiovascular death. Significant heterogeneity was detected across studies regarding these risk estimates.

CONCLUSIONS: This study demonstrated that prasugrel reduced ischemic events without clear tradeoff of bleeding when compared to clopidogrel, and supported preferential use of prasugrel over ticagrelor among NSTEMI-ACS patients.

LEARNING OBJECTIVE #1: Medical Knowledge: Prasugrel might be superior to ticagrelor in regard to ischemic and bleeding outcomes among patients with NSTEMI-ACS. This findings would help clinicians when they choose P2Y12 inhibitors for NSTEMI-ACS patients.

LEARNING OBJECTIVE #2: Patient Care: The choice of P2Y12 inhibitors needs to be individualized with special considerations for bleeding-ischemic risk profiles. This study would help clinicians to identify, respect, and care about patients' differences, values, preferences when they choose P2Y12 inhibitors for NSTEMI-ACS patients.

PATIENT PREFERENCE DISTRIBUTION FOR TAKING A STATIN

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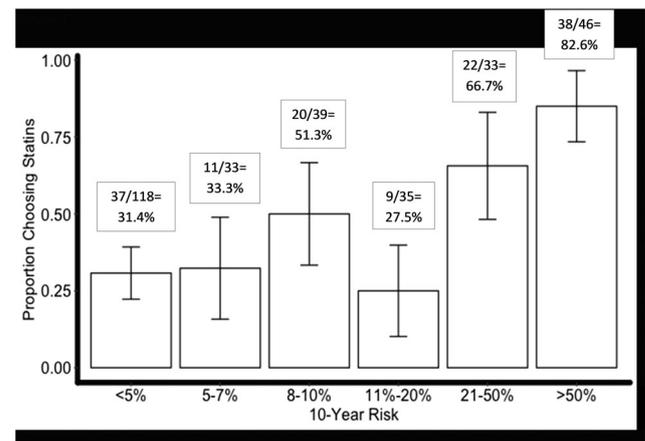
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BACKGROUND: Patient preferences should inform guideline development.

The objective of this study was to define the preference distribution for statin therapy across the spectrum of cardiovascular disease (CVD) risk after participants were informed about the benefits and harms of statins.

METHODS: We conducted a cross-sectional survey using an online nonprobability Qualtrics panel. Participants were a national sample of 304 respondents aged 40 to 75 who had not taken a statin or PCSK9 inhibitor in the past three years, and who knew their total and HDL cholesterol, and blood pressure. Participants were asked to enter their risk information into an online calculator using the Pooled Cohort Equations, which estimated their 10-year CVD risk. Participants were provided with an estimate of their absolute risk reduction if they took a statin, using icon arrays, and the risks of taking statins, from meta-analyses. We explored whether education, health literacy, numeracy, or statin-specific knowledge influenced participants' preferences by examining the proportion of participants with a risk estimate of >10% who would want a statin stratified by these variables.



RESULTS: Participants had a mean age of 55 years (SD=9.9); 50% were female, 44% non-white, 16% had a high school degree or less education, and 51% reported never needing help reading health materials. When asked their preference for taking a statin after reviewing their benefit and risk information, 45% of all participants reported they would definitely or probably want to take a statin. As risk increased, the proportion who would choose to take a statin generally increased (figure). However, a clear majority preference (>60%) for

statins did not emerge until the risk was 20-50%. For participants with a risk >10%, desire to take a statin decreased as health literacy, subjective numeracy and knowledge increased.

CONCLUSIONS: Preferences for statin therapy for primary prevention vary across the spectrum of 10-year CVD risk, but they are relatively flat at intermediate levels of risk, suggesting a broad risk range for shared decision making.

LEARNING OBJECTIVE #1: To appreciate variability in patient preferences for taking statins for primary prevention of CVD.

LEARNING OBJECTIVE #2: To appreciate why both clinical evidence and patient preferences are needed for guideline development.

PEER MENTOR SUPPORT AND HEALTHCARE OUTCOMES

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BACKGROUND: Peer mentors offer psychosocial and recovery support to patients with substance use disorders in various healthcare settings; however, their impact on health outcomes for hospitalized patients remains under-researched. This study compared baseline characteristics and clinical outcomes between patients who received peer mentor services (peer group) and patients who did not (non-peer group).

METHODS: This was an observational, retrospective cohort study of hospitalized patients seen by the Addiction Consult Service at an urban safety-net hospital from January to June 2019. Basic demographics (e.g. race/ethnicity, age, gender, housing status, residing in Boston) and clinical variables (e.g. length of stay, comorbidity index, psychiatric consult status) were collected for each patient admission. The main outcomes were 30-day post-discharge attendance of a medical appointment, attendance of an addiction treatment appointment, and discharged against medical advice (AMA) status, in the peer group as compared to the non-peer group. Descriptive statistics were calculated and unadjusted logistic regressions were performed. All calculations were admission-based.

RESULTS: Overall there were 627 hospital admissions – 148 in the peer group (23.6%) and 479 in the non-peer group (76.4%). In bivariate analyses, significant differences between the peer group and non-peer group were observed, respectively, for gender (54.1% vs 28.6% female; $p < 0.0001$), median age (38 vs 45; $p < 0.0001$), psychiatric consult during admission (23% vs 15.9%; $p < 0.01$) and median length of stay (5.7d vs 3.7d; $p < 0.0001$). Unadjusted logistic regression showed no significant differences between the peer and non-peer groups in whether an addiction appointment was attended 30 days post-discharge (OR 0.58, 95% CI 0.25- 1.35), a non-addiction medical appointment was attended (OR 1.10, 0.69- 1.74), or discharged AMA status (OR 0.66, 0.37- 1.19).

CONCLUSIONS: The peer mentor was found to engage a highly vulnerable group of patients with substance use disorders including women and younger patients as well as those with acute psychiatric needs. In unadjusted analyses, interaction with the peer mentor was not associated with post-discharge appointment attendance or AMA discharges. Future work will control for baseline group differences in order to obtain more robust associations between peer mentors and patient outcomes.

LEARNING OBJECTIVE #1: Characterize and compare patients in the Addiction Consult Service who received peer mentor services (peer-group) and those who did not (non-peer group).

LEARNING OBJECTIVE #2: Describe the relationship between in-hospital peer mentor support and engagement in post-discharge care.

PERCEPTIONS OF A NEW COVID-19 VACCINE AMONG NEW YORK INSTITUTE OF TECHNOLOGY COLLEGE OF OSTEOPATHIC MEDICINE (NYITCOM) STUDENTS

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BACKGROUND: The first case of COVID-19 was diagnosed in China in December 2019. The virus's spread was aggressive that it was declared a pandemic by the World Health Organization (WHO) in March 2020. As the pandemic accelerated, a vaccine was observed as the best hope to restore some normality. However, traditional vaccine development can take years. The lack of an effective national response plan, conflicting messages from the scientific community, and easy access to misinformation have led to widespread skepticism about the new vaccine's safety and effectiveness.

This study explores the perceptions of the students of NYITCOM of the current COVID-19 vaccine. Understanding student perspectives may create learning opportunities for better education regarding vaccine development and recommendations to the communities they serve in the future.

Research questions:

Are NYITCOM students willing to get a new COVID-19 vaccine?

How do opinions regarding a new vaccine vary by medical class year (OMS-I, II, III, and IV) and gender?

Which factors (i.e., family, religious, etc.) have the greatest significance on a student's willingness to get a vaccine?

METHODS: A survey was created by adapting a model of determinants developed by the Strategic Advisory Group of Experts on vaccine hesitancy and sent to the medical students. We classified respondents as either "in favor of a vaccine" if they indicated they agree or strongly agree that they would get a vaccine or "all other" if they indicated they strongly disagree, disagree, or were neutral/undecided.

We grouped race and gender into White male, White female, Asian male, Asian female, and All others (including "prefer not to answer.") Comparisons of answers to whether participants would get a vaccine across sub-groups was made via the Kruskal-Wallis test, comparison of categorical variables was tested with Chi-Square, and multiple regressions were also used to compare multiple sets of variables. Analysis was performed with SPSS27 and statistical significance was set at $p < 0.05$.

RESULTS: The response rate was 11% (196/1734), with 45% (87/194) reporting they would get a new vaccine. The highest percentage of vaccine uptake was by third-year students (59%) and the lowest was among fourth years (38%). Gender, race, class, and perceived COVID-19 risk did not significantly predict intentions. However, lack of having confidence in the U.S. health system ($p < 0.001$), concerns about pharmaceutical profits ($p < 0.001$), possible low vaccine effectiveness ($p < 0.001$), and anti-vaccine acquaintances influenced predicted intentions to not get the vaccine ($p = 0.016$).

CONCLUSIONS: Our findings showed low vaccine uptake among medical students, which might affect vaccine recommendations to the public. Better medical education about vaccine development might increase vaccine uptake.

LEARNING OBJECTIVE #1: Increase knowledge about osteopathic medical students' (OMS) attitudes toward a new COVID-19 vaccine

LEARNING OBJECTIVE #2: Identify factors that drive future doctors' recommendation to prevent disease

POST-COVID PRIMARY CARE NEEDS

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BACKGROUND: Covid-19 disease, resulting from the virus SARS-CoV-2, has caused significant morbidity and mortality across the globe. In the acute setting, Covid-19 is characterized by its inflammatory impact, notably leading to acute respiratory distress syndrome, increased risk of blood clots, cardiomyopathy, and acute kidney injury. Long-term complications known as "long-haul Covid," "chronic Covid," or "post-Covid syndrome" include fatigue, depression, persistent respiratory complaints, and decreased quality of life. However, little research exists to elucidate the primary care needs of those who have recovered from Covid-19. This longitudinal observational study describes healthcare usage patterns and new medical diagnoses after acute Covid-19 infection.

METHODS: We queried the NYU Langone COVID Deidentified Dataset for adults 18+ years old with a positive SARS-CoV-2 PCR test. Patients had at least one visit in the NYU Langone Health system >2 weeks before and >2 weeks after infection (n = 2940). We further narrowed this cohort to patients with a primary care encounter where a Covid-19 related concern was documented at follow-up (n = 454; 57% female; 22%=18-42 years, 51%=43-67 years, 27%=68+ years old). The median length of follow-up was 6 weeks (IQR=3.6-10.1 weeks, max=38 weeks). ICD-10 codes and the Clinical Classification Software Refined (CCSR) categories were used to identify diagnoses newly developed after Covid-19 infection or symptoms that persisted beyond the initial 14-day infection period.

RESULTS: Of 2,940 patients with pre and post-infection visits, only 454 (15%) sought primary care for a Covid-19 related concern. Respiratory signs and symptoms were the most common complaint.

Prevalent diagnoses included cough (8%), hypoxia or respiratory failure (8%), and shortness of breath (7%). Malaise and fatigue (7%), musculoskeletal pain (6%), and generalized weakness and deconditioning (5%) were also common. Nutritional deficiencies were documented among 28 patients (6%), most often for vitamin D deficiency (5%). Palpitations (5%) and nonspecific chest pain (such as chest tightness or discomfort, 3%) as well as deep vein thrombosis and pulmonary emboli (4%) were also reported.

CONCLUSIONS: Most patients with a Covid-19 diagnosis did not seek follow-up, consistent with reports that Covid-19 predominantly causes acute illness. For patients who developed new or persistent symptoms, the most common complaints were respiratory concerns, malaise and fatigue, and musculoskeletal pain. The persistence of these symptoms in our cohort suggests that patients may indeed present a constellation of symptoms after acute Covid-19 infection. Updated longitudinal queries and further research may continue to highlight the importance of tailoring longer term primary care for those who have recovered from acute Covid infection.

LEARNING OBJECTIVE #1: Identify common symptoms of patients returning to primary care more than 2 weeks after Covid-19 infection

LEARNING OBJECTIVE #2: Determine need for primary care follow-up after Covid-19 recovery

POST-DISCHARGE OUTCOMES OF PATIENTS HOSPITALIZED WITH COVID-19

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BACKGROUND: As the SARS-CoV-2 virus continues to spread, most clinical descriptions focus on inpatient and critical care, whereas there is limited understanding of the clinical trajectory and outcomes of patients with COVID-19 after hospital discharge. The UCLA COVID Ambulatory Monitoring Program clinically monitors patients with COVID after hospital discharge to identify clinical instability and evaluate function. To date this program has enrolled >300 patients. We analyzed the functional outcomes and symptoms of the first 102 patients.

METHODS: Consecutive patients were invited to enroll in the post-discharge follow-up program. As part of the monitoring, patients completed symptom and function surveys at 30 and 60 days post-discharge.

RESULTS: 102 patients with COVID-19 followed post-discharge had a mean age of 58.5 years, 50 were male, 37 Hispanic, 35 White, 12 Asian, 8 Black, 9 other races, and 2 declined to answer. 75 patients who completed the 30 day survey reported that before COVID, 29 could complete vigorous activities (ie running), 32 moderate activities (ie pushing a vacuum), 4 could not do moderate activities but could climb 1 flight of stairs, 4 could walk 1 block, and 6 could only bathe or dress. At 30 days post discharge. 61% of patients stated their health was back to normal. Compared to pre-COVID function, 29 (39%) had preserved function after 30 days, 26 (35%) were limited a little and 20 (27%) were limited a lot.

At 60 days, 63 patients provided function information: 62% were at baseline function, 24% were limited a little from pre-COVID-19 levels, and 14% were

limited a lot. Of those with vigorous function at baseline, 59% returned to baseline, 14% were limited a little and 27% limited a lot. Of those capable of moderate activities pre-COVID, 56% returned to baseline, 37% were limited a little and 7% limited a lot. Of those with more compromised function at baseline, 73% reported that they had returned to baseline function.

Of 75 patients who provided information at 30-days about cognition and symptoms, 19 (25%) “sometimes” or “often” had trouble getting things organized and 17 (22%) had trouble concentrating. Concerning symptoms at 30 days post-discharge, 46% reported fatigue; 41% shortness of breath; 28% fever, chills or night sweats; 16% loss of smell or taste; 8% chest pain; 7% muscle aches; 3% nausea, vomiting or diarrhea; 3% numbness or tingling.

CONCLUSIONS: After a COVID-19 hospitalization, less than 4 in 10 patients had returned to baseline function at 30 days and less than 2/3 by 60 days. After 1 month, large proportions continued to have symptoms.

LEARNING OBJECTIVE #1: Characterize functional outcomes of hospitalized COVID patients post-discharge.

LEARNING OBJECTIVE #2: Understand post-discharge monitoring needs of hospitalized COVID patients.

PREDICTING PATIENT EXPERIENCE: UTILIZING A NOVEL DATABASE REGISTRY TO ASSESS COMPLETION OF THE HOSPITAL CONSUMER ASSESSMENT OF HEALTHCARE PROVIDERS AND SYSTEMS (HCAHPS) SURVEY AND WOULD RECOMMEND HOSPITAL RATING BY PATIENT RACE

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BACKGROUND: Patient Experience (PE) is a central focus of many healthcare organizations. At Cleveland Clinic, our goal is for patients to have an empathetic, seamless experience as a lifelong partner in healthcare. Thus, we created a registry of data related to PE at Cleveland Clinic and created multivariable models to predict ratings of PE as measured by the CAHPS survey. This registry represents a significant advance in health services analytics and findings can inform interventions that meaningfully impact patients at our hospital system. There is abundant evidence that patient race is associated with healthcare disparities. However, little is known about the association between race and patient experience. To that end, we utilized our registry to assess HCAHPS survey completion and “would recommend hospital” rating by patient race.

METHODS: We evaluated the percent of patients who responded to the HCAHPS survey in our Cleveland Clinic main campus hospital between 2011 and 2019 and the survey response rate overall and across different demographic groups. We used logistic regression analysis to evaluate survey response vs. non-response and adjusted for race, age group, sex, length of stay, and year of admission, and fitted the same model using only 2019 data. Then we evaluated top-box response (definitely yes) vs. all other responses to the “would recommend hospital” rating among patients who responded to HCAHPS in 2019 using generalized estimating equations while adjusting for race, age group, sex, education, overall health, marital status, median census tract level income per American Community Survey, and length of stay.

RESULTS: Among 254,038 patients sent HCAHPS surveys, 91,889 (36%) responded. We found a 17% response among Black patients vs. a 42% response among White patients. In a logistic model adjusted for race, age group, sex, length of stay, and year of admission, we found Blacks had lower odds of responding compared to non-Blacks (OR 0.34, 95% CI: 0.33, 0.35). When evaluating 2019 only, we also found Blacks had lower odds of responding than non-Blacks (0.32, 95% CI: 0.29, 0.35). Among 6,881 patients who responded to the “would recommend hospital” rating in 2019 and adjusting for above-mentioned covariates, Blacks had lower odds of top box hospital recommend compared to non-Blacks (OR 0.56, 95% CI: 0.44, 0.71).

CONCLUSIONS: The difference in HCAHPS survey completion indicates an underrepresentation of experience data from Black patients at our hospital. Furthermore, among those who did complete HCAHPS surveys, Black

patients reported they would be significantly less likely to recommend the hospital. These findings suggest patient experience disparities that need to be further examined and for evidence-based interventions to reduce disparities.

LEARNING OBJECTIVE #1: Describe the utilization of a novel database registry to predict patient experience.

LEARNING OBJECTIVE #2: Describe the implications of differences in completion of hospital CAHPS surveys and "would recommend hospital" by patient race.

PRETERM MOTHERS AND POST-PARTUM CARDIOVASCULAR DISEASE RISK

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BACKGROUND: Preterm birth (PTB), remains the primary cause of neonatal mortality, at over 10% for those with GA<28w. While significant research has been published regarding maternal PTB risk factors^[4,5,6], as well as short- and long-term outcomes of these neonates^[7,8,9], there remains a large gap in knowledge regarding maternal health consequences. Prior research exploring the effects of PTB on maternal health has indeed been significant for increased risk of cardiovascular disease (MI, stroke, and CHF). However, these studies have been limited either by demographic homogeneity, small sample size, or by project design [10]. Our project utilizes a very large, demographically heterogeneous databases, thus allowing for a powerful retrospective cohort analysis.

METHODS: This is a retrospective cohort study referencing data collected from birth certificates from births within California from 2005-2011, cross-referenced with clinical outcomes as collected in the Healthcare Cost and Utilization Project (HCUP). In total, this includes 2,963,888 births, which comprises ~98% of all births in the state during this time period. Demographic information assessed via FREQ Procedure. Within logistic regression modeling, all categorical variables modeled using Chi-squared method, and continuous variables modeled via t-test to produce Odds Ratio Estimates and Wald 95% Confidence Intervals. Adjusted and fully adjusted models adjusted for cardiovascular risk factors (dyslipidemia, smoking, baseline hypertension, diabetes, BMI), perinatal factors (gestational age, parity, previous PTB), and maternal demographics (age, race, insurance status).

RESULTS: Results of fully adjusted logistic regression analysis conclude that gestational age under 37 weeks is an independent risk factor for cardiovascular disease risk (defined as stroke, MI, or CHF) with odds ratio 2.403 (95% CI 2.141 - 2.697) and that gestational age under 32 weeks is an independent risk factor for CVD with odds ratio 3.366 (95% CI 2.725 - 4.158)

CONCLUSIONS: Though analysis (including birth weight as risk factor) is ongoing, interpretation thus far of data are suggestive of a significant inverse proportionality between gestational age and the 1-year risk of CHF, MI, and/or stroke. This finding is consistent with our hypothesis and is independent of individual risk factors such as hypertension, diabetes, obesity, smoking, and nulliparity. Clinically, women giving birth preterm should be considered at higher risk for the development of CVD and be screened and treated accordingly in a timely fashion.

LEARNING OBJECTIVE #1: Aim 1: To define the relationships between early gestational age categories (<24w, 24-31w, 32-37w) at birth, and the maternal risk of developing CVD within one year using a logistic regression model.

LEARNING OBJECTIVE #2: Aim 2: To generate a clinical prediction model for cardiovascular disease risk for mothers within a year of preterm birth using GA categories above, using adjusted odds ratios from the regression model.

PSYCHOSOCIAL STRESSORS, RACE, AND LEFT VENTRICULAR MASS: THE MULTI-ETHNIC STUDY OF ATHEROSCLEROSIS

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BACKGROUND: African Americans experience higher rates of hypertension, left ventricular (LV) hypertrophy, and subsequent heart failure and mortality from heart disease. Psychosocial stressors may play a role in the development of cardiac structural changes, particularly among African Americans, but the interrelationships of race, stressors, and LV mass are understudied.

METHODS: We conducted a cross-sectional analysis of the Multi-Ethnic Study of Atherosclerosis, an ongoing cohort study of 6,814 adults free of clinical cardiovascular diseases at baseline. During the baseline examination, participants completed questionnaires related to perceived discrimination, everyday hassles, and chronic burden. Scores from these scales were used to create a standardized, cumulative psychosocial stressor score. Race/ethnicity was self-reported as White, African American, Asian, and Hispanic. LV mass was estimated using cardiac MRI with 1.5-T imaging units (Avanto and Espree, Siemens Medical Systems, Erlangen, Germany; and Signa HD, GE Healthcare, Milwaukee, Wis). We examined the association of psychosocial stressors with LV mass using multivariable linear regression and tested effect modification by race using multiplicative interaction terms. We tested the mediating effect of psychosocial stressors using analytic methods that account for exposure-mediator interactions. All analyses were adjusted for site, age, gender, race, height, weight, blood pressure, antihypertensive medication use, diabetes, education, income, physical activity, tobacco use, alcohol use, and health insurance status.

RESULTS: African American race was directly and positively associated with LV mass (9.5g higher compared to Whites, 95% CI: 6.55, 11.37; P<0.0001.) and with psychosocial stressors (0.34 SD greater compared to Whites, p<0.0001 95% CI 0.29, 0.39). Psychosocial stressors were positively associated with LV mass (1.51g greater LV mass per SD increase in psychosocial stressors, p=0.014, 95%CI 0.3, 2.73), although 59% of this association was mediated by the relationship of psychosocial stressors with weight and was not significant in weight-adjusted models. Despite the associations of race with LV mass and psychosocial stress, psychosocial stressors did not modify the association of race/ethnicity with LV mass (p=0.82), and they mediated only an insignificant proportion (5.8%) of the latter association.

CONCLUSIONS: African Americans experience greater psychosocial stressors and have higher LV mass than Whites, but these stressors did not modify, nor did they mediate, the association of race with LV mass. Although the questionnaires used are likely unable to fully capture individuals' lived experiences and may be subject to measurement error, future studies should incorporate other domains, such as diet, and childhood deprivation, to further elucidate racial disparities in cardiac structure.

LEARNING OBJECTIVE #1: To determine association of psychosocial stressors with LV mass

LEARNING OBJECTIVE #2: To determine the associations of race, psychosocial stressors, and LV mass

RACIAL DIFFERENCES IN RED BLOOD CELL TRANSFUSION IN HOSPITALIZED PATIENTS WITH ANEMIA

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BACKGROUND: In hospitalized patients with anemia the AABB recommends transfusion of red blood cells when a patient's hemoglobin (Hb) drops below either 7 or 8g/dL. These restrictive transfusion guidelines are the result of a growing body of clinical trials showing that transfusion at restrictive Hb thresholds is safe, using mortality as the primary outcome. These guidelines have become standard of care, but they do not specify whether individual patient characteristics beyond Hb level may influence the need to receive or not receive a transfusion within restrictive transfusion ranges (7-8g/dL). As a result, there may be variation in restrictive transfusion practices based on patient's individual characteristics. The purpose of this study was to test for variation

in restrictive transfusion practices and determine whether any variation in transfusion practices was associated with patient's demographic (age, gender, race) or clinical characteristics (comorbidities, length of stay (LOS)).

METHODS: Hospitalized general medicine patients with a Hb<10g/dL were eligible for study participation. Patients with sickle cell anemia were excluded. Transfusion and Hb data were collected from the hospital's administrative data mart. Multiple linear regression was used to test the association between receipt of a transfusion as the dependent variable, and patients demographic (age, gender, race, ethnicity) and clinical characteristics (Charlson Comorbidity Index (CCI), LOS) as the independent variables, controlling for patient's admission and nadir Hb levels.

RESULTS: 4,096 patients consented to participate, of which 26% received a transfusion. The average age was 60 (± 17), 57% were female, 71% were African American, and 95% were non-Hispanic/Latino. The mean nadir Hb was 7.9g/dL (± 1 g/dL). The rate of transfusion was 1% for patients with a nadir Hb 9-10g/dL, 21% for patients with a nadir Hb 7-8g/dL, and 83% for patients with a nadir Hb<7g/dL. In the regression model, Hispanic/Latino patients were less likely to receive transfusion compared to non-Hispanic/Latino patients ($\beta=-0.26$, $p=0.05$), African American patients were less likely to receive transfusion ($\beta=-2.03$, $p<0.01$), and patients reporting a race of "other" were more likely to receive a transfusion ($\beta=1.73$, $p<0.01$), compared to white patients. A longer LOS ($\beta=0.1$, $p<0.01$) was also associated with a higher likelihood of receiving a transfusion. There was no association between transfusion and age, gender, or CCI.

CONCLUSIONS: Within restrictive transfusion ranges the rate of transfusion differs by race, ethnicity, and LOS. The differences in transfusion by race and ethnicity are surprising findings, and future work should examine whether these differences reflect disparities in care.

LEARNING OBJECTIVE #1: Examine variation in restrictive red blood cell transfusion practices.

LEARNING OBJECTIVE #2: Examine whether variation transfusion practices is associated with patient's demographic or clinical characteristics.

RANDOMIZED TRIAL OF THE EFFECT OF A HIPAA AUTHORIZATION FORM ON SURVEY RESPONSE FOR A RESEARCH COHORT IN A CLUSTER-RANDOMIZED ADVANCE CARE PLANNING TRIAL

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BACKGROUND: The Health Insurance Portability and Accountability Act (HIPAA) protects patients by setting limits on who can view and receive their health information. HIPAA requires adherence to institutional regulations and forms include legal language that can be confusing to patients. Although HIPAA forms would ideally be described in detail by study staff, this is not always feasible, especially for large pragmatic trials. Therefore, we evaluated the effect of including a HIPAA authorization in mailed survey packets on study enrollment.

METHODS: Enrollment packets (i.e., consent forms, +/- HIPAA and surveys) were mailed to English and Spanish-speaking seriously ill eligible patients (i.e. advanced cancer, heart failure, COPD, cirrhosis, renal failure, ALS, vulnerable elder with comorbidity) as part of a population-based advance care planning (ACP) pragmatic trial at three University of California Health Systems. Participants were excluded if clinicians reported the patient had cognitive impairment or the survey might cause psychological harm. The Community Advisory Group raised concerns that the 3-page HIPAA form required by the institution would hinder enrollment. Therefore, we randomized 1/3 of eligible patients to have the HIPAA authorization included in their

mailed packet and 2/3 to not have it included. Mailed packets included a self-addressed, stamped envelope and were followed by up to three reminder phone calls. We compared enrollment rates within 3 months of outreach for the two groups.

RESULTS: We mailed enrollment packets to 4634 eligible patients; 1544 patients received an enrollment packet that included a HIPAA authorization form and 3090 patients received an enrollment packet that did not. Patients were 51% male, 63% white, 63% were ≥ 70 years old, and 10% were Spanish speaking; demographic characteristics were similar between the two groups. There was no difference in rates of telephone follow up between the two groups. Patients randomized to receive the enrollment packet without the HIPAA form were significantly more likely to enroll in the study (13.9% v. 9.8%, $p<0.001$). For subsequent enrollment (phase 2) of the study, we excluded the HIPAA authorization form from all enrollment packets and met our enrollment target. Follow-up will be needed to collect HIPAA authorization forms for enrolled patients.

CONCLUSIONS: Inclusion of HIPAA authorization in mailed enrollment packets led to lower rates of study enrollment. Although HIPAA forms are more easily described in person or by phone, this is often too resource intensive for large pragmatic trials. HIPAA authorization forms must be redesigned to meet the health literacy needs of patients and to prevent unnecessary barriers to research enrollment.

LEARNING OBJECTIVE #1: Understand the Health Insurance Portability and Accountability Act (HIPAA) and its role in protecting patient information.

LEARNING OBJECTIVE #2: Understand how HIPAA authorization form and how it can have an impact on response rates in clinical trials.

REMDESIVIR FOR THE TREATMENT OF COVID-19: A META-ANALYSIS OF RANDOMIZED CONTROLLED TRIALS

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BACKGROUND: The global pandemic of Coronavirus Disease 2019 (COVID-19) has led to over 80 million confirmed cases worldwide and has been attributed to nearly 2 million deaths. Remdesivir, an adenosine analog pro-drug, has shown effectiveness in previous in vitro and clinical studies. However, most randomized studies are preliminary or are limited by small sample sizes and conflicting findings. As a result, this meta-analysis of randomized, controlled trials (RCTs) was performed to compare intravenous remdesivir to control in patients hospitalized for COVID-19.

METHODS: A comprehensive literature search of EMBASE, PubMed, Clarivate Web of Science, and clinical trial registries such as Clinicaltrials.gov and the World Health Organization International Clinical Trials Registry Platform. The titles and abstracts of eligible studies were reviewed independently by two authors according to inclusion-exclusion criteria established a priori. A third author resolved the disputes. A second round of screening by in-depth full-text review was then performed. A total of two randomized controlled trials met criteria for inclusion into quantitative synthesis. The primary outcome was clinical improvement as indicated by a reduction in ordinal scores based on patient clinical status. Secondary outcomes included mortality rate and adverse events. Standardized mean differences (SMD) and 95% Confidence Intervals (CI) were used for continuous outcomes. Odds ratios (OR) and 95% CIs were used for dichotomous outcomes. The significance level was set at 0.05.

RESULTS: This meta-analysis analyzed data from 1,295 patients from 70 clinical sites included in 2 RCTs. Remdesivir was administered as a 200 mg loading dose on Day 1 followed by 100 mg maintenance doses on Days 2-10. Remdesivir significantly reduced ordinal scores (2.4 ± 1.7 vs 2.8 ± 1.9 , SMD =

-0.21, 95% CI = -0.33 to -0.09, $p < 0.001$), indicating clinical improvement, and significantly reduced mortality (6.8% vs 10.2%, OR = 0.62, 95% CI = 0.41 to 0.94, $p = 0.02$). The use of remdesivir did not significantly increase anemia, acute kidney injury, cardiac arrest, deep vein thrombosis, pulmonary embolism, respiratory failure, or septic shock (all $ps > 0.05$).

CONCLUSIONS: The findings of this meta-analysis suggest that intravenous remdesivir significantly improves clinical status and reduces mortality in patients with COVID-19. Moreover, remdesivir appears to be well-tolerated among hospitalized patients. Further studies are needed to complete the side-effects profile of the drug as well as optimize dosing, timing, and mode of delivery. Clinicians should decide whether to administer remdesivir based on the highest level of evidence available in the literature.

LEARNING OBJECTIVE #1: Recognize whether intravenous remdesivir improves clinical status.

LEARNING OBJECTIVE #2: Recognize whether intravenous remdesivir affects mortality rates compared to control.

SEX DIFFERENCES IN THE SYMPTOMS AND TOLERANCE OF ANEMIA DURING HOSPITALIZATION

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BACKGROUND: The WHO defines anemia in females as a hemoglobin (Hb) <12g/dL and in men as a Hb <13g/dL. These different Hb cutoffs for defining anemia represent well established differences in normal baseline Hb concentration between females and males. There are also differences in the prevalence of anemia in females and males over the life course. Despite these known differences in baseline Hb concentration and rates of anemia, there is little data describing whether females and males may also differ in their tolerance of anemia symptoms, such as fatigue. This is important because if either males or females have higher anemia-related fatigue levels, then using the same Hb threshold to transfuse all hospitalized patients may not be the optimal management for either sex. Importantly, the RCT's that have informed restrictive transfusion practices have not reported on sex differences in baseline Hb levels or how such differences may impact transfusion thresholds with respect to patients' symptoms. The purpose of this study was to measure the fatigue levels of hospitalized patients with anemia, and to test for differences in the anemia-related fatigue levels of females and males.

METHODS: From 7/2017-2/2020, hospitalized general medicine patients with a Hb <10g/dL were approached for consent. Patient's fatigue was measured using the Patient-Reported Outcome Measurement Information System Fatigue instrument. Patients' Hb values and clinical data were abstracted from hospital administrative data. Multiple linear regression was used to test the association between fatigue as the dependent variable, patients' sex as the primary predictor variable, controlling for age, race, ethnicity, nadir Hb level, Charlson Comorbidity Index, receipt of a transfusion, and length of stay (LOS).

RESULTS: 1,931 patients consented and 58% were female. Females were older than males (58 vs. 56, $p=0.01$). There was a higher percentage of African American females than males (76% vs 66%), and a lower percentage of white females compared to white males (46% vs 54%) ($p<0.01$). Females had a shorter LOS (9 vs. 10 days, $p<0.01$) and higher fatigue levels at admission (27 vs 24, $p<0.01$) compared to males. There were no other differences in baseline characteristics between males and females with respect to ethnicity, nadir Hb (7.7g/dL), receipt of a transfusion (31%), or number of comorbidities. In the regression model, controlling for the above characteristics females had clinically significant higher fatigue levels than did males ($\beta=3.0$, $p<0.01$).

CONCLUSIONS: Hospitalized female patients have higher anemia-related fatigue levels than do hospitalized male patients. This difference in fatigue levels may represent different tolerances to anemia and should be further examined to work determine whether different transfusion thresholds may mitigate the effects of anemia on fatigue for females and males.

LEARNING OBJECTIVE #1: To measure fatigue levels in hospitalized patients with anemia

LEARNING OBJECTIVE #2: To compare fatigue levels between hospitalized men and women with anemia

THE ASSOCIATION OF PRESCRIBED OPIOIDS AND INCIDENT CARDIOVASCULAR DISEASE IN THE VETERANS AGING COHORT STUDY

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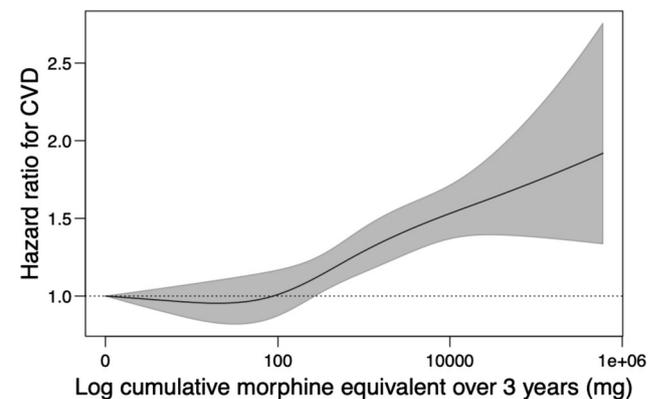
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BACKGROUND: Recent data suggest that prescription opioids (PO) may increase cardiovascular disease (CVD) risk. Compared to those without HIV, people with HIV have higher risk for CVD and are more likely to have chronic pain for which they receive PO and at higher doses. We assessed the association of outpatient PO with incident CVD in the Veterans Aging Cohort Study (VACS).

METHODS: VACS, a national cohort of Veterans with and without HIV, were eligible at their first clinic visit on or after 4/1/2003 (index date). Patients were excluded if, in the year after index date (baseline period), they had: died, an opioid use disorder diagnostic code, more than minimal PO receipt (>14 days PO or >100mg average morphine-equivalent daily dose [MEDD]), or severe illness (VACS Index >100). The primary exposures of interest, PO receipt and total MEDD, were determined in the 3 years after baseline period. Follow-up for incident CVD began at the end of the opioid exposure window among those free of CVD and cancer. We used Cox proportional hazards regression to estimate hazard ratios (HR) with inverse probability weighting to balance confounders by probability of PO receipt. Models were adjusted for covariates assessed at the index date: CVD risk factors, HIV, pain intensity rating, VACS Index, hepatitis C (HCV), alcohol/cocaine use disorder, depression, antidepressant receipt.



RESULTS: Of 38,024 participants, 40% received any PO during the three year period. Median age was 48 years. The sample was 97% male, 49% black, and 48% current smokers. HIV, HCV, and diabetes mellitus prevalence were 28%, 5%, and 12% respectively. Alcohol use disorder was greater among those

with PO receipt (24%) versus those without (18%). Pain intensity rating in those reporting pain (11,594) was similar regardless of PO receipt (Median [Q1, Q3]: 5 [3, 7]). CVD incidence rates per 1000 person-years (18.8 [17.7-19.9] vs. 14.8 [14.0-15.7]) and risk (adjusted HR: 1.27 [1.16-1.37]) were higher among those with PO receipt than without. CVD risk increased with MEDD (Figure).

CONCLUSIONS: PO receipt and higher MEDD are associated with increased CVD risk. Future studies will evaluate these effects by HIV status.

LEARNING OBJECTIVE #1: People with HIV have elevated risk for cardiovascular disease

LEARNING OBJECTIVE #2: Recognize the potential for non-overdose morbidity associated with prescription opioids in people with HIV

THE IMPACT OF AN INTEGRATED PDMP CHECKER ON OPIOID AND BENZODIAZEPINE PRESCRIBING ACROSS CLINICIANS IN A METROPOLITAN AREA: A LINKAGE STUDY OF PDMP DATA

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BACKGROUND: Despite inconclusive evidence that prescription drug monitoring programs (PDMP) reduce opioid-related mortality, guidelines recommend PDMP review with opioid prescribing. Reported barriers to use include time-consuming processes to obtain data and workflow disruptions.

METHODS: We provided access to an electronic health record (EHR)-integrated PDMP checker to 123 clinicians in one healthcare system. Remaining prescribers within the healthcare system and metropolitan area prescribers did not receive PDMP checker access. We calculated rate changes in prescriptions by each prescriber category pre and post PDMP checker integration by high-dose opioid prescriptions (>90 MME); opioid naïve residents receiving extended-release opioids (LA/ER); overlapping opioid prescriptions; and overlapping opioid and benzodiazepine prescriptions. Lastly, we surveyed clinicians to assess their perspectives on PDMP ease of use pre and post PDMP checker integration within our healthcare system.

RESULTS: From July to December 2017, ≈1.7 million opioid prescriptions were dispensed to 494,926 residents. From July 2018 to December 2019, ≈1.85 million opioid prescriptions were dispensed to 650,755 residents. Pre/post PDMP checker integration, there was a significant decrease in high-dose opioids (>90 MME) prescribed across all three prescriber groups. High-dose opioid prescriptions by providers with PDMP checker access decreased from 27.6% (95% CI 0.26 – 0.30) to 6.9% (95% CI 0.06 – 0.07), $p < 0.0001$, approximately a 4-fold decrease. There was a 2-fold decrease in high-dose opioid prescriptions among prescribers without access to the PDMP checker in our healthcare system, 4.8% (95% CI 0.04 – 0.05) to 2.9% (95% CI 0.02 – 0.03), $p < 0.0001$, and in metropolitan Denver, 13.5% (95% CI 0.132 – 0.137) to 6.13% (95% CI 0.061 – 0.062), $p < 0.0001$. Long-acting opioid prescriptions dispensed to opioid naïve residents by metropolitan Denver prescribers increased from 32.3% (95% CI 0.32 – 0.33) to 52.7% (95% CI 0.52 – 0.53), $p < 0.0001$. Overlapping opioid prescriptions prescribed by prescribers with PDMP checker access decreased from 17.3% (95% CI 0.172 – 0.175) to 16.32% (95% CI 0.161 – 0.165), $p < 0.0001$ and decreased by metropolitan Denver prescribers, 20% (95% CI 0.1995 – 0.20) to 19.2% (95% CI 0.1920 – 0.1925), $p < 0.0001$. There was a significant decrease in overlapping opioid and benzodiazepine prescriptions across all three prescriber groups. Clinicians with the integrated PDMP checker overwhelmingly reported increased ease of data acquisition beyond the usual PDMP interface.

CONCLUSIONS: An integrated PDMP checker was associated with a 4-fold reduction in high-dose opioid prescribing and greater ease of data acquisition.

Expansion of EHR-integrated PDMPs could increase clinician compliance to review PDMP data while reducing clinician's clerical workload.

LEARNING OBJECTIVE #1: Determine if an integrated PDMP checker would be useful in your clinical practice.

LEARNING OBJECTIVE #2: If so, what steps would be required to integrate a similar application in your EHR?

THE ROLE OF NEW YORK COMMUNITY HOSPITALS DURING PANDEMICS

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BACKGROUND: New York City became the epicenter of the COVID-19 pandemic in the US, reporting its first case of SARS-CoV-2 on March 1, 2020. Patients with co-morbid conditions such as hypertension and diabetes are disproportionately impacted by COVID-19. Hospital systems have been burdened nationwide, including community and safety-net hospitals who serve medically underserved populations, placing them at risk from a resource-needs standpoint. Our study aim is to describe the clinical presentation and outcomes of hospitalized patients with COVID-19, and to highlight the burden on community hospitals, in order to guide health policy and resource allocation in future crises.

METHODS: We conducted a retrospective case series of patients admitted to NYU Langone Hospital - Brooklyn between March 13th and April 4th, 2020. Reverse-transcriptase polymerase chain reaction nasopharyngeal swab confirmed infection with the SARS-CoV-2 virus. Clinical demographics were obtained from the electronic health record (Epic Hyperspace, Madison, WI). The primary outcome was time-to-event, defined as transfer to an intensive care unit, mechanical ventilation or death from time of admission. Statistical analysis was performed using Stata SE 16 (StataCorp, College Station, TX).

RESULTS: There were 561 patients admitted with a median age of 61 years (IQR 48-74). See Table 1. The median time to composite event was 4.13 days (IQR: 2.23-7.97).

CONCLUSIONS: Our results show that the impact of COVID-19 on a community hospital is similar to what has been reported in the literature for tertiary centers, implying that safety-net hospitals can play an integral role in future impact mitigation. These implications hold true as the pandemic continues to disproportionately affect those with chronic diseases. As cases of COVID-19 near 20 million, our experience positions us as harbingers who can provide insight for resource allocation across the US.

LEARNING OBJECTIVE #1: Patient Care: Identify the characteristics in patients with COVID-19 associated with increased risk for hospitalization

LEARNING OBJECTIVE #2: Medical Knowledge: Understand the outcomes related to COVID-19 in a diverse population

TRENDS IN DEPRESSIVE SYMPTOM BURDEN AMONG CORONARY HEART DISEASE PATIENTS DURING THE COVID19 PANDEMIC

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BACKGROUND: About 1 in 5 patients with coronary heart disease (CHD) experience elevated depressive symptoms. A recent cohort study found that even subthreshold depressive symptoms lead to recurrent cardiac events and mortality. While the mental health burden of COVID19 has been described, little research has explored trends in depressive symptoms among CHD patients, a risk factor for recurrent events that may partially explain excess cardiac deaths. We examined depressive symptom burden among CHD

patients as well as depression screening rates at the healthcare system level pre vs. post-COVID19.

METHODS: The iHeart DepCare study is a randomized control depression screening and activation trial among adults ≥ 21 years with documented CHD and upcoming appointments at cardiology and primary care clinics in a large academic, healthcare system. We used descriptive statistics to assess trends in elevated depressive symptoms (patient health questionnaire [PHQ]9 ≥ 10), generalized anxiety disorder (GAD7 ≥ 10), moderate/severe symptoms (Beck Depression Index (BDI-II) ≥ 10) and treatment (therapy, antidepressants, exercise) rates based on self-report among non-intervention participants recruited by phone (using identical clinics and methods) during a 6-month period (July to December) of 2019 (pre-COVID19) vs. 2020 (post-COVID19) during the nadir in NY). We conducted an electronic health record query of depression screening rates among accountable care organization eligible patients at the healthcare system level during the third quarter of 2019 vs. 2020.

RESULTS: At the healthcare system level, 702/853 (82.3%) vs. 402/642 (62.6%) of patients were screened for depression ≥ 1 in 2019 vs. 2020. Among the patients recruited pre (n=259) vs. post (n=76) COVID19, 56 (21.6%) vs. 23 (30.3%) had elevated depressive symptoms. Post (vs. pre) COVID19, more depressed patients self-reported black race (27.3% vs. 14.9%), moderate to severe symptoms (83% vs. 72%), anxiety (71% vs. 64%), antidepressant use (100% vs. 51%) and lower mean [SD] days with ≥ 30 minutes of activity in prior 7 days (0 [0] vs. 1.3 [2.1]). Otherwise, the pre- vs. post-COVID cohort patients were similar in age, sex, ethnicity, average PHQ9 score, therapy and study refusal rates.

CONCLUSIONS: Preliminary results suggest that while depression screening rates decreased, the burden of depressive symptoms, a key risk factor for recurrent cardiac events, increased by 10% among CHD patients pre vs. post COVID19. Redeployment, staffing limitations, and telemedicine uptake may have limited screening. Our results also suggest that depression may disproportionately affect CHD patients, surpassing recently reported post-COVID rates in the general population. Future research will focus on elucidating whether depressive symptoms resulted in higher hospitalizations and recurrent cardiac events.

LEARNING OBJECTIVE #1: Systems-based practice. Exploring the role the COVID pandemic played on health care system

LEARNING OBJECTIVE #2: Practice based learning and improvement: Improving depression screening in primary care

VITAMIN D LEVELS AND CORRESPONDING RISK FOR COVID-19-RELATED HOSPITALIZATION AND MORTALITY: RESULTS FROM A NATIONAL COHORT OF DEPARTMENT OF VETERANS AFFAIRS PATIENTS

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BACKGROUND: Small studies have recently reported that vitamin D deficiency is associated with worse clinical outcomes among patients infected with coronavirus disease 2019 (COVID-19). However, the precise relationship between vitamin D level and patient outcomes remains controversial. This study sought to evaluate the association between vitamin D levels and risk for COVID-19-related clinical outcomes in a large national cohort.

METHODS: A retrospective cohort of 5,608 patients at US Department of Veteran Affairs (VA) health care facilities with a positive severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) test and a vitamin D test in the preceding 90 days was identified between February 20, 2020 to November 8, 2020. Study outcomes included inpatient hospitalization requiring isolation and mortality among this group

of hospitalized patients. Poisson Generalized Linear Models with robust errors adjusted for sociodemographics and comorbidities estimated outcome probabilities conditional on the log of vitamin D levels.

RESULTS: Of 5,608 veterans with a positive COVID-19 test, 704 (12.6%) were female, mean age was 62.5 (SD +/-15.1); 1,909 (34.0%) identified as non-White, and 617 (11.0%) as Latinx. Low vitamin D levels (< 20 ng/mL) were found in 787 (14.0%) and 1,137 (20.3%) were hospitalized for COVID-19 infection. After adjusting for all covariates, the probability of hospitalization with isolation was 23.1% for those with lower vitamin D levels of 15ng/mL, but decreased to 19.5% for patients with higher vitamin D levels of 40 ng/mL, [Adjusted Relative Risk (ARR)= 1.19 (95% Confidence Interval, CI=1.04-1.35, p=0.009)]. Among 1,137 hospitalized patients requiring isolation, 180 (15.8%) died within 30 days. The adjusted mortality rate for patients with vitamin D levels of 15 ng/mL was 21.7% and decreased to 14.3% for patients with higher vitamin D levels of 40 ng/ml, [ARR=1.51 (95% CI=1.07-2.14, p=0.019)].

CONCLUSIONS: In this cohort, there was a continuous inverse relationship between vitamin D level and risk for COVID-19-related hospitalization and mortality, with lower levels of vitamin D predicting worse clinical outcomes. Larger randomized controlled trials are needed to determine if vitamin D supplementation improves COVID-19-related clinical outcomes.

LEARNING OBJECTIVE #1: To review the controversy related to vitamin D and COVID-19-related clinical outcomes in the context of prior vitamin D research.

LEARNING OBJECTIVE #2: To understand findings from a national cohort showing a continuous inverse relationship between decreasing vitamin D levels and increasing risk for COVID-19 related hospitalization and mortality.

WILLINGNESS OF RESIDENT AND FELLOW PHYSICIANS TO RECEIVE A VACCINE AGAINST COVID-19

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BACKGROUND: Though the average resident or fellow physician is unlikely to be of advanced age or have underlying medical conditions, both of which increase likelihood of death or serious complications due to COVID-19, frequent exposure to the virus in the workplace can increase risk of contraction. In those who contract it and survive, long-term health effects include impairment of multiple organ systems, the full extent of which is yet unknown. Throughout the pandemic, The Journal of the American Medical Association has conducted surveys on public willingness to receive a vaccine; as of December 2020, 56% were willing. In light of vaccine approval, we aim to assess that same willingness in resident and fellow physicians.

METHODS: Prior to distribution of the vaccine, a survey was sent to physicians in Anesthesiology, Emergency Medicine, Surgery, Internal Medicine, Med-Peds, Neurology, Pediatrics, Radiology, Cardiology, and Critical Care programs at Geisinger Medical Center. The anonymous survey consisted of multiple-choice questions that separated respondents into groups based on willingness to be vaccinated; those who would decline the vaccine were directed to an additional question regarding their reason for declining. All were asked if their decision would change if they did not work in health care.

RESULTS: Data was returned by 141 resident and fellow physicians of 250 eligible for a 56% response rate. When asked if willing to receive the vaccine, 89.4% stated they were, and of the 10.6% who refused, 80% cited unknown long- and short-term effects. Of the 89.4% willing, 17.4% would change their decision if they were not health care workers; therefore, only 74% of respondents were willing to be vaccinated regardless of occupation. In those with risk factors, 93.7% were willing to vaccinate as opposed to 88% of those without risk factors. Likewise, 92.3% of those living with high-risk individuals would

vaccinate in comparison to 87.7% of those who live with low-risk individuals. There was no difference in willingness between genders.

CONCLUSIONS: Most resident and fellow physicians at Geisinger Medical Center are willing to receive the COVID-19 vaccine, though fewer would if not in health care.

LEARNING OBJECTIVE #1: Assess percentage of resident and fellow physicians willing to be vaccinated against Covid-19.

LEARNING OBJECTIVE #2: Recognize reasons resident and fellow physicians may be unwilling to receive a vaccine against Covid-19.

Scientific Abstract - Resiliency and Wellness

BURNOUT, STRESS, AND LONELINESS AMONG U.S. MEDICAL STUDENTS DURING THE COVID-19 PANDEMIC: A NATIONAL SURVEY

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BACKGROUND: COVID-19 has disrupted medical education in the U.S. and may have negatively impacted medical student well-being for a group that already experiences high mental distress. While studies suggest disasters can exacerbate healthcare worker distress, little is known about the impacts on medical student well-being. We conducted a cross-sectional survey of US medical students during the COVID-19 pandemic to 1) assess the prevalence of burnout, stress, and loneliness, 2) compare results to pre-pandemic data, and 3) identify risk factors for distress to inform well-being interventions.

METHODS: In May-June 2020, we electronically surveyed all enrolled students from 22 US LCME-accredited medical schools regarding pandemic experiences and effects on their well-being. The Maslach Burnout Inventory, Perceived Stress Scale, and three-question UCLA Loneliness Scale were used; burnout and stress were compared to pre-pandemic studies. Results were analyzed in R (3.6.1) using descriptive statistics, as well as T-tests, chi-squared tests, and one-way ANOVA for subgroup comparisons.

RESULTS: Of 12,389 students, 3,826 responded (31%). Burnout prevalence was 50% (1635/3296), which was not significantly different from five baseline studies (50% vs 51% (2607/5111), $p=0.09$). Mean stress scores were higher during the pandemic compared with four baseline studies (18.9 vs 15.6, $p<0.001$). Half of respondents (1624/3247) reported high ($\geq 6/9$) mean loneliness scores.

Significant differences were found in burnout and stress by class year ($p<0.0001$ for both) and race ($p=0.004$, $p<0.0001$), with second and third year students and Black, Asian, or other racial minority students reporting the highest levels. Students reporting financial strain or COVID-19 related racism had higher burnout and stress ($p<0.0001$ for both). Students diagnosed with COVID-19 or with family members diagnosed with COVID-19 had higher stress scores ($p<0.0001$). Nearly half (49%, 1756/3569) of students volunteered during the pandemic, with volunteers reporting less burnout than non-volunteers (48% (782/1756) vs 52% (853/1813), $p=0.03$).

CONCLUSIONS: Stress scores were higher during the pandemic while burnout was unchanged, possibly related to student removal from clinical duties early in the pandemic. Higher burnout and stress amongst Black, Asian, and other racial minority students and those experiencing COVID-

19 racism or diagnoses may reflect underlying racial and socioeconomic inequalities exacerbated by the pandemic and concurrent national events involving racial injustice. Volunteerism was associated with lower burnout. In the wake of COVID-19, medical schools should develop targeted interventions to support vulnerable students and may consider encouraging volunteer opportunities to promote student well-being.

LEARNING OBJECTIVE #1: Evaluate pandemic impacts on medical student burnout, stress, and loneliness.

LEARNING OBJECTIVE #2: Identify risk factors for distress to inform well-being interventions.

DETERMINANTS OF PRIMARY CARE PHYSICIAN SATISFACTION AND BURNOUT WITHIN A PRIMARY CARE NETWORK

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BACKGROUND: Physician burnout and job dissatisfaction disproportionately impact primary care, resulting in higher turnover, decreased satisfaction, and worse patient outcomes. Tailoring behavioral interventions to the psychological principle of self-determination theory (SDT) may mitigate burnout and improve job satisfaction by increasing intrinsic motivation. We examined the relationship between PCP intrinsic motivation, job satisfaction, burnout, and differences across demographic groups.

METHODS: Beginning October 2019, UCLA PCPs completed quarterly surveys assessing job satisfaction, burnout, and features of intrinsic motivation (autonomy, competence, and relatedness). Participants also completed a survey assessing age, gender, race, and relationship status. Responses were analyzed using linear regression.

RESULTS: 238 PCPs completed the fiscal year quarter one survey and 264 PCPs completed at least one demographic survey. Average job satisfaction and burnout was 5.38 and 2.29, equating most closely to "somewhat satisfied" and "occasionally under stress, but I don't feel burned out." However, 33.2% of PCPs indicated they were burned out with a score of ≥ 3 . Compared to demographic counterparts, males reported lower burnout (2.06 vs. 2.41, $p<0.01$) and white PCPs reported higher job satisfaction (5.56 vs. 5.21, $p=0.03$). PCPs in relationships reported higher job satisfaction (5.48 vs. 5.05, $p=0.02$) and lower burnout (2.54 vs. 2.22, $p=0.02$). An SDT linear regression model evaluating job satisfaction yielded a moderate fit ($R^2=0.50$). Job satisfaction was positively associated with autonomy, competence, and relatedness ($p\leq 0.01$). An SDT burnout model showed a weaker fit ($R^2=0.24$) with only relatedness showed a significant negative association ($p<0.01$).

CONCLUSIONS: Physician burnout remains a prevalent challenge within the primary care community. Survey results show that gender, race, and relationship status are associated with differences in job satisfaction and burnout. Furthermore, intrinsic motivation constructs account for job satisfaction variance better than burnout variance. Our findings suggest both the promise of SDT-centered PCP interventions and the need to focus such interventions on historically underrepresented demographic groups.

LEARNING OBJECTIVE #1: Understand how physician job satisfaction and burnout differ across different self-identified demographic groups.

LEARNING OBJECTIVE #2: Evaluate the extent to which Self-Determination Theory constructs influence job satisfaction and burnout and determine whether behavioral interventions targeting SDT constructs may be promising future approaches to decrease physician burnout and improve job satisfaction.

DRIVERS OF BURNOUT AND PROFESSIONAL FULFILLMENT AMONG ACADEMIC MEDICAL FACULTY

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BACKGROUND: Burnout is a critical issue affecting physicians. It has negative effects on physician health and career fulfillment, as well as healthcare practice and workforce availability. We sought to describe rates of burnout and professional fulfillment and characterize the factors associated with burnout and professional fulfillment at a major academic medical center.

METHODS: In Summer 2019, an adaptation of the Stanford Physician Wellness Survey was administered to all clinical faculty at Brigham and Women's Hospital, an academic medical center affiliated with Harvard Medical School. It included validated measures of burnout and professional fulfillment. It also assessed culture of wellness, personal resilience, and efficiency of practice factors associated with burnout. Generalized estimating equations clustered by department (t-tests) were used to compare burnout and professional fulfillment scores by gender and academic rank. Multivariable linear regression was used to explore the relationship between burnout and professional fulfillment scores and culture of wellness, personal resilience, and efficiency of practice factors.

RESULTS: Our survey sample included 1,070 physicians (50% response rate). 44.7% of respondents were female. 36.5% of respondents were instructors, 27.8% assistant professors, 13.1% associate professors, and 10.7% full professors. Departments with the most respondents included medicine, anesthesiology, and radiology. The overall rate of burnout was 40%, while that of professional fulfillment was 38%. For female faculty and those at the instructor level (versus other academic ranks), rates of burnout were higher and rates of professional fulfillment were lower.

In multivariable models adjusting for age and gender with clustering by department, greater sleep-related impairment, lower perceived gratitude, and lower organizational/personal values alignment significantly predicted higher burnout and lower professional fulfillment scores (all $p < 0.001$). Additionally, lower self-valuation rates predicted higher burnout scores ($p < 0.001$), and lower organizational leadership ratings predicted lower professional fulfillment scores ($p < 0.001$).

We are currently leveraging information about the factors associated with burnout and professional fulfillment in our institution (which we refer to as drivers) to design and deploy targeted interventions centrally, facilitate knowledge sharing among departmental wellbeing champions, and fund grassroots projects addressing drivers.

CONCLUSIONS: Burnout and lack of professional fulfillment are prevalent among academic faculty. We have identified the factors associated with these phenomena and are leveraging this knowledge to design targeted interventions and learning opportunities in order to enhance quality of care and workplace satisfaction.

LEARNING OBJECTIVE #1: To characterize rates of burnout and professional fulfillment among academic medical faculty.

LEARNING OBJECTIVE #2: To describe drivers of burnout and professional fulfillment in this population.

EFFECTS OF THE COVID-19 PANDEMIC ON THE RATES OF SECONDARY TRAUMATIC STRESS AND BURNOUT IN HEALTH CARE WORKERS

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BACKGROUND: Existing research from prior pandemics suggests that the COVID-19 crisis will likely have a substantial adverse impact on the well-being of health care workers (HCWs). Limited available literature has found that the pandemic is associated with increased anxiety and depression. But the effect of COVID-19 on rates of secondary traumatic stress and burnout in HCWs has not been thoroughly examined. Among HCWs, secondary traumatic stress is related to numbness and fatigue, and burnout is associated with higher rates of depression and medical errors. The objective of this study was to examine how the COVID-19 pandemic has impacted stress and burnout rates in HCWs and how these rates may be affected by job type, departmental exposure to patients with COVID, confidence in Personal Protective Equipment (PPE) use, and number of COVID+ cases.

METHODS: Staff at a large, urban academic medical center ($N=479$) were surveyed using the validated Professional Quality of Life instrument with secondary traumatic stress and burnout subscales between March and July 2020. Five job types were made based on self-reported job description: faculty/physicians, residents, nurses, clinical staff, and non-clinical staff. Self-reported departments were categorized based on likely exposure to patients with COVID: low (e.g. OB/GYN), moderate, and high (e.g. Critical Care). Other predictors included self-reported confidence in PPE use and the seven-day rolling average of city COVID+ cases on the date of survey completion. Multiple regression models were used to assess associations between secondary traumatic stress and burnout with predictors.

RESULTS: Job type was significantly associated with stress ($F[4,436]=6.32$, $p < .001$) and burnout scores ($F[4,436]=2.40$, $p=.05$); non-clinical staff had higher levels of stress and burnout than other job types. Department-level COVID+ exposure was associated with burnout ($F[2,436]=8.06$, $p < .001$) but not stress; low COVID+ contact departments reported less burnout. Confidence in PPE use was associated with lower stress ($b=-0.91$, $se=.13$, $t436=-7.23$, $p < .001$) and burnout scores ($b=-1.13$, $se=.12$, $t436=-9.23$, $p < .001$). There was no observed effect of the number of COVID+ cases on either measure.

CONCLUSIONS: Overall, we found that non-clinical job types had higher secondary traumatic stress and burnout rates, and departments with more exposure to patients with COVID had higher burnout levels. Confidence in PPE use also predicted less stress and burnout. The results reveal opportunities to promote resilience in the ongoing and future pandemics: first, attention to the secondary traumatic stress and burnout levels of all HCWs is important; second, burnout emerges as the main negative consequence of treating patients with COVID, and lastly, training in PPE use may be important in reducing secondary traumatic stress and burnout.

LEARNING OBJECTIVE #1: Examine effects of the COVID-19 crisis on secondary traumatic stress and burnout rates in HCWs

LEARNING OBJECTIVE #2: Use the results to better prepare for the ongoing and future pandemics

IREG GROUPS: ADAPTING A BOTTOM-UP APPROACH TO RESIDENT WELLNESS DURING COVID-19

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BACKGROUND: Clinician burnout has long simmered as a pervasive and debilitating healthcare issue. One aspect of our residency program's approach to fighting burnout is a program titled "JeffRED." Based on the previously described RED framework, JeffRED is a discussion group that focuses on the unique challenges and emotions

METHODS: May-June 2020, we electronically surveyed students at 22 US LCME-accredited medical schools regarding pandemic experiences. Likert responses were dichotomized. T test, chi-squared, one-way ANOVA, and unadjusted odds ratios compared results across subgroups. R (3.6.1) was used for statistical analysis.

RESULTS: Of 12,389 students, 3,826 responded (31%). The most common pandemic experiences were limited physical activity/outdoor space access (68%), tension between personal safety and professional duty (38%), and financial strain (30%). Black and Hispanic students were 2.3 times as likely to have financial strain as compared to other racial groups ($p < 0.001$).

Students' top 3 concerns were a loved one getting sick (70%), COVID-19 impacts on society (44%) and impacts on clinical training (35%). Only 17% reported personal health as a top concern. Most (54%) felt stronger in their resolve to be physicians, and 14% were now more likely to choose a frontline specialty.

Over half (54%) were satisfied with school support access. Significant differences were found across race ($p = 0.004$) with Black students reporting the lowest levels of satisfaction. While 51% and 43% of students were satisfied with mental and student health access, those in the same state as their school were more satisfied than those out of state (53% vs 46%, $p = 0.001$, 44% vs 36%, $p = 0.0001$ respectively). Black and Asian students reported significantly lower satisfaction with access to mental health ($p < 0.0001$) and student health ($p = 0.0005$). Nearly half (47%) were satisfied with academic advising, with no difference across race or location ($p = 0.76$, $p = 0.45$).

Notably, 17% reported a family member with COVID-19, 4% were diagnosed with COVID-19 themselves, and 4% reported COVID-19 related death of a loved one. Black and Hispanic students were 1.8 times as likely ($p < 0.001$) to report these experiences with COVID-19 as compared to other racial groups. Students reported increases in self-care (41%), negative coping mechanisms (41%) and caregiver stress (24%) with no differences across sex, race or marital status ($p = 0.3$, 0.1, 0.45).

CONCLUSIONS: The pandemic reaffirmed most students' decision to pursue medicine. Concerns for others outweighed concerns for personal health, with many reporting increased self-care and unhealthy coping. Supporting vulnerable students, such as those with financial strain and caregiver stress, and improving medical and mental health access for all students is key, with specific attention to racial minorities and out of state students since they may be disproportionately affected.

LEARNING OBJECTIVE #1: Understand medical student pandemic experiences.

LEARNING OBJECTIVE #2: Identify priority areas to inform student support services.

UNDERSTANDING EARLY BURNOUT: A MIXED METHODS ANALYSIS OF BURNOUT IN FIRST YEAR HEALTH PROFESSIONAL STUDENTS

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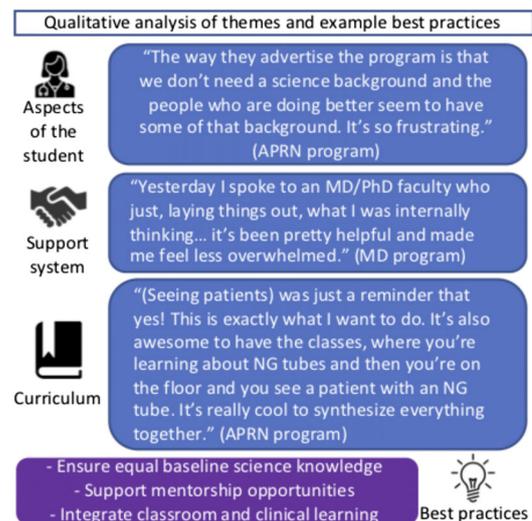
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BACKGROUND: Little is known about burnout in first year health professional students. Measurement of burnout early in training may determine needs for early intervention.

METHODS: Using mixed methods design, we described and compared burnout in first-year students from three programs at our institution: Advance Practice Registered Nursing (APRN), Medicine (MD), and Physician Associate (PA). Outcomes were measured with the Oldenburg Burnout Inventory, with subscales for exhaustion and disengagement, which comprised a total burnout score. Total burnout and subscales were modeled cross-sectionally at the beginning (pre-test) and end (post-test) of the school year using multivariable linear regressions, with gender, type of program, and direct entry from college as predictors. Change over time was measured with analysis of covariance. To explain the quantitative results, we purposively sampled students for semi-structured interviews to explore the experience of first-year students. We used an inductive, iterative approach to analysis to identify salient themes.



RESULTS: On a scale from low (16) to high (64), burnout ranged from 36.2 (MD) to 40.1 (APRN) among 245 students (97% response). APRN and PA students had higher burnout scores compared to MDs. Pre-test outcomes were negatively associated with post-test changes (high pre-test scores were less likely to change). Based on 14 student interviews (7 MD, 7 APRN), aspects of the student, support system and curriculum components emerged as themes underpinning student burnout (Figure 1).

CONCLUSIONS: Moderate levels of burnout in all programs at the start of training challenge the notion that burnout is an issue in later training. High burnout scores may not decrease over time. Results from interviews suggest implementable intervention targets for possible curricular and administrative modifications to mitigate burnout.

LEARNING OBJECTIVE #1: Determine the prevalence of burnout in beginning health professional students

LEARNING OBJECTIVE #2: Identify best practices for a pre-clinical curriculum in which students thrive

USING A HOSPITALIST MORALE INDEX (HMI) TO MEASURE WELL-BEING DURING THE COVID-19 PANDEMIC

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BACKGROUND: Psychological distress is on the rise from the COVID-19 pandemic. The objective of this study was to evaluate a Hospitalist Morale Index (HMI) as a measure of well-being in comparison to other measures of morale, quality of life, and burnout.

METHODS: HMI is a scale comprising 5 domains: clinical, workload, leadership, appreciation & acknowledgement, and material rewards. Overall and domain scores are weighted means of items based on importance and satisfaction ratings, ranging from 0 (low) to 5 (high). We surveyed hospitalists in 5 programs on self-reported quality of life, personal and group morale, emotional exhaustion, depersonalization, depression, and thoughts of leaving hospital medicine or the current group. Demographic factors included age, sex, race/ethnicity, and having children. Clinical factors included academic role, position/rank, years as a hospitalist and with current group, number of hospitalist groups worked for, and percent clinical time. We used ANOVA and logistic regression to determine the association of HMI between groups and outcomes, accounting for site clustering.

RESULTS: Of the 183 hospitalists, 141 (77%) responded; 54% were women, 42% Caucasian, 39% Asian, 5% African-American and 1% Latino. The majority of physicians were 35-44 years old (44%), with 28% <35 years old. By position, median 90% clinical time [IQR: 65%, 100%], 46% were Clinical Associates, 42% Faculty Physicians, 12% PA/NPs; 45% identified as academic. By experience, 51% worked as a hospitalist for >7 years, 12% <1 year, and 37% 1-7 years; for 62%, this was their first hospitalist group.

Average HMI score was 3.00 (SD ±0.77). For HMI and its domains, there was no significant association between measured demographic and clinical variables except for position, where NP/PAs had a lower overall HMI compared with Clinical Associates and Faculty Physicians (2.5, 3.1, 3.1, respectively; $p=0.04$) and those with children reported higher HMI, workload, and leadership scores (all $p<0.02$). An increase of 1 HMI point significantly increased good quality of life (OR 5.24; 95% CI 2.56, 10.74) and decreased emotional exhaustion (OR 0.51; CI 0.27, 0.98), depersonalization (OR 0.13; CI 0.04, 0.43), feeling depressed (OR 0.43; CI 0.21, 0.87), poor ratings of personal (OR 0.22; CI 0.10, 0.45) and group (OR 0.40; CI 0.21, 0.75) morale, and thoughts of leaving within 3 months (OR 0.27; CI 0.13, 0.53), from the group (OR 0.27; CI 0.14, 0.54) and hospital medicine (OR 0.34; CI 0.17, 0.69).

CONCLUSIONS: There was no significant association between HMI and most demographic and clinical variables, suggesting its robustness across groups. Higher HMI was associated with positive well-being measures and could be used to monitor hospitalist well-being during and after the pandemic.

LEARNING OBJECTIVE #1: To understand how to monitor system-wide hospitalist well-being using individual measures of morale, quality of life, burnout, and a Hospitalist Morale Index

LEARNING OBJECTIVE #2: To understand the potential impact of demographic or clinical factors on well-being

USING POSITIVE DEVIANCE TO IDENTIFY MANAGEMENT TACTICS ASSOCIATED WITH HEALTHCARE WORKFORCE WELLBEING.

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(Control ID #3535709)

BACKGROUND: Prior research of ourselves and others show a link between healthcare workforce wellbeing and organizational performance. We sought to

characterize leadership tactics associated with improved workforce well-being. We sought tactics that mapped to Kahn's framework of engagement and Hazy's complexity leadership.



METHODS: A survey of all staff was conducted in April, 2020. Engagement was measured with the mean of three UWES-9 questions that map to the three dimensions of engagement. We focused on the dedication dimension because of its association with organizational commitment. Burnout was measured with the Mini-Z. Additional questions were taken from previously validated surveys. Path analysis identified the strongest associations with burnout. Lastly, one of the authors did a structured interview with the unit manager with the highest engagement and lowest burnout.

RESULTS: 108 surveys were returned from 6 work units. The rates of burnout and dedication were 32%, and 68%, respectively. Path analysis showed that strongest association with burnout was the negative association with the mean engagement score. The strongest association with engagement was the presence of reciprocal learning. One unit had the lowest burnout, the highest dedication, and the second highest report of reciprocal learning. An example tactic used by this unit was the starting of meetings with a "Pause for Purpose" in which accomplishments, small or larger, that lead explicitly to the unit's vision statement are mentioned. The manager seeds the conversation by announcing a few recent achievements. However, the manager allows continuation of the Pause to encourage others in the unit to acknowledge accomplishments by colleagues in order to "decentralize accountability and acknowledgment."

CONCLUSIONS: We were able to identify the theory-based tactics of a local manager whose efforts were associated with higher workforce engagement and reduced burnout. This manager's tactics mapped to multiple, validated factors. First, the Pause may foster engagement by linking accomplishments to Kahn's meaningfulness and mastery. Second, the Pause may foster innovation by mapping to Hazy's complexity leadership by gathering, interpreting, and then disseminating meaningful successes across the unit. Limitations included small sample size that prevented quantifying heterogeneity across business units. Future studies include 1) replicating in a larger population and using the full framework of engagement and 2) comparing tactics of the positive deviants with non-deviants to verify uniqueness, 3) triangulating from different perspectives by surveying unit members to better characterize details and reception of the manager's tactics.

LEARNING OBJECTIVE #1: Identify tactics of managers that are associated with high wellbeing among members of their work unit.

LEARNING OBJECTIVE #2: Learn the use of positive deviance as an application of complexity science that fosters the dissemination of innovation.

WORKFORCE WELLBEING AND HOSPITAL MORTALITY

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BACKGROUND: Many previous studies of the state of a healthcare organization's workforce and performance have focused on the role of burnout. The role of positive organizational states has not been well studied in healthcare. We performed a panel study using two regression analyses, cross-lagged and splined, in order to assess direction of causation and nonlinear relationships, respectively.

METHODS: We studied the English acute and combined Trusts participating in the National Health Service (NHS) Staff Surveys from 2012-2019. We measured three workforce factors: engagement, work satisfaction, and burnout using the NHS Survey. Satisfaction was measured by "I would recommend my organisation as a place to work." Burnout was

measured with a proxy, “feeling unwell from work stress”. Hospital performance was measured using the Summary Hospital-level Mortality Indicator (SHMI). In the first analyses, univariable regression weighted by the number of clinical respondents in each Trust tested each predictor variable. The second analysis was a univariable, cross-lagged, splined regression. The optimum number of knots was determined for each factor, and non-linearity of each factor was assessed by using analysis of variance (ANOVA) to compare the spline models with linear regression. In the final analysis, multivariable, cross-lagged, splined analysis was performed to characterize the response gradient between different states. Heterogeneity in predictor variables across Trusts in 2019 was studied using random effects analysis.

RESULTS: In univariable regression, all factors significantly and negatively correlated with SHMI. In univariable spline regression analysis, engagement and satisfaction significantly improved upon linear regression. In multivariable, cross-lagged spline analysis, only satisfaction and burnout were significant with satisfaction having non-linear effect on SHMI. The heterogeneity of engagement, satisfaction, and burnout was ‘considerable’ at 89%, 99%, and 92% respectively.

CONCLUSIONS: Higher workforce engagement, satisfaction, and unexpectedly, higher work stress are associated with improved performance. The relationships are complex, nonlinear, and suggest that organizations should measure multiple workforce states in order to optimize achieving both organizational missions and workforce well-being. Further investigation is needed of unexpected findings. Heterogeneity in workforce well-being suggests an opportunity to share best management tactics.

LEARNING OBJECTIVE #1: Learn workforce goals beyond burnout for a successful clinical practice.

LEARNING OBJECTIVE #2: Learn the relationships between organizational wellbeing and performance in order to foster practice-based learning and improvement.

Scientific Abstract - Veterans Affairs

ARGUMENTS FOR AND AGAINST A NEW DIAGNOSTIC ENTITY FOR PATIENTS ON LONG- TERM OPIOID THERAPY FOR WHOM HARMS OF CONTINUED OPIOID THERAPY OUTWEIGH BENEFITS

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BACKGROUND: Patients prescribed long-term opioid therapy (LTOT) for pain are at risk for adverse outcomes, including worsening pain and function and opioid use disorder (OUD). A challenge in clinical, research, and policy spheres is how to apply the Diagnostic and Statistical Manual-5 (DSM-5)’s OUD criteria to patients receiving LTOT in whom the harm of therapy may be outweighing benefit – and thus tapering is indicated. Among a group of experts, we aimed to 1) explore perspectives on the merits of creating a new diagnostic entity capturing the experiences of people on LTOT for chronic pain and 2) develop consensus on its diagnostic criteria.

METHODS: We designed a Delphi study to meet our aims. We recruited invitees to a 2019 Veterans Health Administration conference on opioid-related research priorities and invited them to complete online surveys, including both open-ended and Likert-scale questions. The first-round survey began: “Do you think a new diagnostic entity is needed for patients who have been taking opioids and for whom the harms outweigh the benefits of the therapy? Why, or why not?” Here, we present a thematic analysis of qualitative data collected in response to “Why or why not?” Two independent coders used Rapid Qualitative Methods to summarize and then analyze responses.

RESULTS: 51 participants with expertise in internal medicine, psychiatry, addiction, psychology, pain medicine, pharmacy and nursing

completed the first-round survey. Three-quarters of respondents answered “yes,” a new diagnostic entity is needed. Most felt that the current DSM-5 OUD diagnostic criteria did not fit the clinical experience of patients on LTOT and that a new diagnostic entity could facilitate treatment access and reduce stigma for these patients. Those in favor highlighted distinct behavioral and social consequences of opioid use among these patients and problems with the term “use disorder.” Participants that answered “no” argued that the biology of LTOT is identical to what occurs in patients with OUD and that the continuum of patient experiences captured with DSM-5’s OUD diagnosis includes those of patients on LTOT. Many had concerns that a new diagnostic entity would worsen stigma for patients with OUD.

CONCLUSIONS: Our Delphi panel had an array of varying perspectives regarding the need for a new diagnostic entity to characterize patients on LTOT for who harm outweighs benefit. Future research should investigate the role of stigma and how it can be both an argument in favor and against creating a new diagnosis; subsequent rounds of the Delphi survey will work to clarify potential diagnostic criteria for a new diagnostic entity.

LEARNING OBJECTIVE #1: Explain Delphi methods used to elicit expert opinions and develop consensus (Practice-Based Learning and Improvement)

LEARNING OBJECTIVE #2: Explore expert perspectives on a new diagnostic entity capturing experiences of people on LTOT for chronic pain (Patient Care, Medical Knowledge)

ASSESSING THE PATIENT-CENTERED MEDICAL HOME FOR HOMELESS PATIENTS: CAN WE MEASURE WHAT MATTERS?

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BACKGROUND: Over 350 VA and non-VA patient-centered medical homes offer services tailored for homeless patients. However, there has been no evidence on which aspects of clinic design make a difference to patients, because an organizational assessment tool is lacking. Our research team developed a 5-scale organizational survey to assess VA’s Homeless Patient-Aligned Care Teams (H-PACTs). We surveyed Veterans with Homeless Experience to assess whether any organizational features correlated with patient satisfaction.

METHODS: The organizational survey was developed based on 57 qualitative interviews with staff at 5 clinics, producing 139 draft items. These were then administered to staff at 29 VA H-PACTs. We finalized items for scales using Principal Component Analysis, Cronbach α tests, and expert consultation. Concurrently, we surveyed 3394 patients from the same 29 H-PACTs using the validated Primary Care Quality-Homeless (PCQ-H) tool. The PCQ-H offers patient ratings of Relationship to providers, Cooperation, Accessibility/Coordination and Homeless-Specific Needs. We tested for associations between organizational ratings and patient ratings using linear mixed models, adjusting for patient demographics and site.

Society of General Internal Medicine

Increment in Patient-rated Primary Care Experience (1-4 scale) in relation to a 1-sd increment in Organizational Scale Rating by staff				
		Patient Rating via PCQ-H Survey (increment on 4-point scale)		
		Relationship	Cooperation among providers	Access/Coordination
Organizational Rating	Access (+1 sd)			
	Coordination (+1 sd)	+0.06		+0.03
	Patient Centered Care (+1 sd)	+0.05	+0.05	+0.04
	Staff/Team (+1 sd)			
	Leadership Support (+1 sd)			
p<0.05 in model indicated by grey shading				
Modeled change in Patient Rating of Care for +1 SD change in the organizational scale, adjusted for covariates, with random effect for site				

RESULTS: Our analysis produced 5 organizational scales: Access(9 items), Coordination(10), Staff/Team Dynamics(6), Leadership Support(6), & Patient-Centered Care(8; for example, degree of agreement with "Staff provide non-medical forms of assistance"). Two organizational scales (Coordination, Patient-Centered Care) were independently associated with patient ratings on plausibly related PCQ-H scales (Table 1).

CONCLUSIONS: This study finds that staff-reported ratings of Coordination and Patient-Centered Care on an organizational survey are associated with small increments on patients' ratings for related constructs. It may be the first study to do so. However, staff ratings alone are not likely sufficient to operationally measure the medical home for homeless patients.

LEARNING OBJECTIVE #1: To identify primary care organizational features that optimize engagement for homeless Veterans

LEARNING OBJECTIVE #2: To demonstrate novel methods for measurement of primary care organization and delivery for a vulnerable population

ASSOCIATION BETWEEN NEUROTOXIC EXPOSURES AND COGNITIVE AND GASTROINTESTINAL SYMPTOMS IN VETERANS OF THE 1990-1991 GULF WAR.

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BACKGROUND: Environmental toxic exposures are of increasing general concern, and can affect the enteric and central nervous system. During deployment in 1990-1991, many Gulf War Veterans (GWVs) reported exposure to neurotoxins including chemical weapons, pesticides, and pyridostigmine bromide (PB). We investigate the relationship between neurotoxic exposures and chronic gastrointestinal (GI) and cognitive symptoms in a large cohort of GWVs clinically evaluated at the War Related Illness and Injury Study Center (WRIISC).

METHODS: Self-reported intake packets were completed by 716 GWVs referred to the WRIISC, a tertiary clinical evaluation center in the Veterans Health Administration, from 2010 – 2020. Queried neurotoxic exposures included PB, chemical weapons, and exposure to pesticides. Primary outcomes of interest included two gastrointestinal (GI) symptoms (Nausea and Upset Stomach, Diarrhea; 0- almost never to 5-every day over the prior 6 months) and two cognitive symptoms (Difficulty Concentrating and Difficulty Remembering Recent Information; also 0-5). Ordered logistic regression models were run for each symptom and exposure, and odds ratios (ORs) and 95% confidence intervals (95%CI) were reported. Models controlled for current age, sex, race, ethnicity and post- traumatic stress disorder (PTSD).

RESULTS: Mean current age of GWVs was 57 (50) years, 88.4% were men, 16.5% were non-white, 18.2% were Hispanic, and 62.7% reported PTSD. Reported neurotoxic exposures were common: 72.7% endorsed exposure to PB, 33.1% chemical weapons, and 53.2% pesticides. Pesticides exposures were significantly associated with a higher likelihood of having nausea and upset stomach (OR:1.55; 95% CI: 1.04-2.31), difficulty concentrating (OR:

2.29; 95%CI 1.46-3.60), and difficulty remembering recent information (OR: 2.50; 95%CI 1.59-3.93) every day compared to weekly, monthly, or almost never. Chemical weapons exposures showed a similar significant association with a higher likelihood of developing diarrhea (OR: 2.05; 95%CI 1.27-3.28) every day compared to aforementioned choices.

CONCLUSIONS: More than 20 years after the 1990-1991 Gulf War, Veterans who reported exposure to certain neurotoxins during deployment continue to experience chronic GI and cognitive symptoms at significantly elevated rates, compared to unexposed Veterans. Exposures to chemical weapons and pesticides were significantly associated with persistent GI symptoms; pesticide exposure was also associated with cognitive symptoms. In this well-characterized clinical sample, demonstrating the link between chronic symptoms and neurotoxic exposures corroborates findings from epidemiologic and pre-clinical studies and underscores the potential importance of assessing and documenting self-reported exposure concerns in clinical practice.

LEARNING OBJECTIVE #1: To further clinical knowledge about neurotoxin exposure-related hazards to Veterans and all patients

LEARNING OBJECTIVE #2: Analyze clinical experience to improve care of patients with neurotoxic exposures

COVID-19 OUTCOMES AND SEQUENCING OF SARS-COV-2 ISOLATED FROM VETERANS IN NEW ENGLAND

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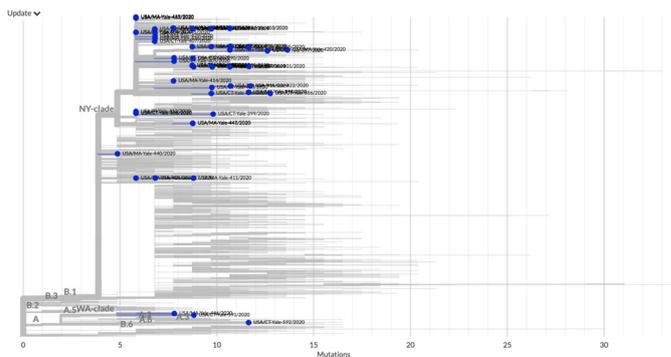
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BACKGROUND: Clinical outcomes of Veterans with COVID-19 in New England and respective genomic variants of SARS-CoV-2 have not been described. Factors impacting outcomes will inform triage and management algorithms.

METHODS: We recorded demographics, comorbidities, and outcomes for 274 patients with COVID-19 in 6 states (CT, MA, ME, NH, RI, VT) from 4/8/20-9/16/20. Peak disease severity was graded from I-VI based on O2 requirement: none, 1-3 liters (L), 4-6L, >6L, non-invasive ventilation, and mechanical ventilation. We generated 64 whole genomes from 3/31/20-5/11/20 (20x coverage, ≥80% of genome) on Illumina(4) and Nanopore(60) platforms and built a phylogenetic tree (Nextstrain).



RESULTS: Of 274 Veterans, 92.7% were male, 83.2% white, and mean age was 63 years. Nonwhite race (OR: 1.97, p=0.043), age (1.06, p<0.001), skilled nursing facility (SNF) residence (1.78, p=0.036), coronary artery disease (CAD) (3.73, p<0.001), atrial fibrillation (aFib) (2.05, p=0.042), and chronic obstructive pulmonary disease (COPD) (3.0, p<0.001) associated with increased hospitalization. Higher mortality was seen with SNF (7.86, p<0.001), hospitalization (2.58, p=0.017), age (1.1, p<0.001), BMI<30 (5.8, p=0.001), dementia (7.23, p<0.001), aFib (3.11, p=0.011), and O2 requirement on diagnosis (4.34, p=0.001). Peak severity

increased with SNF status (2.78, $p=0.001$), aFib (2.97, $p=0.002$), CAD (2.1, $p=0.016$), and age (1.06, $p<0.001$).

Our samples distributed over 4 clades: New York (CT 22, MA 32, NH 1, RI 2), B1 (MA 4), Washington (CT 1, MA 1), and A3 (CT 1). Most (B1 and New York) had a D614G mutation. All 57 New York clade samples had Q57H mutation in open reading frame (ORF) 3a, and 53 had T265I mutation in ORF1a.

CONCLUSIONS: Among Veterans in New England, SNF and older age correlated with worse outcomes. Each incremental year in age increased the odds of hospitalization and peak disease severity by 6% and of mortality by 10%. CAD and aFib also associated with poorer outcomes, and mortality was higher in those with low BMI or dementia. Veterans in New England were infected with multiple SARS-CoV-2 genomic variants early in COVID-19 era, mostly the New York clade with a D614G mutation, with no association to outcomes.

LEARNING OBJECTIVE #1: Identify clinical factors associated with COVID-19 outcomes among Veterans in New England.

LEARNING OBJECTIVE #2: Evaluate genomic variants in infections in Veterans with COVID-19 in New England.

DISPARITIES IN VIRTUAL CARDIOLOGY VISITS AMONG VETERANS HEALTH ADMINISTRATION PATIENTS DURING THE COVID-19 PANDEMIC

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BACKGROUND: The Veterans Health Administration (VA) rapidly expanded virtual care (defined as care delivered by video and phone) in response to the COVID-19 pandemic, raising concerns about technology access disparities (i.e. the digital divide). Although virtual care was well-established in primary care and mental health care prior to the pandemic, it was rarer in most subspecialties. We describe changes in use of cardiology virtual care in the VA during the COVID-19 pandemic and associated patient-level characteristics, including those that could be used to target patients in need of support to overcome barriers to accessing virtual care.

METHODS: In this retrospective cohort analysis, we categorized 2,038,720 outpatient cardiology encounters between 1/1/19-3/10/20 (pre-pandemic) and 3/11/20-11/25/20 (pandemic) by delivery method (i.e., in-person, telephone, video). For the 517,706 patients with cardiology encounters, we employed an Anderson-Gill survival analysis model to assess the likelihood of a virtual cardiology visit, adjusting for baseline patient sociodemographic and clinical characteristics, including age, sex, race, rurality, and presence of heart failure (HF), coronary artery disease (CAD), arrhythmia, or valvular disease.

RESULTS: Virtual encounters increased from 10% of cardiology care pre-pandemic to a maximum of 71% in April 2020, then fell to 39% by October. Though most virtual encounters were phone visits, video visits comprised an increasing share of virtual care, peaking at 12% of virtual care in November 2020. The likelihood of receiving any virtual care was equal across races, but Black and rural patients were less likely to have video visits than other races of patients and those living in urban locations, with adjusted hazard ratios of 0.79 for Black patients (95% confidence interval [CI] 0.76-0.83), 0.51 for rural patients (95% CI 0.48-0.53), and 0.36 for highly rural patients (95% CI 0.32-0.41). Men were less likely than women to have video visits (HR 0.87, 95% CI 0.80-0.95). HF patients were more likely than non-HF patients to receive a video cardiology visit (HR 1.61, 95% CI 1.58-1.70); hazard ratios for patients with arrhythmia, CAD, and valvular disease were also elevated.

CONCLUSIONS: More vulnerable sub-populations of VA cardiology patients were less likely to receive video cardiology care during the COVID-19

pandemic. This suggests that the pandemic worsened the digital divide for cardiology care to the extent that video visits represent added value over phone visits. Black patients and those living in more rural locations might benefit from targeted interventions to address this digital divide and fulfill the promise of virtual care for access.

LEARNING OBJECTIVE #1: Systems-Based Practice: Consider the “digital divide” and disparities in subspecialty virtual care, even within a vertically integrated health system.

LEARNING OBJECTIVE #2: Patient Care: Understand which sub-populations of patients are vulnerable to virtual care access barriers in order to optimize population health.

ELECTRONIC POPULATION-BASED DEPRESSION DETECTION AND MANAGEMENT THROUGH UNIVERSAL SCREENING IN THE VETERANS HEALTH ADMINISTRATION

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BACKGROUND: In 2016, the United States Preventive Services Task Force newly recommended universal screening for depression, the leading cause of disability globally, with the expectation that screening would be linked to appropriate treatment. Few studies, however, assess the population-based trajectory from a positive depression screen to receipt of depression follow-up and treatment. This study examined adherence to guidelines for follow-up and treatment among primary care patients who newly screened positive for depression in the VA.

METHODS: In a retrospective cohort study, we used VA electronic data to identify the 33,694 patients who screened positive for new depression on the 2-item Patient Health Questionnaire in one of the 82 primary care clinics in Southern California, Arizona, and New Mexico between October 1, 2015 to September 30, 2019 ($n=607,730$). We assessed receipt of guideline-concordant care by identifying screen positive patients who were determined by a clinician to be depressed and the timeliness of follow-up and treatment.

RESULTS: Approximately 8% (82,998 of 997,185 person-years) screened positive for new depressive symptoms in VA primary care. 32% (5,034 of 15,650) met treatment guidelines for appropriate follow-up by receiving ≥ 3 mental health specialty visits, ≥ 3 psychotherapy visits, or ≥ 3 primary care visits with a depression ICD-10 diagnosis within 84 days of screening. 77% (12,026 of 15,650) completed at least “minimally appropriate treatment” by having ≥ 60 days of antidepressant prescriptions filled, ≥ 4 mental health specialty visits, or ≥ 3 psychotherapy visits within 12 months of screening. Several patient characteristics, such as age (OR=.98; CI=.97-.98; $p<.001$), Black race (OR=1.30; CI=1.17-1.44; $p<.001$), and having comorbid psychiatric diagnoses (ORs=2.07 to 5.33; all p 's $<.001$), were significantly associated with treatment completion. Patients in rural clinics had lower odds of treatment than those in non-rural clinics (OR=.71; CI=.62-.82; $p<.001$).

CONCLUSIONS: The VA has invested heavily in screening and collaborative primary care and mental health specialist treatment of depression. This study assessed population-level results of these investments in guideline-concordant follow-up and treatment completion. Our findings show that clinicians identified only 19% percent of screen positive patients as depressed and a minority of those received timely clinical follow-up visits. The majority, however, met guidelines for completing treatment within a year of positive screen, with lower rates for geriatric and rural patients. Efforts to improve the

timeliness of care after a positive depression screen and treatment of geriatric and rural patients are necessary. More research is needed to understand whether low rates of depression detection among screen positive patients indicates a gap in recognition of needed care.

LEARNING OBJECTIVE #1: Determine yield of universal depression screening within health systems

LEARNING OBJECTIVE #2: Examine rates of timely follow-up & treatment after positive depression screen

HIGH-RISK PATIENT SATISFACTION WITH ACCESS AND TRUST IN VA IN PATIENT-CENTERED MEDICAL HOMES

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BACKGROUND: Patients at high risk of hospitalization are costly to the healthcare system due to increased use of services. Access to routine medical care and trust are foundational to engaging and managing high-risk patients due to the complexity of their needs. Understanding high-risk patient satisfaction with access and trust may identify potential ways to improve patient-centered care. We examined high-risk patient satisfaction with access and trust at patient-centered medical home (PCMH) in VA.

METHODS: Study design: Multi-level regression analysis of a cross-sectional patient experiences in VA primary care (PC) survey data: Survey of Healthcare Experiences of Patients (SHEP), with items based on Consumer Assessment of Healthcare Providers and Systems (CAHPS).

Setting: VA PCMH.

Population: 7,706,671 Veterans receiving care at 1,018 VA PC clinics between Oct. 2017-Sept. 2018.

Measures: Outcomes included trust in VA and access to 1) care needed right away, 2) routine care, and 3) answer to medical questions. Outcomes were rated as 1 for “agree” or “strongly agree”, 0 otherwise for trust in VA and 1 for “always”, 0 otherwise for the access items. The main predictor was patient risk status, with high-risk defined as those in the top 10% of risk for hospitalization, measured by Care Assessment Need (CAN) scores.

Analytic procedures: A multivariate logistic model for the trust in VA item and each of the three access items. Analyses controlled for patient (age, gender, race/ethnicity, education, self-rated overall and mental health) and site (medical center vs outpatient clinic, median PCP panel size, percent teams with full PCMH staffing) characteristics. Analyses weighted for non-response.

RESULTS: Ten percent (or 772,485) of Veterans were high-risk. High-risk patients were older (proportion age 65 or older: 65% vs 51%), male (93% vs 90%), Black (18% vs 15%), had less education (high school or less: 42% vs 30%) and worse health (poor or fair self-rated overall health: 57% vs 31%; poor or fair self-rated mental health: 39% vs 26%). In multivariate models, high-risk patients had more trust in VA (AOR=1.14; 95% CI:1.07,1.22) but decreased odds of satisfaction with access to routine care (AOR=0.83; 95% CI: 0.78,0.88).

CONCLUSIONS: High-risk patients had high trust in VA, although they were less satisfied with access to routine care. Primary care practices aiming to engage high-risk patients and promote patient-centeredness should target access to increase patient satisfaction.

LEARNING OBJECTIVE #1: Understand high-risk patient satisfaction with access and trust.

LEARNING OBJECTIVE #2: Understand the extent to which patient and site characteristics are associated with high-risk patient satisfaction with access and trust.

HIGH-RISK PATIENT SATISFACTION WITH PRIMARY CARE PROVIDER COMMUNICATION AND CARE COORDINATION IN PATIENT-CENTERED MEDICAL HOMES

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BACKGROUND: Patients at high risk of hospitalization are costly to the healthcare system due to increased use of services. Communication with

primary care providers (PCPs) and care coordination are foundational to engaging and managing high-risk patients due to the complexity of their needs. We examined high-risk patient satisfaction with PCP communication and care coordination at patient-centered medical home (PCMH) in VA.

METHODS: Study design: Multi-level regression analysis of a cross-sectional patient experiences in VA primary care (PC) survey data: Survey of Healthcare Experiences of Patients (SHEP), with items based on Consumer Assessment of Healthcare Providers and Systems (CAHPS).

Setting: VA PCMH.

Population: 7,706,671 Veterans receiving care at 1,018 VA PC clinics between Oct. 2017-Sept. 2018. Measures: Outcomes included PCP communication: 1) explaining information, 2) listening carefully, 3) showing respect, and 4) spending enough time and care coordination: 1) medication discussion, 2) provider aware of history, and 3) test follow-up. Outcomes were rated as 1 for “always”, 0 otherwise for all items. The main predictor was patient risk status, with high-risk defined as those in the top 10% of risk for hospitalization, measured by Care Assessment Need (CAN) scores.

Analytic procedures: A multivariate logistic model for each of the four PCP communication and three coordination items. Analyses controlled for patient (age, gender, race/ethnicity, education, self-rated overall and mental health) and site (medical center vs outpatient clinic, median PCP panel size, percent teams with full PCMH staffing) characteristics. Analyses weighted for non-response.

RESULTS: Ten percent (n=772,485) of Veterans were high-risk. High-risk patients were older (age>65: 65% vs 51%) and had worse self-rated health (poor or fair self-rated overall health: 57% vs 31%; poor or fair self-rated mental health: 39% vs 26%). In multivariate models, high-risk patients had decreased odds of satisfaction with PCP communication: listening carefully (AOR=0.92; 95% CI: 0.87,0.98), showing respect (AOR: 0.92 ; 95% CI: 0.86,0.98), and spending enough time (AOR: 0.92; 95% CI: 0.87,0.98). Care coordination, high-risk patients had decreased odds of satisfaction with medication discussion (AOR=0.92; 95% CI:(0.88,0.97) and test follow-up (AOR=0.83 95% CI: 0.79,0.88) but increased odds of satisfaction with provider aware of history (AOR=1.10; 95% CI: 1.04,1.17).

CONCLUSIONS: High-risk patients were less satisfied with PCP communication. Primary care practices aiming to engage high-risk patients and promote patient-centeredness should target PCP communication to increase patient satisfaction.

LEARNING OBJECTIVE #1: Understand high-risk patient satisfaction with Primary Care Provider (PCP) communication and care coordination.

LEARNING OBJECTIVE #2: Understand how patient and site characteristics are associated with high-risk patient satisfaction with PCP communication and care coordination.

HISTORY OF INTERPERSONAL VIOLENCE AS A RISK FACTOR FOR RECENT UNSTABLE HOUSING AMONG VETERANS

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BACKGROUND: There is increasing recognition that interpersonal violence (IPV) is a risk factor for negative health outcomes and that housing is crucial to maintaining good health over a lifetime.

However, there are relatively little data on how IPV impacts the successful acquisition of stable housing later in life. We hypothesized that IPV would be a risk factor for unstable housing. We also believed that substance use, mental illness and post-traumatic stress disorder (PTSD) would partially explain any association of IPV and unstable housing.

METHODS: We evaluated adult veterans in the Mind Your Heart Study (N = 737) for previous trauma. IPV was categorized as experiencing sexual violence, physical violence or mugging/physical attack using the Brief Trauma Questionnaire. We then surveyed their access to housing in the prior year. Multivariate models examined associations between trauma and unstable housing, defined as endorsing no permanent place to stay, being without shelter, staying in a homeless shelter or living in a hotel in the previous year. These models adjusted for age and sex. They also evaluated for potential mediators: marital status, income, substance use disorder (SUD), major mental illness (bipolar disorder, psychosis or major depression disorder) or PTSD.

Race/ethnicity and education were not included in the models, as they were not significantly associated with IPV.

RESULTS: Veterans who had experienced IPV had higher odds of unstable housing after adjusting for age and sex (AOR 2.0, 95% CI 1.2-3.2). The odds decreased when income, SUD, mental illness and PTSD were added to the model (AOR 1.6, 95% CI 1.0-2.7). Considering specific types of interpersonal violence, participants with a history of physical abuse had 1.7 times the odds of unstable housing compared to those who had not been physically abused (AOR 1.7, 95% CI 1.2-2.5). Sexual violence and mugging/physical attack were associated with an elevated odd of unstable housing compared to those who did not experience these forms of violence (AOR 1.4, 95% CI 0.9-2.2; AOR 1.8, CI 1.2-2.8). The associations between these subtypes of IPV and unstable housing were decreased with the addition of the potential mediators (Physical Abuse AOR 1.4, 95%CI 0.9-2.1; Sexual Violence AOR 1.1 95% CI 0.7-1.8; Mugging/Attack AOR 1.4, 95% CI 0.9-2.2).

CONCLUSIONS: This study demonstrates that previous experiences of IPV are associated with unstable housing among adult veterans. Income, SUD, major mental illness and PTSD largely explained the relationship between IPV and housing. This reiterates the interconnected nature of housing, mental health and substance use – and highlights the potential to improve health outcomes through public health approaches that address them concurrently.

LEARNING OBJECTIVE #1: Determine whether a history of IPV was associated with unstable housing in order to guide public health interventions.

LEARNING OBJECTIVE #2: Influence patient care by identifying risk factors for unstable housing that providers can use to give holistic, trauma informed care.

IMPROVING FACULTY RETENTION THROUGH A FACULTY DEVELOPMENT PROGRAM

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BACKGROUND: The Veteran Health Administration (VHA) provides care for over 500,000 women. In 2010 VHA instituted a policy requiring each facility to identify at least one designated women's health provider (WH-PCP) to offer comprehensive gender-specific primary care. Women Veterans who receive care from WH-PCP are more likely to receive gender-specific cancer screenings, use contraception, and endorse satisfaction with care. Unfortunately, access to WH-PCP remains a challenge with high turnover, 16%, among WH-PCP.

Faculty development programs have been demonstrated to foster professional development, networks, and mentorship which can enhance job satisfaction, provide one potential solution to address WH-PCP turnover. One such program, the VA Women's Health Mini-Residency (WH-MR) was developed in 2011 to train WH-PCPs through case-based hands-on training. The program is highly rated by participants who report improvement in comfort with the clinical care of women Veterans.

The objective of this study was to determine the impact of WH-MR participation on WH-PCP retention.

METHODS: Our analysis used data from the Women's Health Assessment of Workforce Capacity- Primary Care survey, an annual survey of VHA WH-PCP conducted at the end of each federal fiscal year (FY), by Women Veteran Program Managers. This survey collects basic information on WH-PCPs across all 1,255 health care facilities within the VHA system. We assessed for retention of WH-PCP status from FY2018 to FY2019 based on WH-MR participation status. Individuals who attended the WH-MR for the first time in FY2019 were excluded from the analysis. Individuals who retired in FY2019 were also excluded from our analysis of attrition as this reason for departure was felt to be different from other factors contributing to turnover.

RESULTS: Our cohort included 2,663 WH-PCP in FY2018. Of these, 2,155 remained WH-PCP in FY2019. The majority of WH-PCP were women 1,983 (74.5%) and 1,856 (69.7%) were physicians, 669 (25.1%) were nurse

practitioners, and 139 (5.2%) were physician assistants. Two-thirds (1,775) of WH-PCP had attended the WH-MR previously. Among WH-MR participants, 86.7% remained WH-PCP in FY2019 compared to 77.4% of non-participants (p-value<0.005). After controlling for provider gender, type (MD/NP/PA), women's health leadership, and mean clinical days, WH-MR participants were more likely to remain WH-PCP in FY2019 with an adjusted OR of 1.99 (95%CI 1.61-2.48).

CONCLUSIONS: Participating in the WH-MR appears to be protective against turnover. Given the negative impact of provider turnover on patient care and the significant financial cost of onboarding a new WH-PCP, VHA should continue to encourage all WH-PCP to participate in the WH-MR in order to promote employee engagement and foster a strong network of WH-PCPs all of whom aim to provide the highest quality care to women Veterans.

LEARNING OBJECTIVE #1: Understand the role of faculty development programs on faculty retention

LEARNING OBJECTIVE #2: Recognize the importance of continuing medical education on faculty development

IMPROVING RACIAL EQUITY IN THE VETERANS HEALTH ADMINISTRATION CARE ASSESSMENT NEEDS RISK SCORE

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BACKGROUND: The VA computes the Care Assessment Needs (CAN) score weekly for over 5 million Veterans to predict risk of one-year mortality and to improve resource allocation to high-risk Veterans. Motivated by evidence of unfair predictive algorithms in other settings, we examined the CAN score for racial unfairness.

METHODS: We constructed a cross-sectional cohort of Veterans who were alive and had at least one outpatient primary care encounter during 2016, based on a VA national repository of administrative claims and electronic health data containing inpatient, outpatient, laboratory, procedure, and pharmacy encounters. First, we descriptively compared distributions of the last CAN scores in 2016 for White and Black Veterans. Second, we assessed CAN fairness by calculating the false-negative rate (FNR) as our primary fairness metric, defining a "positive" prediction at or above the 80th percentile for Black and White Veterans. Deaths were confirmed using 2017 mortality data. Third, to investigate contributors to unfairness, we compared pooled mortality within strata of Black and White Veterans based on exact matches of the most influential variables in the CAN model: age and Elixhauser comorbidities. To account for class imbalance (lower representation of Black Veterans) we re-assessed fairness after re-training the CAN model by upweighting the Black cohort.

RESULTS: Our population consisted of 791,438 (18.3%) Blacks and 540,877 (81.7%) Whites. Black Veterans were younger (median age 59 vs. 67) and more likely to suffer from PTSD (30.9% vs. 22.4%) and be unmarried (58.8% vs. 42.9%). CAN scores were lower for Blacks than Whites (mean [SD] 41.8 [28.2] vs 52.2 [28.1]) and appeared more unfair for Blacks than Whites (FNR 35.3% vs. 26.5%, meaning CAN under-predicted death for Blacks versus Whites). When matching on comorbidities, the pooled mortality rate was lower for Blacks (2.1% vs. 3.6%), largely because younger Blacks had similar comorbidities to older White Veterans. This discrepancy was mitigated after additionally matching on age (pooled mortality 2.9% vs. 3.0%). Accounting for class imbalance marginally reduced unfairness for Blacks vs. Whites (FNR 34.1% vs. 25.4%).

CONCLUSIONS: The CAN score, a widely-used VA risk model, underestimates mortality risk for Black relative to White Veterans. Differences in the age distributions strongly suggest statistical unfairness driven by confounded social factors. Addressing class imbalance only marginally improves fairness.

This is the first study to show systematic racial unfairness in a VA algorithm due to a relatively young and sick Black population, a mechanism of unfairness that could apply to other VA algorithms. Mitigating algorithmic unfairness may require data on social determinants and should be a priority to improve VA healthcare equity.

LEARNING OBJECTIVE #1: Risk scores generated using clinical data may be unfair

LEARNING OBJECTIVE #2: Unequal representation of racial groups may be a driver of unfairness

I SMOKE TO COPE WITH PAIN: PATIENT PERSPECTIVES ON THE LINK BETWEEN SMOKING AND PAIN

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BACKGROUND: In people with chronic pain, smoking is associated with greater pain intensity and pain-related interference. Researchers have hypothesized a reciprocal model in which pain and smoking exacerbate each other, resulting in a spiral of more pain and increased smoking. The present study aimed to qualitatively examine patient perspectives on this link.

METHODS: A retrospective thematic analysis of smoking cessation counseling notes of 136 Veterans in the Pain and Smoking Study, a tailored smoking cessation trial, was conducted. A validated codebook was applied to each counseling note by four independent coders using Atlas.ti. Coders participated in a consensus-forming exercise with salient themes validated among the wider research team. This analysis captures the emergent themes around the perceived connection between pain and smoking.

RESULTS: The mean age was 60 years (range: 28 to 77 years), and 9% of the sample was women. The median number of cigarettes smoked per day was 15, with a mean pain intensity score in the last week (from 0-10) of 5.1. While not all patients acknowledged connections between pain and smoking, most felt that smoking helped them cope with pain, especially during pain flare-ups (Table). Smoking helped calm their mood, for some via modulation of pain-related stress and anxiety, and distracted from pain. Concerns about managing pain without smoking was a compelling barrier to cessation.

CONCLUSIONS: Most patients with chronic pain who smoke readily identified pain as a motivator of their smoking behavior and are reticent to quit for this reason. Interventions for smokers with pain should address these perceptions and expectancies and promote uptake of more adaptive self-management strategies for pain.

LEARNING OBJECTIVE #1: Assess how patients perceive the relationship between smoking and chronic pain.

LEARNING OBJECTIVE #2: Identify barriers to smoking cessation among patients with pain to inform the integrated design of interventions addressing both smoking cessation and pain management concurrently.

LOW VALUE PRE-OPERATIVE TESTING DELIVERED TO VETERANS THROUGH VETERANS AFFAIRS MEDICAL CENTERS AND VA COMMUNITY CARE PROGRAMS

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BACKGROUND: Low-value preoperative testing accounts for a large proportion of unnecessary healthcare use among Medicare and private insurance beneficiaries. However, its use within the Veterans Health Administration (VHA) is unknown. Our objective was to determine the overall use and costs of low-value preoperative tests conducted for VHA beneficiaries, both at Veterans Affairs Medical Centers (VAMCs) and in non-VA settings through VA Community Care (VACC) programs.

METHODS: We conducted a retrospective study among all Veterans continuously enrolled in VHA and who underwent a low or intermediate risk surgical procedure in FY 2018. Using VA administrative data from both VAMCs and VACC programs, we applied a claims-based metric to identify 4 low-value preoperative tests: chest radiography, echocardiography, pulmonary function testing (PFT), and cardiac stress testing. These tests had to occur before a low-intermediate risk surgical procedure and not be done during an inpatient admission or emergency department visit. Overall and for each individual test, we determined the count per 100 Veterans in FY2018 and applied standardized cost estimates to arrive at the total costs. For each low-value service, we also examined variation in use across all 129 VAMCs by calculating the ratio of tests performed per 100 Veterans at VAMCs in the 90th vs 10th percentiles of utilization.

RESULTS: There were 716,138 Veterans in the overall cohort, of whom 26.0% received surgery via VACC programs. The mean age was 63 (13 SD), 90.3% were male, and 73.1% were non-Hispanic white. The overall count of low-value preoperative tests per 100 Veterans was 21.1, of which 2.6/100 were delivered via VACC. The total cost was \$3.1 million (M). The overall service-specific counts per 100 Veterans for chest radiography, echocardiography, PFTs, and stress testing were 16.4 (VACC count 1.8), 2.0 (VACC 0.2), 0.81 (VACC 0.11), and 1.8 (VACC 0.5), respectively. The total service-specific costs were \$1.2M for chest radiography, \$1.0M for echocardiography, \$50,223 for PFTs, and \$796,458 for stress testing. The ratio of total low-value testing per 100 Veterans when comparing VAMCs in the 90th vs 10th percentiles was 3.77 (24.9 vs 6.6) for chest radiography, 3.30 (3.17 vs 0.96) for echocardiography, 7.63 (1.45 vs 0.19) for PFTs, and 4.19 (3.31 vs 0.79) for stress testing.

CONCLUSIONS: Low-value preoperative testing affected over 1 in 5 VHA beneficiaries who underwent a low or intermediate risk surgical procedure in FY18, was largely delivered directly by VHA, and exhibited up to 8 fold variation across VAMCs. Our findings reinforce the need to characterize those VAMC factors that drive the variable delivery of low-value pre-operative testing to ensure that interventions aimed at reducing such care are successful at the local VAMC level.

LEARNING OBJECTIVE #1: To characterize the use and cost of low-value preoperative testing within the Veterans Health Administration.

LEARNING OBJECTIVE #2: To determine the variation in low-value preoperative testing across VA Medical Centers.

PATIENT SELECTION STRATEGIES IN AN INTENSIVE PRIMARY CARE PROGRAM

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BACKGROUND: Intensive primary care programs (IPC) have had variable impacts on outcomes for complex patient populations, which may be due to the heterogeneity of these patients and lack of consensus

on appropriate patient-selection methods. The US Department of Veterans Affairs (VA) piloted an IPC known as Primary care Intensive Management (PIM) in 5 medical centers with the goal of improving the care of patients with complex care needs. Patients were initially identified using electronic health record (EHR) criteria, then team members evaluated each patient for enrollment.

The objective of this study is to describe the patient selection process at the medical centers, and describe team member perspectives on appropriate patient selection.

METHODS: This study employs an exploratory sequential mixed-methods design. We analyzed qualitative interviews with 22 IPC team members and EHR data from 2,061 patients screened between 2014 and 2017 for PIM enrollment. Qualitative data were analyzed using a hybrid inductive/deductive approach. Quantitative data were analyzed using descriptive statistics.

RESULTS: Of 1,887 patients who were screened for PIM services using EHR criteria, 830 (44.0%) were deemed appropriate for PIM services. Qualitative data showed that team members found the EHR criteria too broad and identified patients that were inappropriate for PIM, because they were not adequately complex, were receiving effective care from their current primary care team, had conditions that PIM could not impact, or required more care than PIM could provide. Qualitative data revealed that participants believed that clinical judgment was required to assess the multiple dimensions of patient complexity to determine appropriateness for PIM. EHR data showed that, among patients who were considered appropriate (N=174), providers most commonly conducted chart reviews (n=152, 87.4%) and contacted the patient's primary care provider (n=148, 85.1%) to gather more information. The most common reasons why patients were deemed inappropriate for enrollment were: lack of an ambulatory care-sensitive condition linked to emergency department use or hospitalization, presence of substance use disorder, or presence of severe mental illness. Finally, qualitative data showed that unfocused program goals to either reduce hospitalization rates, improve patient satisfaction, or reduce burnout in primary care, led to conflicting opinions of which patients should be enrolled in PIM.

CONCLUSIONS: EHR criteria for patient selection were inadequate for discerning the multiple dimensions of patient complexity needed to determine appropriateness for an IPC. Clinical judgement, in-depth case review, and targeted program goals are needed to support appropriate patient selection processes.

LEARNING OBJECTIVE #1: To understand linkages between patient selection processes and program goals in an Intensive Primary Care program.

LEARNING OBJECTIVE #2: Describe how the use of clinical judgement and in-depth case review support patient selection processes.

PRESCRIBER PRACTICES AND CHALLENGES IN PROVIDING GENDER-AFFIRMING HEALTH CARE TO TRANSGENDER AND GENDER DIVERSE (TGD) VETERANS

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BACKGROUND: Although there have been efforts made to train and educate Veteran Health Administration (VHA) providers in gender affirming care, little research has evaluated prescriber practices and comfort in delivering care in line with VHA policy. Therefore, the purpose of this study was to explore prescriber practices and comfort with providing care to transgender and gender diverse (TGD) patients.

METHODS: This is a descriptive study using a one-time survey managed by REDCap. Prescribers at two VHA medical centers were queried regarding current hormone prescribing practices for TGD veterans, comfort level prescribing and what would increase comfort, and barriers to prescribing hormones. The survey was developed by the LGBT training and education group at one of the study sites. Participants were eligible to participate if they were currently employed by the VHA and able to read and understand English.

RESULTS: The majority of participants (n=34, 64.2%) reported that they do not provide hormone treatment in any form for TGD patients. For those that do, a total of 8 (15.1%) reported assessing and initiating hormones, 18 (34.0%) maintain hormones prescribed by another provider, 5 (9.4%) provide evaluation for gender confirming surgery and 5 (9.4%) provide follow-up care for gender confirming surgery. Of those that endorsed any of the above practices, most (n=10, 62.5%) reported not providing informed consent.

The largest percentage of respondents (40.8%) endorsed feeling very uncomfortable with providing any hormone care to TGD veterans. When asked to select what options would increase comfort prescribing hormones, a little less than half of prescribers reported that consultation with another provider (n=24; 45.3%), a prescription algorithm (n=24; 45.3%), in-person training (n=23; 43.4%), and continued education training (n=22; 41.5%) would increase their comfort.

When asked to select the biggest barrier to prescribing, participants were most likely to endorse not feeling adequately trained (n=17, 32.1%). Other responses included feeling prescribing requires a specialist (n=8, 15.1%), not feeling like it is part of their job (n=3, 5.7%), not having adequate time to properly assess (n=2, 3.8%), and feeling mental health professionals should always assess beforehand (n=2, 3.8%).

CONCLUSIONS: Our findings suggest that most providers are not providing hormone therapy for TGD Veterans and many have several reservations and barriers regarding their comfort in doing so. Findings demonstrate the need for training and education to create a unified approach to hormone prescription for TGD Veterans in the VHA. Future work should identify mechanisms for increasing provider comfort with prescribing hormones in order to promote optimal access to gender-affirming care for TGD Veterans in line with VHA policy.

LEARNING OBJECTIVE #1: Describe current patient care practices for TGD Veterans at two VHA medical centers

LEARNING OBJECTIVE #2: Identify future directions toward the goal of providing affirmative care for TGD Veterans across VHA

PRIMARY CARE EXPERIENCE RATINGS AMONG VETERANS WITH CHRONIC PAIN, SUBSTANCE USE PROBLEMS, AND HOMELESSNESS IN THE PRIMARY CARE QUALITY-HOMELESS SERVICE TAILORING (PCQ-HOST) STUDY.

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BACKGROUND: Clinicians who serve patients who have been homeless report difficulty in managing problems related to chronic pain and substance use. The US Department of Veterans Affairs (VA) implemented an integrated primary care model (Homeless Patient-Aligned Care Teams, HPACTs) tailored to the needs of Veterans with Homeless Experience (VHE). Using a national survey, we sought to determine the prevalence of unfavorable experiences for VHEs with chronic pain and/or substance use who receive care in HPACTs.

METHODS: This is a secondary analysis of data collected from VHEs (n=3281) engaged in HPACT primary care in 29 VA's. Randomly-selected VHEs responded to a survey by mail or phone. Unfavorable primary care (PC) experiences were assessed with the validated Primary Care Quality- Homeless (PCQ-H) scales of Relationship to provider, perceived Cooperation among clinicians, Accessibility/Coordination, and Homeless-specific Needs. We classified unfavorable experience based on the highest tertile of unfavorable responses on each PCQ-H scale. Self-reported substance use problems (SUP)

(derived from the Two-Item Conjoint Screen), chronic pain (derived from the PEG-3 and 1-item from the Brief Chronic Pain Questionnaire), social, and demographic indicators were collected. We compared the prevalence of unfavorable PC experiences for VHEs in 4 groups: chronic pain and SUP, chronic pain alone, SUP alone, or neither. Multivariable logistic regression models adjusted for demographics, psychosocial indicators, and site effects.

RESULTS: Among 3281 VHEs, 12% (n=382) had SUP only, 37% (n=1213) had chronic pain only, 24% (n=780) had co-occurring chronic pain and SUP, and 28% (n=906) had neither. In unadjusted comparisons, the prevalence of unfavorable experience was higher on all 4 scales for patients reporting chronic pain (with or without SUP) (all $p < 0.001$), but not for SUP alone compared to VHEs with neither pain nor SUP. On 3 scales, after adjusting for patient characteristics, the odds of an unfavorable experience were higher for VHEs with chronic pain and co-occurring SUP when compared to patients with neither: OR = 1.34 (95% CI, 1.12-1.59) for Relationship, OR = 1.23 (1.03-1.47) for Cooperation, OR = 1.32 (1.11-1.56) for Access/Coordination. VHEs with chronic pain alone had nearly identical ORs to those with combined chronic pain and SUP, relative to having neither.

CONCLUSIONS: Whereas substance use problems alone do not correlate with poor primary care experiences in VA's H-PACTs, chronic pain (with or without SUP) does. Because unfavorable care experiences relate to poor care outcomes, initiatives should be coupled with research to learn how to improve the care experiences of VHEs with chronic pain in primary care.

LEARNING OBJECTIVE #1: To identify differences in primary care experiences for Veterans with homeless experience self-reporting chronic pain and substance use problems (SUP), chronic pain alone, SUP alone, or neither.

LEARNING OBJECTIVE #2: To describe the relationship between chronic pain and unfavorable primary care experience.

PROTECTING THE HEALTHCARE WORKFORCE DURING COVID AND BEYOND: A RAPID QUALITATIVE NEEDS ASSESSMENT OF VA EMPLOYEE OCCUPATIONAL HEALTH

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BACKGROUND: Healthcare workers (HCWs) carry a heavy burden regarding COVID-19 – representing up to 20% of cases in some states. In the Veterans Health Administration (VA), Employee Occupational Health (EOH) has been at the center of organizational response. VA EOH assumes responsibility for the “safety and health” of over half-million HCWs, trainees and volunteers. We aimed to identify best practices and gaps in the expanding role of EOH in supporting the healthcare workforce.

METHODS: We used the Lightning Report approach (Brown-Johnson et al., 2019) rapid qualitative analysis to identify needs from key informant interviews (n=21) with EOH providers conducted July - Dec 2020.

RESULTS: Five interdependent needs included:

1) Infrastructure to support employee population management, including tools to facilitate infection control measures such as contact tracing (e.g., employee-facing electronic health records, coordinated databases). Providers report “drowning” without an initial electronic complete health record for employee population management.

2) Mechanisms for information-sharing across settings (e.g., EOH listserv), especially for changing policy and protocols. Providers reflect a strong need for **standardization. Shared learning supported by a peer-led listserv is “a big advantage”.**

3) Sufficiently-resourced staffing using detailing to align EOH needs with human resource capital. People, time, and skills were flexibly needed to adequately resource EOH. Providers report inconsistent staffing during

COVID crisis. Furthermore, even with adequate people on hand, “the biggest thing we wanted... is cross-train[ing].”

4) Connected and resourced local and national leaders. **Leadership is critically important, both in terms of successes** at the local level where networked, tenured leaders at multiple levels were able to connect with crisis response “incident command” structures, and in terms of gaps at the national level. This lack of adequate resources for leadership at the national level may contribute to the sense that “there isn’t a coherent union of all the VA [centers across the country].”

5) Strategies to support HCW mental health. Overwork and trauma has negatively impacted all aspects of healthcare. EOH providers must manage employee fear as they come in contact with COVID.

CONCLUSIONS: This study describes healthcare workforce needs in a national system during the dynamically changing circumstances of an infectious global pandemic. Not surprisingly, attention to interprofessional networks, technology infrastructure, staffing/expertise, and leadership bandwidth are perceived as core to supporting HCWs. Additionally, our participants emphasized mental health needs for HCWs as a gap. Preparedness around these basics will support the healthcare workforce and empower EOH in future crises.

LEARNING OBJECTIVE #1: Understand employee occupational health needs for a national healthcare system workforce.

LEARNING OBJECTIVE #2: Evaluate alignment of local healthcare center EOH with these national needs.

SOCIODEMOGRAPHIC AND CLINICAL CORRELATES OF GABAPENTIN RECEIPT WITH AND WITHOUT OPIOIDS AMONG A NATIONAL COHORT OF PATIENTS WITH HIV

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BACKGROUND: Gabapentin is commonly prescribed for chronic pain, including to patients with HIV (PWH). There is growing concern regarding gabapentin’s potential for harm, particularly in combination with opioids. Among PWH, we examined factors associated with higher doses of gabapentin receipt and determined if receipt varied by opioid use.

METHODS: We examined data from the Veterans Aging Cohort Study, a national prospective cohort including PWH, from 2002 through 2017; data were analyzed in 2020. Gabapentin receipt was categorized as none, low dose (<1,469 mg/day), and high dose ($\geq 1,469$ mg/day). Covariates included prescribed opioid dose, self-reported past year opioid use, and other sociodemographic and clinical variables. We used multinomial logistic regression to determine the independent association between gabapentin receipt and prescribed opioids and other sociodemographic and clinical characteristics. In secondary analyses, we replaced prescribed opioids with self-reported opioid use.

RESULTS: Among 3,702 PWH, 902 (24%) received any gabapentin during the study period at a mean daily dose of 1,469 mg. There were no observed differences in gabapentin receipt over the study period. In the multinomial model, high-dose gabapentin receipt was associated with high-dose benzodiazepine receipt (adjusted odds ratio [aOR], 95% confidence interval [CI]= 1.55, [1.04-2.31]), pain interference (1.63 [1.37-1.95]), and hand or foot pain (1.81, [1.45-2.25]). High-dose prescribed opioid receipt was associated with increased odds of high dose gabapentin receipt (2.70 [1.98-3.68]); in secondary analyses, self-reported opioid use was not (1.03 [0.88-1.20]).

CONCLUSIONS: PWH prescribed gabapentin at higher doses are more likely to receive high-dose opioids and high-dose benzodiazepines, raising safety concerns.

LEARNING OBJECTIVE #1: Identify sociodemographic and clinical factors associated with any and high-dose gabapentin receipt among people with HIV.

LEARNING OBJECTIVE #2: Characterize the relationship between any or high-dose gabapentin receipt with opioid use among people with HIV.

THE HCV TREATMENT CASCADE BY INCARCERATION STATUS IN PATIENTS WITH AND WITHOUT HIV

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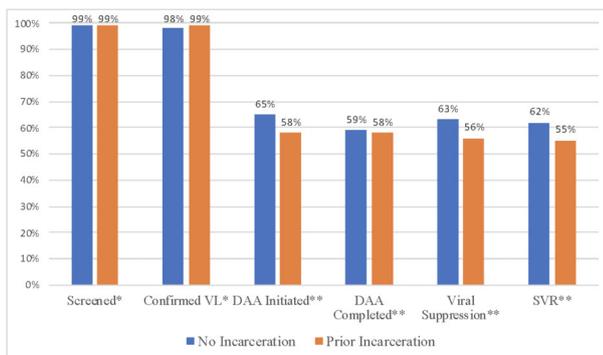
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BACKGROUND: The VA is the largest provider for hepatitis C virus (HCV) care in the U.S. Veterans with an incarceration history experience HCV at higher rates and have worse health outcomes for chronic disease than those without. Direct-acting antivirals (DAA) are the standard of care for HCV treatment. However, it is unknown if incarceration history impacts DAA treatment initiation and sustained virologic response (SVR) rates. We compared the HCV treatment cascade between those with and without prior incarceration in the Veterans Aging Cohort Study (VACS) survey sample, an ongoing cohort that enrolls HIV infected and uninfected patients.

METHODS: We included 1,632 HIV infected and 1,477 uninfected patients who enrolled in VACS from 2012-2019. Outcomes included screening for HCV and viral load confirmation, initiation and completion (≥ 8 weeks) of DAA treatment, viral suppression at last test available, and SVR at 4 or more weeks after the end of treatment.



RESULTS: Of the 3,109 participants, 58% reported ever being incarcerated. Among those with and without prior incarceration, 40% and 21% had HCV infection respectively ($p < 0.001$). Rates of screening and viral load confirmation were high in both groups (99% and 98%). Among those with HCV, those with prior incarceration were slightly less likely to complete treatment cascade components compared to those without, but the differences were not statistically significant (all $p > 0.06$): 58% vs. 65% started DAA, 58% vs. 59% completed 8+ weeks of DAA, 56% vs. 63% had viral suppression at last check, and 55% vs. 62% had confirmed SVR, respectively. Of those who started DAA treatment, 94% and 95% of those with and without prior incarceration, respectively, had confirmed SVR.

CONCLUSIONS: In the VA, with its standardized treatment protocols, HCV screening is near universal regardless of prior incarceration, as is SVR among those who initiate DAA. The greatest drop overall, and difference by incarceration status, was at treatment initiation. Therefore, future interventions for HCV, particularly among those with prior incarceration, should focus on barriers to DAA initiation for those who have experienced incarceration.

LEARNING OBJECTIVE #1: To understand differences, in achievement of the HCV treatment cascade between VA patients with and without a history of incarceration.

LEARNING OBJECTIVE #2: To identify areas in the HCV treatment cascade where the VA excels.

THE USE AND COST OF LOW-VALUE SERVICES DELIVERED TO VETERANS THROUGH VETERANS AFFAIRS MEDICAL CENTERS AND VA COMMUNITY CARE PROGRAMS

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BACKGROUND: Low-value care is harmful to patients and a major driver of wasteful healthcare spending. Within the Veterans Health Administration (VHA), prior studies have focused on singular low-value services delivered at Veterans Affairs Medical Centers (VAMCs). Our objective was to characterize the use and cost of a diverse set of low-value services received by Veterans at VAMCs or paid for by VHA through VA Community Care (VACC) programs.

METHODS: Among a national cohort of VHA beneficiaries, we applied a claims-based metric to identify 22 low-value services across 4 domains: imaging (8 services), cancer screening (4 services), pre-operative testing (4 services), and preventive testing (6 services). Overall, by domain, and for each service, we determined the service counts per 100 Veterans in FY 2018, capturing services delivered at VAMCs and in non-VA settings through VACC. To determine the cost of care, we applied service-specific cost estimates based on average national reimbursement rates. For each service, we also calculated facility-level service counts per 100 Veterans and quantified variation by calculating the ratio of the 90th and 10th percentiles across 129 VAMCs.

RESULTS: There were 5.2 million (M) Veterans in the overall cohort, of whom 29.8% received any care through VACC in FY18. The mean age was 62 (SD 16); 91.7% were male, and 68.0% were non-Hispanic white. Overall, 18.2 low-value services per 100 Veterans were delivered, of which 1.8/100 were delivered through VACC. The total cost was \$32.5M. The count of low-value imaging services was 7.2/100 Veterans (VACC 1.2/100), costing \$16.1M. Imaging for low-back pain was most common, with a count of 2.8/100 Veterans. The count of low-value cancer screening tests was 5.0/100 Veterans (VACC 0.1/100), costing \$6.4M. Prostate-specific antigen screening was most common, with a count of 4.8/100 Veterans. The count of low-value pre-operative tests was 2.9/100 Veterans (VACC 0.4/100), costing \$3.1M. Chest radiography was most common, with a count of 2.3/100 Veterans. The count of low-value preventive tests was 3.1/100 Veterans (VACC 0.1/100), costing \$6.9M. Parathyroid hormone testing in chronic kidney disease stages 1-3 was most common, affecting 1.8/100 Veterans. Between the 90th and 10th VAMC percentiles, the ratios in low-value service delivery ranged from 2 (low-back imaging) to 30 (parathyroid testing).

CONCLUSIONS: Nearly 1 in 5 VHA beneficiary received a low-value service in FY18, with total costs approximating \$33M. The majority of these services were delivered directly by VHA, with substantial variation across VAMCs. Our findings represent the most comprehensive analysis of the use and cost of low-value care among VHA beneficiaries, the findings of which may guide VHA's efforts to reduce specific low-value services delivered via VAMCs and VACC programs.

LEARNING OBJECTIVE #1: To characterize the use and cost of low-value care within the Veterans Health Administration.

LEARNING OBJECTIVE #2: To determine the variation in low-value service use across VA Medical Centers.

VETERAN EXPERIENCES WITH TELEHEALTH

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BACKGROUND: The Covid-19 pandemic necessitates healthcare providers to deliver care through via telephone and video systems (i.e. telehealth programs) to ensure patient safety. Prior to Covid-19 (FY18-19), VA piloted telehealth programs. Understanding Veterans' experiences with telehealth programs is essential to the delivery of these programs, especially in response to the pandemic. We examine characteristics and ratings of care among Veterans with telehealth visits to usual PC during the pilot program.

METHODS: Study design: Cross sectional survey data: Survey of Healthcare Experiences of Patients (SHEP), with items based on Consumer Assessment of Healthcare Providers and Systems (CAHPS). Setting: VA telehealth pilot program.

Population: Veterans receiving care at VA PC clinics offering telehealth visits during FY2018-2019. Measures: We derived CAHPS composites as outcomes indicating optimal experiences with access, care coordination, PCP communication, comprehensiveness (based on the percentages of responses that fall in the top category: Always or Yes) and PCP rating (9 or 10 out of 10). Key independent variables were telehealth index visit v. usual care and proportion of telehealth visits in 6 months prior to index visit. Other measures: age, gender, race/ethnicity, education, number of PC visits in past year, self-rated overall and mental health, and year of visit (2018=reference).

Analytic procedures: Multivariate regression analyses predicting experiences of care experiences, controlling for demographics, healthcare use, health status and year.

RESULTS: In FY2018-2019, 3,201 out of 57,793 Veterans had a telehealth index visit. Telehealth utilization 6 months prior to index visit: 0.25% usual care v. 83% telehealth. Compared to usual care, the telehealth group was significantly older (age \geq 65: 60% telehealth, 50.5% usual care), had fewer PC visits (0-1 visits: 69% telehealth, 56% usual care). In multivariate models, we failed to detect statistically significant difference between telehealth and usual care groups for the composite measures of Veteran experiences. AOR (95% CI): 0.68 (0.12-3.81), 0.3 (0.07-1.35), 1.55 (0.48-4.95), 0.47 (0.18-1.22), and 0.66 (0.18-2.49) for access, coordination, PCP communication, comprehensiveness, and PCP rating, respectively. Older age and greater number of PC visits were associated with greater likelihood of optimal care ratings; fair/poor overall and mental health were associated with lower likelihood of optimal experiences.

CONCLUSIONS: Compared to usual care, telehealth users did not differ in likelihood ratings of optimal care experience although they are distinct in their demographics and healthcare utilization.

LEARNING OBJECTIVE #1: Understand Veteran experiences with access, care coordination, comprehensiveness and primary care provider (PCP) communication and rating during a telehealth pilot program.

LEARNING OBJECTIVE #2: Examine Veteran characteristics associated with telehealth visits during a telehealth pilot program.

VETERANS' AMBULATORY CARE EXPERIENCE DURING COVID-19: HOW THE PANDEMIC IMPACTED VETERANS' ACCESS TO PRIMARY CARE

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BACKGROUND: The COVID-19 pandemic forced abrupt changes in healthcare delivery, altering how patients interact with the system and providers. Despite the increase in reliance on telehealth, workforce availability,

scheduling, communication and travel to appointments have been substantially altered, likely impacting access to care. This study interviewed veterans with scheduled primary care (PC) visits from March to June 2020 to quantitatively assess barriers to access and document their lived experiences in their own words.

METHODS: We interviewed 40 veterans with PC appointments scheduled at the Houston VA Medical Center between March 1 and June 30, 2020. Data were collected using a semi-structured phone interview to elicit structured responses and narrative comments about healthcare experience since the start of COVID-19 restrictions. Quantitative data were summarized using descriptive statistics, and a matrix analysis was used to evaluate the comments. Primary outcomes are number and mode of appointments, completed encounters, and perceptions of barriers to care.

RESULTS: Considering 37 full, and 3 partial interviews, veterans reported a greater number (mean \pm standard deviation) of PC encounters completed (2.57 \pm 2.24) than scheduled (2.25 \pm 2.19). Modality of encounter per veteran was varied: in-person (1.94 \pm 1.61), telephone (2.05 \pm 1.69), and video (1.50 \pm 0.55). 13 veterans (33%) reported no change in their ability to see the PC doctor since the start of the pandemic. A sizable minority (9,22.5%) indicated more difficulty scheduling appointments, and 17 veterans (42.5%) noted a greater number of missed appointments since March 2020. When asked if their doctor had spent enough time with them since the start of the pandemic, 9 veterans (22.5%) said no. Of the 27 (67%) veterans who reported decreased access, 15 (56%) noted administrative barriers as a source of frustration. This included frequent appointment changes, cancellations and long phone wait times. The next most cited reason was lack of physician availability (9,33%). 7 veterans indicated telehealth encounters as insufficient to meet their needs. Quotes from participants will be used to enhance these findings.

CONCLUSIONS: The interviews reveal a mixed picture of access to PC in the first 4 months of the COVID-19 pandemic at a large VA medical center. The absolute number of PC visits indicates likely adequate access through various modalities, but 67% of the veterans reported a perception of decreased access. Explanations given include inadequate time with their provider, difficulty scheduling visits due to administrative barriers, and inadequacy of telehealth services. Ongoing evaluation of PC access in context COVID-19 public health measures is necessary to optimize access and patient experience.

LEARNING OBJECTIVE #1: Assess how the COVID-19 pandemic healthcare practice changes impacted veterans' access to primary care.

LEARNING OBJECTIVE #2: Use veterans' lived experiences to optimize changes to primary care delivery in context of the ongoing COVID-19 pandemic.

Scientific Abstract - Women's Health

A CASE-CONTROL STUDY OF HORMONE REPLACEMENT THERAPY AND OSTEOPOROSIS MEDICATIONS AMONG WOMEN WITH EHLERS-DANLOS SYNDROMES

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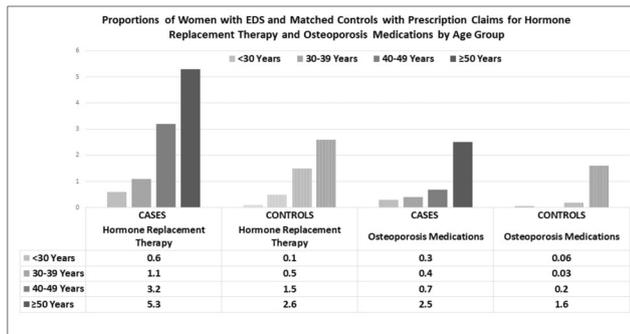
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BACKGROUND: The Ehlers-Danlos Syndromes (EDS) are a group of inherited connective tissue disorders, with tissue fragility leading to high symptom burden involving multiple organs, particularly the musculoskeletal system. There are anecdotal reports of premature menopause, osteopenia, and osteoporosis in EDS. There is a lack of large population studies to understand normal aging and age-associated conditions (menopause and osteoporosis) among women with EDS. Prescription claims databases describe age-related patterns of common medications prescribed to women and provide estimates for the underlying disease burden. The goal of this study was to determine the proportion of prescription claims for hormone replacement therapy (HRT) and

osteoporosis medications among women with EDS compared to matched controls.

METHODS: We used 10 years (2005-2014) of private prescription claims data from a MarketScan database to compare the proportions of HRT and osteoporosis medication claims among women with EDS (N=3042) against their age-, sex-, state of residence-, and earliest claim date-matched controls. All included subjects had to be continuously enrolled for two years from the earliest claim date in a MarketScan covered insurance plan.



RESULTS: The bar graph shows the distribution of prescription claims by age group in women with EDS and matched controls as well as age-associated trends for HRT and osteoporosis medications. The proportion of prescriptions for HRT and osteoporosis medications were higher among women with EDS compared with matched controls at all age groups.

CONCLUSIONS: Hormone replacement therapy has evolved from a blanket therapy for most menopausal women, to a more nuanced therapy based on individual risk-benefit profiles. The higher proportion of HRT prescriptions among women with EDS compared to matched controls points to a need to align HRT with the aging needs of women with EDS. The greater proportion of osteoporosis medication prescriptions focuses attention on endogenous and exogenous risk factors for age-related bone health among women with EDS. Understanding and supporting healthy aging remains a high priority among women with EDS and warrants further study.

LEARNING OBJECTIVE #1: Patient Care: Understanding and supporting healthy aging among women with EDS

LEARNING OBJECTIVE #2: Medical Knowledge: Provides evidence for normal aging and age-associated conditions (menopause and osteoporosis) in EDS using prescription claims data

ARE INTERNAL MEDICINE PHYSICIANS READY TO PROVIDE MEDICATION ABORTION?

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BACKGROUND: Medication abortion has been shown to be a safe and effective method of early pregnancy termination. Provision by primary care providers (PCPs) may expand access to abortion service, though few Internal Medicine (IM) PCPs currently offer this care. Prior studies suggest many women would prefer to receive abortion care from their PCP, but only 1% of abortions are currently performed in this setting. We sought to understand attitudes and interest in future medication abortion provision among IM PCPs, and to characterize barriers to provision.

METHODS: We conducted an online survey with IM attending physicians who serve as PCPs and IM trainees at a large academic medical center in Western Pennsylvania. We used Chi-squared and Fisher exact tests to assess associations between participant characteristics and two primary outcomes: belief medication abortion is within their scope of practice and willingness to provide this care in the future. We used logistic regression to assess adjusted associations between participant characteristics (gender identity, trainee status,

and political identity) and the primary outcomes. Finally, we assessed barriers to providing this care.

RESULTS: The overall response rate was 30% (121/397) with most respondents being female (60%), White (64%), and attending physicians (55%). Nearly half (44%) believed medication abortion is within the scope of practice of IM PCPs, with trainees (60% vs. 30%, $p=0.001$) and female providers (53% vs 31%, $p=0.009$) significantly more likely to report this compared to attendings and male providers, respectively. Overall, 43% reported interest in future provision of medication abortion with trainees (67% vs. 23%, $p<0.001$) and female providers (54% vs. 27%, $p=0.002$) more likely to express interest. In adjusted logistic regression analysis, trainee status (adjusted odds ratio (aOR) 3.66, 95% CI 1.64-8.20) and female gender identity (aOR 2.40, 95% CI 1.03-5.59) were associated with belief that medication abortion was within the scope of PCPs, while Republican-leaning political identity (aOR 0.18, 95% CI 0.04-0.95) was associated with decreased belief. Similarly, both trainee status (aOR 7.38, 95% CI 3.00-18.18) and female gender identity (aOR 4.41, 95% CI 1.70-11.45) were associated with interest in future provision. Factors most frequently identified as “significant barriers” to provision included limited training in (70%) and after residency (67%), and low familiarity with abortion medications (59%).

CONCLUSIONS: Over 40% of IM physicians, especially trainees and female physicians, reported that providing medication abortions is within the scope of PCPs and expressed interest in providing this care in the future. Future efforts should focus on implementing medication abortion into the practice of IM PCPs, and addressing knowledge-based barriers during and after residency.

LEARNING OBJECTIVE #1: Understand what factors are related to PCP willingness to provide medication abortion.

LEARNING OBJECTIVE #2: Understand what barriers exist to PCP provision of medication abortion.

BARRIERS TO ACCEPTABILITY OF SOIL-TRANSMITTED HELMINTH INFECTION TREATMENT IN PREGNANT AND LACTATING WOMEN IN LEYTE, PHILIPPINES

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BACKGROUND: Leyte, Philippines is endemic for soil-transmitted helminth (STH) infections. In pregnant women, the primary consequence of STH infections is anemia which can lead to poor outcomes such as premature birth, low birth weight, and decreased breast milk production. Although treatment for STH infections is relatively low-cost and safe during pregnancy, treatment rates in the pregnant and lactating populations are low. This study aims to identify barriers to STH treatment in pregnant and lactating women in the Philippines and understand the knowledge, perceptions, and concerns of local healthcare providers and women in the community regarding STH and its treatment.

METHODS: Cross-sectional Knowledge, Attitudes, and Practices (KAP) surveys were administered to women, nurses, and midwives in the community to assess their perception of deworming treatments and STH infections. Qualitative, key informant interviews were conducted with the Department of Health (DOH) administrators and healthcare workers. The regional focus was on Leyte, Philippines within the municipalities of Alangalang and Carigara. Data analysis was performed using SPSS and Nvivo.

RESULTS: The survey study sample size included 295 women and 35 health workers. 12 key informants were interviewed. In KAP surveys, 30.2% of women and 28.6% of healthcare workers claimed taking STH medication while pregnant would harm the baby. Women who were willing to participate in a government-sponsored anti-helminth program had significantly greater knowledge as demonstrated by higher scores on questions pertaining to Effective STH Treatment Methods (mean rank 158.4 versus 122.4, $z = -3.741$,

$p < 0.001$). Key informants identified misconceptions about drug safety for STH treatment in pregnant women in both healthcare workers and women of reproductive age. Most commonly, informants described confusion about drug side effects and safety during different trimesters of pregnancy amongst healthcare workers.

CONCLUSIONS: The largest barriers to administration of deworming treatment to pregnant and lactating women are misunderstandings about the safety of deworming treatment amongst women and rural health workers and a reluctance to provide preventative treatment. There is a need for expanded and improved health education regarding STH infections in pregnancy and the importance of treatment and prevention among health workers and in the larger community. These results will guide DOH program changes and resource allocation to effectively provide STH treatment to pregnant and lactating women in the region.

LEARNING OBJECTIVE #1: Patient care: This study aims to understand women's concerns regarding STH treatment and identify misunderstandings or worries that can be addressed in future interventions, with a focus on population health and STH prevention.

LEARNING OBJECTIVE #2: Interpersonal and Communication Skill: The study required strong cultural competency and communication skills while working with local healthcare workers and interpreters as the study population had limited English proficiency.

DISPARITIES IN GESTATIONAL DIABETES MELLITUS AMONG US- AND FOREIGN-BORN WOMEN: AN ANALYSIS OF 2016-2017 NATIONAL HEALTH INTERVIEW SURVEY

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BACKGROUND: Gestational diabetes mellitus (GDM) is a common adverse pregnancy outcome, affecting approximately 6-9% of pregnancies in the US. General internists play a role in preconception lifestyle counseling that may address cardiometabolic risk factors associated with GDM. GDM is associated with increased risk of cardiovascular disease and prior studies have reported increased prevalence of GDM among foreign born women compared to US unbor. However, it is unclear whether cardiometabolic risk factors for GDM differ between US-born and foreign-born women and whether length of US residence among foreign-born women influences these associations.

METHODS: We analyzed cross-sectional data from the 2016-2017 National Health Interview Survey among women currently living in the US who both reported ever being pregnant and reported a GDM status. Using logistic regression, we examined the prevalence of GDM by nativity status and length of US residence adjusting for potential confounders.

RESULTS: Of 24,466 women in the sample, 14.3% were foreign-born. The crude prevalence of GDM was higher among foreign-born (9.0%) compared to US-born women (7.1%; $p < 0.001$). Foreign-born women with ≥ 15 years of residence in the US had the highest age-standardized GDM prevalence (9.1%) compared to US-born women (7.8%) and foreign-born women with < 15 years US residence (5.8%). Among women with a history of GDM, US-born women had a higher prevalence of overweight or obesity, hypertension, current smoking and alcohol use, than foreign-born women. Among foreign-born women, those with ≥ 15 years of US residence had higher prevalence of hypertension, current smoking and alcohol use than those with < 15 years of US residence. In the fully adjusted regression model, only foreign-born women with ≥ 15

years of residence in the US had a significantly higher prevalence of GDM than US-born women (PR=1.37; 95% CI:1.18-1.60).

CONCLUSIONS: Greater length of US residence contributes to nativity-related disparities in women with GDM. Acculturation, including changing health-related behaviors, may have an important impact on maternal health outcomes of foreign-born women, and should be further investigated to appropriate target interventions to reduce GDM and future cardiometabolic diseases.

LEARNING OBJECTIVE #1: Recognize cardiometabolic risk factors for gestational diabetes mellitus

LEARNING OBJECTIVE #2: Consider the internist role in counseling foreign-born women with at risk for gestational diabetes mellitus

EXPERT RECOMMENDATIONS FOR DESIGNING REPORTING SYSTEMS TO ADDRESS PATIENT-INITIATED SEXUAL HARASSMENT IN HEALTHCARE SETTINGS

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BACKGROUND: Recent studies from Veterans Affairs (VA) healthcare settings found that over 80% of women staff experienced harassment by Veteran patients in the past year, and 25% of women patients experienced harassment by men patients in the past six months. Best practices for reducing harassment include clear policies for reporting and remediating harassment. However, many healthcare organizations do not have adequate systems for reporting patient-initiated harassment, and there is limited evidence to guide administrators in developing them. The objective of this study is to generate expert recommendations for designing effective systems for reporting patient-initiated harassment in VA healthcare settings.

METHODS: Using snowball sampling, we recruited experts in sexual harassment prevention and intervention from military, academic, non-profit, VA, and other healthcare settings. Experts included researchers, clinicians, administrators, and program developers. We conducted 40 semi-structured telephone interviews and coded data using the constant comparative method.

Recommendations	Strategies
1. Take corrective measures	1a. Focus on stopping behavior 1b. Attend to facility hotspots
2. Minimize harm to reporting parties	2a. Support and validate 2b. Permit anonymity 2c. Give control over process 2d. Follow up about outcomes
3. Facilitate the reporting process	3a. Clear, accessible policies 3b. Multiple modalities
4. Hold the system accountable	4a. Evaluate system impact 4b. Interpret data with care

RESULTS: Experts emphasized that reporting systems play a critical role in influencing organizational climate related to harassment. Well-designed reporting systems signal that an organization takes harassment seriously. Conversely, inadequate systems communicate tolerance for harassment, thereby increasing harassment prevalence and impeding willingness to report. Expert recommendations for designing effective harassment reporting systems included: facilitate and simplify reporting processes; minimize adverse outcomes for reporting parties; implement proportional, corrective measures in response to reports; and hold the reporting system accountable. Table 1 presents specific strategies.

CONCLUSIONS: This study generated expert recommendations to guide healthcare administrators in assessing and improving systems for reporting patient-initiated harassment. Results underscore the importance of ensuring that systems foster an organizational climate in which harassment is not tolerated. Additional research is needed to evaluate strategies that address patient-initiated harassment while balancing clinical needs.

LEARNING OBJECTIVE #1: Describe how harassment reporting systems influence harassment prevalence.

LEARNING OBJECTIVE #2: Identify components of effective systems for reporting patient-initiated harassment.

FEASIBILITY OF AN MHEALTH POSTPARTUM LIFESTYLE INTERVENTION FOR WOMEN WITH CARDIOMETABOLIC RISK PRE- AND MID-COVID: THE FIT AFTER BABY PILOT RANDOMIZED CONTROLLED TRIAL

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BACKGROUND: Postpartum women with overweight/obesity and with a history of gestational diabetes, hypertensive disorders of pregnancy, small-for-gestational age deliveries, and/or preterm birth are at high risk for diabetes and cardiovascular disease. Postpartum weight loss and lifestyle changes can decrease these risks, yet traditional face-to-face interventions often fail. We adapted the Diabetes Prevention Program into a theory-based mobile health (mHealth) program called Fit After Baby (FAB) and tested FAB in a pilot randomized controlled trial.

METHODS: FAB delivers daily evidence-based content, facilitates tracking of weight, diet, and activity, provides weekly coaching, and includes gamification using points and rewards. We randomized women at 6 wks postpartum 2:1 to FAB or Text4Baby (T4B) app (active control). Participants were asked to read daily content for 84 days, measure weight and check in with a lifestyle coach weekly. We measured weight and administered behavioral questionnaires at 6 wks, and 6 and 12 months postpartum, and collected app user data. An additional survey assessed the impact of the COVID-19 pandemic.

RESULTS: We randomized 82 women (77% White, 2% Asian, 15% Black, with 23% Hispanic), mean baseline BMI 32±5 kg/m² and age 31±5.1 years. Participants logged into the app a median of 51/84 (IQR 25,71) days, wore activity trackers 66/84 times (IQR 43,84) days, weighed in 17 times (IQR 11,24), and did coach check-ins 5.5/12 (IQR 4,9) weeks. The COVID-19 pandemic interrupted data collection for the primary 12 month endpoint, and impacted diet, physical activity, and body weight for many participants. Among 47 participants surveyed about the impact of COVID, 39% reported less physical activity than usual (28% reported more), and 33% reported eating more poorly than usual (11% reported more healthfully), and 35% reported gaining weight (24% losing weight).

Weight change at 12 months from baseline was -8.9 lbs [95% CI 4.3,13.6] in the FAB group and -5.2 lbs [95% CI +0.8,-11.2] (p=0.66). However, on average FAB participants affected by COVID gained weight from baseline (mean +1.1 lbs, [95% CI -8,+10.2]) while T4B lost 6.7 lbs [95% CI -20.4,+7.1]. At 12 months, 45% of FAB vs. 31% of T4B achieved clinically meaningful weight loss of at least 5% (p=0.4), with 65% vs. 52% back to prepregnancy weight (p=0.4). Accumulating points was significantly associated with weight loss at 6 months (p<0.05). At 6 months the FAB group decreased kilocalorie, saturated fat, and % added sugar intake by more than control, by 15% (p=0.14), 22% (p=0.07), 4% (p=0.14) respectively.

CONCLUSIONS: The mHealth FAB program demonstrated feasibility and a high level of engagement among overweight/obese women at elevated cardiometabolic risk. Given the scalability and potential public health impact, the efficacy for decreasing cardiometabolic risk by decreasing postpartum weight retention and improving diet and activity should be tested in a larger trial.

LEARNING OBJECTIVE #1: Transform clinical care

LEARNING OBJECTIVE #2: mHealth for disease prevention

GENDER DIFFERENCES IN INTERNAL MEDICINE RESIDENCY RESEARCH EXPERIENCES: A SURVEY STUDY

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BACKGROUND: Despite representing an equal proportion of medical school graduates, female physicians are less likely to become full professors or endowed chairs. It is unclear at which point in the career trajectory that the academic careers of male and female physicians diverge. We sought to characterize gender differences in academic productivity and mentorship during residency training.

METHODS: This was a cross-sectional survey study of resident physicians in one academic, internal medicine residency program. An anonymous survey regarding research accomplishments and experiences (e.g. lifetime and in-residency publications, abstracts, and oral presentations) was sent to all internal medicine residents (excluding those in preliminary programs) in June 2019, with five reminders sent. Demographics collected included self-identified gender, residency track (primary care vs. categorical vs. medicine/pediatrics), residency year, and residency pathway (e.g. clinical research, management). Gender differences in continuous variables were assessed via the Wilcoxon Mann-Whitney test, while differences in categorical variables were assessed Pearson's Chi-squared test.

RESULTS: A total of 78 complete responses were received (42% response rate). 56% of respondents identified as female, 58% were in the categorical track, and 87% of residents were in the PGY1 through PGY3 years, reflecting the broader composition of the program. Female residents published significantly fewer total lifetime papers in peer-reviewed journals than male residents (8.3 for male vs. 4.9 for female residents, p< 0.01). There were no gender differences in the average impact factors of journals in which residents published, number of lifetime abstracts accepted, number of papers submitted or accepted during residency, numbers of abstracts accepted during residency, or number of oral presentations completed during residency. There were no differences by gender in total number or gender of research mentors, or academic rank of residents' primary research mentors. There was no difference in receipt of financial support to attend conferences or in the proportion of residents' whose research mentors had sponsored them for awards or research opportunities.

CONCLUSIONS: While female internal medicine residents have significantly fewer total publications than male counterparts, other aspects of research productivity, in-residency mentorship, and self-reported financial support and sponsorship are similar between genders. Our study suggests that as compared to residency itself, the periods before and after residency may contribute more heavily to gender disparities commonly observed in academic medicine, and thus should be a focus for programs seeking to rectify gender differences in research trajectories.

LEARNING OBJECTIVE #1: Characterize gender differences in academic productivity of internal medicine residents

LEARNING OBJECTIVE #2: Understand potential gender differences in research mentorship, support, and sponsorship during residency.

GENDER DIFFERENCES IN REPRESENTATION IN THE ALTMETRIC TOP 100

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BACKGROUND: Female physicians are less likely than male counterparts to become full professors. They receive less grant funding, and may be less likely

to engage in self-promotion. The Altmetric Top 100 is an annual list of research that garnered the most public attention. We examined gender differences in Altmetric attention score components and representation of female authors among the Altmetric Top 100.

METHODS: Data on authorship, journal, Altmetric attention score, media and social media mentions, and yearly journal impact factor were retrieved for all studies on the 2015-2019 Altmetric Top 100 lists. Differences in proportions of female vs. male first and last authors were assessed via Pearson's chi-squared test. The Mann-Whitney-Wilcoxon test was used to assess differences in author count, journal impact factor, Altmetric attention score, Google Scholar citations, and media mentions by gender of first, last, and first/last author pairs. Strengths of associations between author gender and Altmetric scores, journal impact factor, citation counts, and social media mentions were calculated via point-biserial correlations. Associations between selected variables and Altmetric attention score and citation counts were examined via linear and Poisson regression, respectively.

RESULTS: 500 manuscripts were featured in the 2015-2019 Altmetric Top 100 lists. Significantly fewer studies were authored by female than male first authors (144 vs. 347, $p<0.01$), female than male last authors (108 vs. 372, $p<0.01$), and female first-last author pairs than male first-last author pairs (43 vs. 273, $p<0.01$). Manuscripts with female first authors or female first-last author pairs had significantly fewer Google scholar citations than those with male first authors ($p=0.01$) or male first-last author pairs ($p<0.01$), respectively. There were significant gender differences in blog and Google mentions. There were significant negative associations between having a female first author and Altmetric attention scores, Google Scholar citations, and blog mentions, and having a female last author and blog or Google mentions (all $p<0.05$). On multivariable Poisson regression adjusted for author count, impact factor, and year, having a female first or last author was associated with fewer Google Scholar citations (both $p<0.001$). On multivariable linear regression adjusted for the same factors, having a female first or last author was associated with a lower Altmetric score (both $p<0.001$).

CONCLUSIONS: We identified significant gender authorship differences among studies in the Altmetric Top 100. There were also gender differences in citations and metrics such as blog posts and Google mentions. Our findings corroborate a gap in attention to research produced by female authors, both in formal scientific and popular attention metrics.

LEARNING OBJECTIVE #1: Characterize gender differences in authorship of articles in the Altmetric Top 100

LEARNING OBJECTIVE #2: Describe gender differences in attention score components for articles in the Altmetric Top 100

HEALTH CARE UTILIZATION AMONG PREGNANT WOMEN WITH SUBSTANCE USE DISORDERS

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BACKGROUND: In the United States, women are at high risk for developing a substance use disorder during their reproductive years. High rates of opioid use, misuse and abuse have fueled focus on opioid use disorder in pregnancy. However, non-opioid substance use during pregnancy (such as non-medical cannabis) has dramatically risen over the last decade. Yet, health care utilization consequences of substance use disorder (SUD) during pregnancy remain poorly characterized. SUD amongst pregnant women increases likelihood of obstetric complications. This study aims to compare health care use and spending patterns for pregnant women with and without diagnosed SUD.

METHODS: We utilized a national private insurance claims database 2012-2017 to evaluate healthcare spending trends of pregnant women aged 18-50. The data include age, diagnoses, treatments and actual payments for health

services. We identified pregnant women with SUD, including women who had chronic opioid and other drug use disorders, using algorithms from the Centers for Medicare and Medicaid Services. For all pregnant women in the database during the study period, we calculated the Hierarchical Condition Categories risk score to reflect overall disease burden. We then examined the characteristics of pregnant women with SUD and their spending trends compared to women without an SUD diagnosis during pregnancy.

RESULTS: We identified 11,934,769 pregnant women in the private insurance database in the study, with an overall frequency of chronic SUD at about 1%. The proportion of pregnant women with an SUD in the steadily increased over the study period, from below 1% in 2012 to 1.3% in 2017. Pregnant women with SUD were significantly younger, sicker, and more likely to come from the Northeast than other pregnant women. They also have more intensive healthcare resource use as reflected by higher HCC scores. Expenditures for women with SUD were significantly higher than spending among pregnant women without SUDs. Those with SUD spent an average of \$3300 more for inpatient care, an average of \$6520 more for outpatient care, and an average of \$1315 more on prescription drugs. Spending on outpatient and prescription drugs for those with SUDs increased through 2015 before dropping in 2016-17.

CONCLUSIONS: Pregnant individuals with SUD experienced significant healthcare expenditures in inpatient, outpatient, and pharmaceutical care. They also had higher chronic disease comorbidity burden based. These findings suggest that intensive perinatal chronic disease management may provide a strategy for mitigating SUD in pregnancy. Implementation, dissemination, and evaluation of obstetrics integrated primary care models on SUD and related health care utilization are needed to address increasing pregnancy SUD trends.

LEARNING OBJECTIVE #1: To understand the health care cost burdens among pregnant women diagnosed with SUD.

LEARNING OBJECTIVE #2: To describe characteristics of pregnant women diagnosed with SUD.

HORMONAL MODULATION THERAPY AMONG WOMEN WITH EHLERS-DANLOS SYNDROMES

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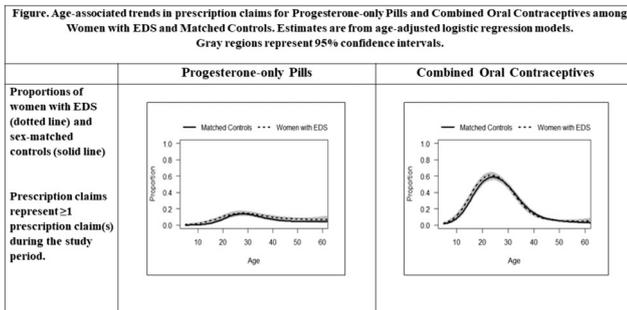
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BACKGROUND: The Ehlers Danlos Syndromes (EDS) are a group of inherited connective tissue disorders resulting in tissue laxity. The 2020 EDS ECHO (Extension for Community Healthcare Outcomes) Summit, sponsored by the Ehlers-Danlos Society, identified a wide range of gynecologic abnormalities among women with EDS particularly dysmenorrhea and menorrhagia. A recent cohort study reported pubertal onset and/or menstrual exacerbation of the EDS disease burdens of pain, fatigue, luxation, digestive symptoms, and migraine/headache in a subset of women with EDS. The combined oral contraceptives (COCs) were more likely to worsen EDS disease burden in the subset of women with peripubertal and perimenstrual exacerbations whereas progesterone-only pills (POPs) alleviated symptoms in others (Hugon-Rodin et al. *Orphanet Journal of Rare Diseases* (2016) 11:124). The goal of this study was to examine the prevalence of COCs and POPs prescription claims among women with EDS.

METHODS: We used 10 years (2005-2014) of private prescription claims data to calculate the proportions of COCs and POPs prescription claims among women with EDS (N=3042) and to compare these proportions to their age-, sex-, state of residence-, and earliest claim date-matched controls. All included subjects had to be continuously enrolled for two years from the earliest claim date in a MarketScan covered insurance plan.



RESULTS: In this sample, women with EDS had a mean age of 32 years. The proportion of women with EDS receiving POP prescriptions was 8% as compared to 5% of control women ($p = 0.001$). The proportion of women with EDS receiving COC prescriptions was 24% as compared to 21% of control women ($p = 0.3$). The figure shows time trends across age groups which are similar among women with EDS and controls.

CONCLUSIONS: Hormone therapy is commonly prescribed to women with EDS. The small but statistically significant increase in POP prescriptions among women with EDS compared to matched controls is intriguing. Clinicians may be seeking non-estrogen-based therapies, related to exacerbation of EDS symptoms with estrogen therapy. Clinicians prescribing hormone therapy to women with EDS may use the perimenstrual and peripubertal histories to help guide hormonal therapy choices in this population.

LEARNING OBJECTIVE #1: Patient Care: Understand the role of hormonal modulation in EDS

LEARNING OBJECTIVE #2: Medical Knowledge: Provide evidence for hormonal therapy in the context of EDS-related pubertal exacerbations

INCREASES IN LONG-ACTING CONTRACEPTIVE USE AMONG WOMEN WITH HIGH- DEDUCTIBLE PLANS AFTER THE AFFORDABLE CARE ACT

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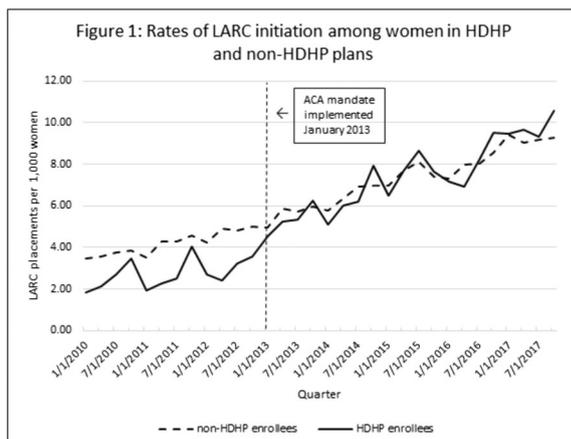
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BACKGROUND: The Affordable Care Act (ACA) mandated that private health plans cover contraceptives without out-of-pocket costs to patients. Previously, long-acting reversible contraceptives (LARCs) were subject to deductibles, making them a higher cost service for women in high-deductible health plans (HDHPs); however, the mandate applied to HDHPs as well as traditional health plans.

METHODS: We examine LARC utilization among continuously-enrolled reproductive-age women in a national commercial claims database between 2010 and 2017. Using a quasi-experimental difference-in-difference analysis, we compare LARC utilization among 9,014 women enrolled in HDHP plans with 443,363 women enrolled in non-HDHP plans before and after the implementation of the ACA mandate.



RESULTS: Figure 1 shows the rate of quarterly LARC placements per 1,000 women over the time period of mandate implementation. The adjusted mean quarterly LARC initiation rate for women in non-HDHP plans is 4.16 placements per 1,000 women prior to the mandate and rises to 7.37 placements per 1,000 women after the mandate, a 77% increase relative to the pre-period. For women in HDHP plans, the mean pre-mandate quarterly LARC initiation rate is 2.42 in 1,000 women, rising to 6.75 placements per 1,000 in the post-mandate period, a 179% increase relative to the pre-period. The difference-in-difference estimate is positive and statistically significant ($p < 0.001$), demonstrating that relative to women in non-HDHP plans, LARC initiation increased by an additional 1.11 quarterly placements per 1,000 women following the mandate for women in HDHP plans. The additional 1.11 placements per 1,000 women represents a 35% greater increase than that seen among women in non-HDHP plans over the same period.

CONCLUSIONS: Our results suggest that the ACA contraceptive coverage mandate led to significant increases in LARC initiation among women enrolled in high-deductible health plans compared with women in traditional health plans. Future work should investigate whether these increases in use of highly effective contraception impact birth rates or other health and economic outcomes for women.

LEARNING OBJECTIVE #1: Medical Knowledge

LEARNING OBJECTIVE #2: Systems-Based Practice

PREGNANCY-RELATED CARDIOVASCULAR DISEASE RISK AND FOLLOW-UP IN THE YEAR AFTER DELIVERY AT AN URBAN SAFETY NET HOSPITAL

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BACKGROUND: Pregnancy-related cardiovascular disease (CVD) risk indicators—pregnancy complications associated with future CVD—affect up to 1 in 3 parous individuals in the U.S. Such patients require primary care to reduce CVD risk beginning within the year after delivery. Gaps in postpartum care for Black, Hispanic, and low-income patients likely contribute to long-term chronic disease inequities. We sought to understand factors associated with pregnancy-related CVD risk and follow-up at Boston Medical Center (BMC), New England's largest safety-net hospital, in order to improve care delivery and equity.

METHODS: We conducted a retrospective cohort study of patients with prenatal care and delivery at BMC between 2016 and 2018. Maternal demographic, reproductive health characteristics, and health care use through 1 year after delivery were extracted from the medical record. Pregnancy-related CVD risk indicators including hypertensive disorders of pregnancy, gestational diabetes, preterm delivery (<37 weeks' gestation), low birthweight (<2500 grams), and stillbirth were extracted using ICD10 codes. We examined the distribution of maternal socio-demographic and clinical characteristics, and assessed the prevalence of maternal health care use by established timepoints throughout the first postpartum year, overall and between groups with and without a pregnancy-related CVD risk indicator.

RESULTS: Of 8531 deliveries between 2016-2018, we identified 3738 unique eligible patients. More than half identified as non-Hispanic Black, and nearly one-fifth as Hispanic. Thirty percent had a primary language other than English. Over 70% were publicly insured. Nearly 40% (1428, 38.2%) had at least 1 pregnancy-related CVD risk indicator: hypertensive disorders of pregnancy (903, 24.2%), preterm delivery (455, 12.2%), low birth weight (430, 11.5%), gestational diabetes (278, 7.4%), and stillbirth (19, 0.5%). Compared to those without any CVD risk indicator, only obesity (18.9% v 28.6%) and caesarean delivery (34.6% v. 45.5%) were associated with having a pregnancy-related CVD risk indicator. Overall, 62.4% of patients had a

health care encounter by 6 weeks postpartum, with higher rates after complicated pregnancies (67.0% vs 59.6%). At the end of 1 year postpartum, 20% of patients with a pregnancy-related CVD risk indicator still had no encounters for care at BMC. Analyses to identify factors associated with follow-up are ongoing.

CONCLUSIONS: Nearly 40% of patients delivering at BMC have a pregnancy-related CVD risk indicator, of whom at least 20% receive no care for their CVD risk within the first postpartum year. Further research to understand facilitators and barriers to postpartum care, and interventions to support transitions to primary care after medically complicated pregnancies, are urgently needed.

LEARNING OBJECTIVE #1: To assess the unmet need for pregnancy-related CVD risk management at an urban safety net hospital

LEARNING OBJECTIVE #2: To identify factors associated with pregnancy-related CVD risk and follow-up at an urban safety net hospital

PREVALENCE AND RACIAL/ETHNIC DISPARITIES IN SEVERE MATERNAL MORBIDITY AND MATERNAL MORTALITY AMONG WOMEN VETERANS

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BACKGROUND: Women Veterans who use VA maternity benefits are a vulnerable population who may be at higher risk for adverse pregnancy outcomes, including maternal mortality and severe maternal morbidity (SMM). A high percentage of women Veteran VA-users (42%) are members of racial or ethnic minority groups, who face disproportionately greater risk of experiencing pregnancy-related death or SMM. Data on maternal outcomes or racial/ethnic disparities in these outcomes among women VA-users, however, remain limited.

METHODS: We examined national administrative data to identify women Veterans ages 18-45 with at least one pregnancy outcome (ectopic pregnancy, spontaneous abortion, stillbirth, and/or live birth) during fiscal years (FY) 2010-2017 who used VA maternity care benefits. We limited our sample to women who were actively engaged in VA care by excluding pregnancies with no VA primary care visit in the year prior to last menstrual period (LMP). We describe rates of SMM and pregnancy-associated death (i.e., the death of a woman from any cause while she is pregnant or within 1 year of the end of pregnancy) based on the CDC's ICD coding indicators for SMM during delivery hospitalizations and data from the VA Vital Status file. We explored associations between race/ethnicity and maternal outcomes using unadjusted logistic regression.

RESULTS: We identified 31,082 pregnancy outcomes from 23,762 women Veterans using VA healthcare and maternity benefits during FY10-17. Just over half of pregnancies (57.8%) were in non-Hispanic white women, 25.3% in non-Hispanic Black women, and 11.5% in Hispanic women; mean age at time of pregnancy was 30.6. One or more SMM events from LMP to within one year of pregnancy outcome were recorded for 3.1% of pregnancies (n=979). An SMM event complicated 4% of pregnancies among Black women, 3.1% of pregnancies among white women and 1.9% of pregnancies among Hispanic women (p<0.001). Pregnancies among Black women had higher odds of experiencing any SMM than those among white women (OR=1.31, 95%CI:1.14-1.52). Maternal death within one year of pregnancy outcome was recorded for 20 pregnancies, 14 of which were live births, resulting in a pregnancy-associated death rate of 60.6 per 100,000 live births.

CONCLUSIONS: Our results suggest that the rate of SMM and mortality is high among women Veterans who use VA maternity care benefits and that racial disparities in SMM exist despite universal access to care in this population. As the first national estimates of SMM and maternal mortality among VA-users, these data represent critical new information about women Veterans' health during and after pregnancy and underscore the need to further

investigate targets for intervention to improve maternal health outcomes and equity.

LEARNING OBJECTIVE #1: To describe maternal outcomes among women Veterans, including SMM and maternal mortality

LEARNING OBJECTIVE #2: To explore racial disparities in women Veterans' maternal outcomes

PROVIDERS' VARIABLE PRACTICES ORDERING GENETIC CARRIER SCREENING AND PERCEIVED BARRIERS TO PRECONCEPTION SCREENING

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BACKGROUND: As indications for preventive genetic testing increase, primary care providers must recognize evidence-based screening tests from which their patients could benefit. Genetic carrier screening can identify reproductive couples at risk for passing on devastating recessive genetic conditions. Screening prior to conception allows at-risk couples greater reproductive options.

METHODS: A retrospective observational cohort study was conducted using electronic health record (EHR) data from a single healthcare system. We identified adult women (18-51 years) who had an EHR order for genetic carrier screening during fiscal year 2019. Test orders were linked to patient demographics, encounter data, diagnoses, and indicators of pregnancy status. Women were classified as pregnant at the time of test order using a custom algorithm based on EHR pregnancy dates and obstetrical radiology. On review of 100 random charts the algorithm was >97% sensitive and specific for predicting pregnancy. Orders placed during pregnancy were prenatal carrier screens; all other orders were considered preconception screens. Since test results were not available electronically, results were abstracted from a 10% random sample of test reports, evenly distributed between prenatal and preconception tests. Ordering providers were interviewed to explain variability in test ordering and elicit their perceptions of the barriers to and facilitators of preconception screening.

Questions were drawn from the Consolidated Framework for Implementation Research and transcripts were analyzed using rapid qualitative methods.

RESULTS: A total of 5993 adult women had an EHR order for genetic carrier screening in fiscal year 2019; 63% were pregnant at the time. Compared to women who had orders for prenatal carrier screening, women who had preconception screening were more likely to be older (mean 34.2 versus 31.9 years), White Non-Hispanic (68% versus 53%), and were less likely to have Medicaid listed as primary payor (8% versus 30%). Women receiving preconception carrier screening were more likely to receive expanded panels that test for hundreds of recessive conditions than women who had prenatal screening (34% versus 8%). Ordering providers (N=7) routinely endorsed preconception carrier screening as preferred over prenatal screening, but cited costs, coordination of reproductive partner testing, test timing, and the ability to counsel patients about results as barriers to offering preconception carrier screening. Several providers endorsed favorable impressions of offering preconception carrier screening in the primary care clinic.

CONCLUSIONS: Providing evidence-based preventive genetic testing like preconception carrier screening equitably requires primary care engagement.

LEARNING OBJECTIVE #1: To contrast use of genetic carrier screening prior to conception and in the prenatal period.

LEARNING OBJECTIVE #2: To explain variability in genetic carrier screening orders and providers' perceptions of barriers to implementation of routine preconception screening.

RACIAL DIFFERENCES IN NON-TRADITIONAL RISK FACTORS ASSOCIATED WITH CARDIOVASCULAR CONDITIONS IN PREGNANCY IN US WOMEN VETERANS

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BACKGROUND: Pregnancy-related cardiovascular conditions are important predictors of future cardiovascular disease (CVD) in women. Non-traditional factors, including depression, PTSD, chronic stress and intimate partner violence (IPV) have been associated with CVD, but their role on pregnancy-related cardiovascular conditions remain unknown.

METHODS: Using data from a longitudinal cohort of pregnant women Veterans from across the US (COMFORT), we aimed to determine the association between non-traditional factors and cardiovascular conditions in pregnancy and explore whether this varies by race. We described the prevalence of non-traditional cardiovascular risk factors (depression, anxiety, PTSD, chronic stress, IPV), and military sexual trauma) among pregnant women Veterans. We used logistic regression to identify the odds of having a cardiovascular condition in pregnancy (preeclampsia/eclampsia, gestational hypertension, gestational diabetes, or preterm delivery) by these non-traditional factors, controlling for known risk factors. Descriptive and logistic analyses were then stratified by race (Black vs. White).

RESULTS: Among 706 women enrolled from Jan 2016 – Jan 2020, 26% had a pregnancy-related cardiovascular condition. These women had significantly higher rates of depression (62% vs. 45%, $p<0.01$), anxiety (50% vs. 37%, $p=0.01$), PTSD (44% vs. 29%, $p<0.01$), and high stress levels prior to pregnancy (22% vs. 16%, $p=0.05$) compared to women with normal pregnancies. Overall, these non-traditional factors were not associated with increased odds of having cardiovascular conditions in pregnancy. However, when stratified by race, Black women with a cardiovascular condition in pregnancy had higher rates of depression and PTSD and significantly higher rates of IPV compared to White Women (21% vs. 6%, $p=0.03$). IPV was associated with an increased odds of a pregnancy-related cardiovascular condition among Black women, though not statistically significant (OR 5.06, 95% CI 0.94-27.25). Despite this, Black women with a pregnancy-related cardiovascular condition had the highest rates of PCP follow-up within 9 months postpartum (82% vs. 72% of White women). **CONCLUSIONS:** Women Veterans with pregnancy-related cardiovascular conditions have disproportionately high rates of depression, anxiety, PTSD, and chronic stress. Racial disparities exist in the distribution of pregnancy-related cardiovascular risk factors, which may further compound existing racial disparities in CVD outcomes among women Veterans. High rates of postpartum follow-up among provide a critical opportunity for innovative approaches to optimize these CVD risk factors among women Veterans for early disease prevention.

LEARNING OBJECTIVE #1: To understand the association between non-traditional cardiovascular risk factors and cardiovascular conditions in pregnancy.

LEARNING OBJECTIVE #2: To explore whether this relationship is modified by race.

THE IMPACT OF COVID-19 ON DUAL-PHYSICIAN COUPLES: A DISPROPORTIONATE BURDEN ON WOMEN PHYSICIANS

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BACKGROUND: Currently, physicians face an unprecedented crisis during the novel coronavirus (COVID-19) pandemic. The impact of the pandemic on dual-physician households remains unknown. In this survey study, we examined the impact of the COVID-19 pandemic on dual-physician families. Our

hypothesis was that women in dual-physician couples would be disproportionately impacted by the pandemic compared to men.

METHODS: This was a cross-sectional survey of members of dual-physician couples distributed via e-mail and social media, with results collected from April 30, 2020 until May 26, 2020. Respondents provided information on demographic characteristics and the impact of the pandemic on their professional lives, personal lives, and well-being. Categorical variables were compared using Chi-squared or Fisher's exact test. Ordinal variables were compared between genders using Cochran-Armitage trend test. Feeling emotionally and physically drained compared to pre-pandemic was analyzed as a binary outcome in a multivariable logistic model.

RESULTS: Of the 1799 physicians who completed the survey, 52% were between 30-39 years old, 81% self-identified as women, and 62% were white. Women were more likely to report increased worry about their job security, finances, personal health, partner's health, and children's health ($p=0.02$, $p=0.01$, $p<0.001$, $p<0.001$, and $p<0.001$, respectively). Seventy-eight percent of respondents reported feeling more drained during the pandemic. Multivariable analysis revealed that female gender (OR 2.4, 95% CI 1.7-3.3, $p<0.001$) and having children under 5-years old (OR 1.43, 95% CI 1.05-1.95, $p=0.02$) were associated with an increased risk of feeling more drained.

CONCLUSIONS: Women were more likely to report increased worry about job security, finances, and health and had an increased risk of feeling more drained during the pandemic compared to men. While the COVID-19 pandemic is a significant stress for all physicians, women in dual-physician families were disproportionately affected, demonstrating the need for increased support from hospital administrations.

LEARNING OBJECTIVE #1: Understand how the coronavirus pandemic has impacted the professional lives, personal lives, and emotional well-being of doctors in dual-physician couples.

LEARNING OBJECTIVE #2: Compare the impact of the coronavirus pandemic on women versus men in dual-physician couples.

THE ROLE OF PRIMARY CARE PROVIDERS IN PREGNANCY-RELATED CARDIOVASCULAR DISEASE RISK MANAGEMENT IN THE FIRST POSTPARTUM YEAR: A SYNTHESIS OF CLINICAL PRACTICE RECOMMENDATIONS

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BACKGROUND: Several pregnancy complications are linked to future risk of cardiovascular disease (CVD). Such conditions, known as “pregnancy-related CVD risk indicators,” are recognized by the American Heart Association and can inform CVD prevention. However, most primary care internists have low levels of comfort and experience with pregnancy-related health topics. In addition, the Internal Medicine literature lacks comprehensive practical guidance for primary care providers (PCPs) regarding pregnancy-related CVD risk management.

METHODS: We systematically searched 3 databases (PubMed, EMBASE, and CINAHL) and manually searched clinical websites (Guideline Central, ACOG, USPSTF, AAFP, ACP, SGIM, ADA, and AHA/ACC), Google, and Google Scholar for guidelines related to postpartum care in the United States from 2010 to 2020. Two authors independently conducted title and abstract screening followed by full text review for guidelines or society recommendations relevant to pregnancy-related CVD risk assessment or management by PCPs in the year after pregnancy. A third author resolved discrepancies.

RESULTS: Of 972 unique publications, 12 met inclusion criteria, representing a range of clinical specialties. None was written specifically for Internal Medicine-trained PCPs. Several recommended comprehensive CVD risk assessment within 3 months postpartum for any patient with a history of a pregnancy-related CVD risk indicator, followed by lifestyle counseling or pharmacotherapy and follow-up within 1 year postpartum. Additional screening and follow-up in the first postpartum year were recommended for patients

with prior hypertensive disorders of pregnancy or gestational diabetes. Most recommendations were based on limited or inconsistent evidence, consensus or expert opinion, or were ungraded. Several areas of uncertainty for future research were identified, including CVD risk assessment that incorporates pregnancy complications, and the optimal timing and content of ongoing CVD risk assessments.

CONCLUSIONS: Clinical practice recommendations for the identification and management of pregnancy-related CVD risk by PCPs during the first postpartum year are scattered, at times conflicting, and generally based on unclear or weak evidence. Clear and comprehensive practice guidance is urgently needed to enable PCPs to address CVD risk after medically complicated pregnancies.

LEARNING OBJECTIVE #1: Review the evidence for CVD risk assessment and prevention starting within the first postpartum year.

LEARNING OBJECTIVE #2: Understand the role of primary care providers in the identification and management of pregnancy-related CVD risk.

TRENDS IN UTILIZATION OF WOMEN'S PREVENTIVE HEALTH SERVICES DURING THE COVID-19 PANDEMIC

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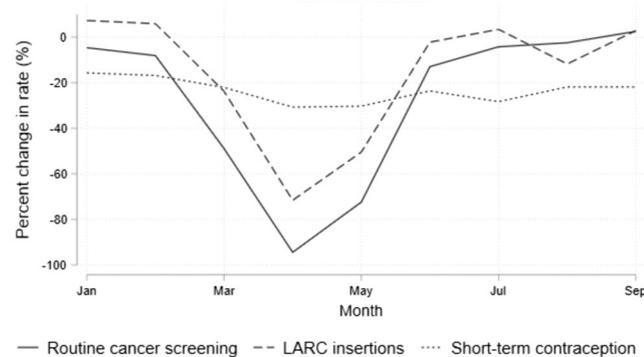
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BACKGROUND: The impact of the COVID-19 pandemic on preventive care for women is largely unknown. Our objective was to describe how the timing of the pandemic impacted use of women's preventive services.

METHODS: We utilized medical and pharmacy claims data from January 2019 to September 2020 from patients enrolled in a state-level commercial insurance plan with ~1 million monthly enrollees. Routine women's health services identified included cancer screening (Pap smears/HPV tests and mammograms), insertions for long-acting reversible contraceptives (LARCs), and provision of other hormonal contraceptive methods (oral contraceptive pills, the patch, the ring, and progesterone injections). Monthly claim rates per 1,000 enrolled women were calculated for each service by dividing the sum of individuals with a claim for that service by the number of women ages 18 to 74 enrolled in that month. The percentage change in claim rates from 2019 to 2020 was calculated for each month.

Figure 1: Percent change in claim rates for women's health services from 2019 to 2020



RESULTS: Figure 1 displays the percentage change in monthly claim rates from 2019 to 2020 for cancer screening, LARC insertions, and other contraception. The largest decline in service utilization was seen in cancer screening, which declined by 94.4% in April of 2020 relative to the prior year, then recovered to 2019 levels by July 2020. A similar pattern was seen for LARC insertion rates, which nadired at a 71.7% decline in April 2020, and then reverted to 2019 levels by July 2020. In contrast, claims for other hormonal contraceptives in 2020 were consistently 15-30% lower than rates in 2019.

CONCLUSIONS: Trends in utilization of women's preventive care declined dramatically during March through May, 2020 compared with the same months in 2019. While claim rates for these services normalized by July 2020,

they did not subsequently increase to higher rates in later months relative to 2019. This likely reflects capacity constraints in the healthcare system and suggests the possibility that some women are experiencing significant delays in recommended preventive care. We also observed a decline in other hormonal contraceptives relative to 2019, which could reflect pre-existing temporal trends in contraceptive use, social distancing recommendations reducing frequency of sexual activity, or access barriers driven by the pandemic.

LEARNING OBJECTIVE #1: Systems-Based Practice

LEARNING OBJECTIVE #2: Medical Knowledge

UNIVERSAL SCREENING FOR MILITARY SEXUAL TRAUMA IN THE VETERANS HEALTH ADMINISTRATION MAY MISS OVER 50% OF MIDLIFE WOMEN VETERANS WITH MILITARY SEXUAL TRAUMA EXPOSURE

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BACKGROUND: Military Sexual Trauma (MST), defined as sexual harassment and/or assault during military service, disproportionately impacts women and adversely affects health. Yet, there is relatively little known about its prevalence among or impact upon midlife women. In the Veterans Health Administration (VHA), universal screening is used to identify MST and provide appropriate care and resources. However, it is unclear whether screening ascertainment is adequate, with MST potentially underreported due to stigma, fear of negative repercussions, or not being re-screened after an initial negative response.

METHODS: Cross-sectional data were drawn from a study of women Veterans aged 45-64 years old enrolled in VHA care in Northern California. Between March 2019-May 2020, participants completed mailed or web-based surveys that collected demographic and clinical information and assessed for MST using standard VHA universal screening questions. Survey data were linked to data from VHA electronic health records (EHR), including responses to MST screening conducted by healthcare providers during VHA clinical visits. In routine screening, responses included "Yes," "No," or "Declined to answer"; those who declined to answer continued to be screened annually. Demographic and clinical characteristics of women with a positive EHR-documented MST screen (+EHR MST) were compared to women with survey-reported MST (+survey MST) without +EHR screen, using chi-square and ANOVA.

RESULTS: In this sample of 202 midlife women Veterans (M=56, SD 5 years), 40% had a positive EHR-documented MST screen, while 70% reported MST on survey. No significant demographic or clinical differences were detected between women with +EHR MST and women with +survey MST and no +EHR MST in regard to mean age (56 vs 55 years), race (e.g. white, 72% vs 69%), sexual orientation (e.g. heterosexual, 72% vs 76%), cardiometabolic disease (52% vs 61%), obesity (43% vs 38%), depression (47% vs 43%) or anxiety (61% vs 48%) ($p > 0.05$ for all).

CONCLUSIONS: Approximately 60% of women Veterans without an EHR-documented MST screen reported MST in the study survey. This discordance did not differ across demographic characteristics. Findings suggest that VHA universal screening for MST may not capture true rates, indicating a potentially serious gap in recognition, care and documentation for midlife women Veterans. Further research is needed to better understand barriers to, and differences in, disclosing MST during universal screening.

LEARNING OBJECTIVE #1: Understand gaps in patient care through comparing rates of MST as assessed by universal screening compared to survey.

LEARNING OBJECTIVE #2: Strengthen a professional commitment to identifying, documenting and treating MST, particularly among midlife women.

Clinical Vignette - Clinical Practice

"A STICH IN TIME"-ISOLATED TUBERCULUS MENINGITIS IN AN IMMUNOCOMPETENT PATIENT

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LEARNING OBJECTIVE #1: Isolated tuberculous meningitis is extremely rare, with high mortality rates. Early diagnosis and prompt treatment is essential for complete neurologic recovery.

LEARNING OBJECTIVE #2: To identify meningeal tuberculosis as a rare cause of altered mentation in an immunocompetent patient in the absence of pulmonary involvement or constitutional symptoms.

CASE: A 20 year old female with a past history of Major Depressive Disorder presented with altered mentation and decreased oral intake. CT head was grossly unremarkable except for questionable frontal lobe hyperattenuation. She was discharged home, and started on fluoxetine and aripiprazole. However, she continued to have progressive altered mentation with headaches, was non-verbal when brought into the ED. She also had a right lateral gaze palsy. CT head with angiogram and venogram was negative. Lumbar puncture (LP) was performed which revealed high protein-143g/dl, low glucose-35 mg/dl, RBC-20/mm³, WBC-0/mm³, occasional neutrophils/monocytes. Cerebrospinal fluid studies with Lyme PCR, oligoclonal bands, AFB, fungal elements on smear, VDRL, and cultures came back negative. CMP was with hyponatremia to 124 mEq/L. Urine studies suggested SIADH. ESR and CRP were normal. TSH-normal. Toxicology screening, RSV panel, ANA, blood EtOH level, acetaminophen level, RPR, HIV came back negative. She started on ceftriaxone, folic acid and thiamine.

MRI revealed diffuse leptomeningeal and basal cistern enhancement which was strongly suspicious for TB meningitis vs neurosarcoidosis. CT chest was unremarkable. QuantiferonGOLD-was indeterminate. She stated on dexamethasone 4mg qid, with quadruple antituberculous regimen.

She improved clinically, became less obtunded, was more interactive and was able to follow simple commands. Repeat LP was with decreased glucose (27mg/dl) and increased protein (73g/dl), increased WBC (34/mm³) with lymphocytic predominance (95%) with AFB negative. Repeated quantiferon gold came back positive. She discharged on standard antitubercular drugs. **IMPACT/DISCUSSION:** Tuberculous meningitis is caused by infection of the central nervous system with Mycobacterium tuberculosis. It is accompanied by nonspecific and heterogeneous clinical symptoms that are difficult to diagnose in the absence of pulmonary involvement. However prompt recognition and treatment is essential for complete neurologic recovery.

Definitive diagnosis often delayed by lengthy time to culture and insensitive results that poses a diagnostic challenge. Oftentimes treatment has to be presumptively started. Our patient had good clinical response to initiation of treatment with antitubercular medications.

CONCLUSION: We describe a case of isolated tubercular meningitis without pulmonary involvement or constitutional symptoms. It is important for clinicians to be cognizant of this entity, as it is associated with high morbidity and mortality, and early diagnosis and treatment can change outcomes.

"OPENING A PANDORA'S BOX"- DIAGNOSIS OF DISSEMINATED TUBERCULOSIS INFECTION FOLLOWING ASPIRATION OF AN ISOLATED SPLENIC ABSESS IN AN IMMUNOCOMPROMISED PATIENT.

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LEARNING OBJECTIVE #1: Identifying tuberculosis infection as a potential cause of splenic abscess specially in immunocompromised patients.

LEARNING OBJECTIVE #2: Tuberculosis infection as an important differential diagnosis in patients on biologics despite a negative quantiferon test prior to initiation.

CASE: A 70 year old male with a past history of rheumatoid arthritis (On Adalimumab [negative QuantiferonGOLD test prior to initiation] and methotrexate for 6 years and prednisone 5mg daily) and HTN presented with left sided abdominal pain, tachycardia, fever [103F], chills and fatigue. He did not have leukocytosis, elevated lactic acid or procalcitonin. CXR showed a L lower lobe opacity and he was started on azithromycin and ceftriaxone for presumptive pneumonia. He continued to spike fevers, despite broadening antibiotic coverage to piperacillin-tazobactam. CT angiography was done- which was negative except for a peripheral hypodense lesion in the spleen which showed filling in the venous phase with contrast compatible with a hemangioma. This was followed up with an MRI which showed 3cm slightly irregular partially cystic lesion in the posterior spleen without restricted diffusion that was not consistent with an hemangioma. minimal free fluid was noted adjacent to the liver. HIV, hepatitis panel were negative.

Quantiferon gold was sent which returned indeterminate. Patient had BCG vaccination as a child. He grew up in rural India on a farm 30 years ago and visited every 2 years.

He underwent IR guided splenic abscess aspiration. 1.5ml Purulent fluid was aspirated. Broth bottle PCR returned positive for Mycobacterium Tuberculosis. He was started on quadruple therapy for TB. He was subsequently noted to have bilateral pleural effusion, and underwent IR guided thoracocentesis which resulted in an exudative effusion with positive PCR for mycobacterium tuberculosis. Repeat CT abdomen was with diffuse ascites increased from prior with diffuse nodular thickening throughout the peritoneal surfaces concerning for peritoneal tuberculosis.

Hospital course was complicated with isoniazid induced transaminitis, acute kidney injury and severe sepsis. Patient unfortunately passed away.

IMPACT/DISCUSSION: This case highlights the importance of having tuberculosis on the radar for patients on biologics despite having a negative quantiferonGOLD test. Specially in those who have immigrated from endemic areas.

Lungs are most commonly involved in tuberculosis infection. Of the extra-pulmonary involvement, splenic involvement is extremely rare and when affected, there is splenomegaly with multiple granulomas unlike in our patient who presented with an isolated splenic abscess.

CONCLUSION: This case highlights the importance of considering disseminated tuberculosis infection as a differential in patients having an isolated splenic abscess who are on biologics, especially if they have immigrated from an endemic area.

NOT A STATIN-INDUCED MYOPATHY: PANCREATIC ADENOCARCINOMA PRESENTED AS PARANEOPLASTIC MYOSITIS

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LEARNING OBJECTIVE #1:

Recognize the clinical features of polymyositis as a paraneoplastic syndrome

LEARNING OBJECTIVE #2:

Treat inflammatory polymyositis secondary to underlying malignancy

CASE: An 81-year-old male with a history of hyperlipidemia on a statin and no recent trauma, who presented with generalized myalgias, was found to have rhabdomyolysis. Stable vitals on admission and labs showed CK of 6059 U/L, ESR of 108 mm/h, and elevated CRP of 15.3. Statin was stopped, and the patient was treated with IV crystalloids and steroids. The hospital course was complicated by sepsis secondary to cholangitis, for which the patient received ceftriaxone and metronidazole. CT scan of the abdomen was unremarkable. MRCP showed evidence of 15 mm dilated distal common bile duct, 10 mm dilated pancreatic duct, and ampulla with a nonspecific 0.6 cm soft tissue density. CA 19-9 was elevated to 9298 U/ml. The patient underwent ERCP with sphincterotomy and biopsy, which revealed the diagnosis of metastatic pancreatic adenocarcinoma. After ductal decompression with sphincterotomy

and antibiotic therapy, the patient clinically improved. Additionally, the patient underwent an MRI of the right thigh, and findings were consistent with severe inflammatory myopathy with significant diffuse subcutaneous myofascial edema without focal abscess or necrosis. Muscle biopsy showed scattered nuclear clumps and rare myofiber necrosis without inflammation. Myositis/antiJo1 extensive antibody panel was negative. Finally, polymyositis was found to be a paraneoplastic presentation of myopathy/myositis secondary to pancreatic adenocarcinoma, and the diagnosis was confirmed with a muscle biopsy and highly compatible imaging findings. The patient was treated with systemic steroids reaching clinical and laboratory improvement. Ultimately, the patient underwent pancreaticoduodenectomy.

IMPACT/DISCUSSION: Polymyositis in the elderly population can present as a paraneoplastic syndrome and is strongly associated with underlying cancer. A muscle biopsy is necessary to establish the diagnosis, as only 30% of patients have positive antibody panels. Lung cancer, rectum and colon cancer, pancreatic cancer, kidney cancer, stomach cancer, breast cancer are the most associated with inflammatory myositis in the descending order. The cornerstone treatment of paraneoplastic myositis/myelopathy stays immunosuppression with glucocorticoids in conjunction with specific cancer treatment.

CONCLUSION: Polymyositis is a paraneoplastic syndrome that can be associated with pancreatic cancer. Clinicians should be aware of this syndrome as the ability to diagnose and treat paraneoplastic syndromes may impact health outcomes, from early detection of cancer to improving quality of life.

48-YEAR-OLD HISPANIC WOMAN WITH INCREASING FATIGUE

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LEARNING OBJECTIVE #1: 1. Recognize that iron deficiency (ID) without anemia can cause fatigue.

LEARNING OBJECTIVE #2: 2. Identify obesity as a non-traditional risk factor for ID.

3. Recognize how simultaneous micronutrient deficiencies may indicate food insecurity.

CASE: A 44-year-old Hispanic woman with obesity, prediabetes, and hyperlipidemia presented to clinic with fatigue and dyspnea on exertion for one month. No chest pain, orthopnea, PND, lower extremity swelling, cough, or wheezing. No medications. BP 113/74, P72. BMI 33.9 kg/m². Lungs clear. Heart regular rate and rhythm without murmurs; no JVD or edema. Muscle strength equal bilaterally. EKG normal sinus rhythm. BMP and TSH normal. Hemoglobin 11.6 (11.6-15.6) and MCV 89 (80-97). Patient returned for iron studies: ferritin <2 (5-204), iron 33 (50-175), % saturation 8 (16-50), TIBC 398 (250-450). In addition: vitamin B12 <170 (213-816), folate 9.7 (>7), and vitamin D 12 (30-80). Denied sources of blood loss including heavy menses. Rare NSAID use. Works 80+ hrs/week. Diet: mainly rice and sweets, rare fruits/vegetables, meat once/week, one drive-thru meal daily. Patient started on PO iron supplements/vitamin C daily. Also PO vitamin D3 and IM B12. Counseled on a balanced diet. Her symptoms of fatigue and dyspnea resolved within 2 weeks.

IMPACT/DISCUSSION: Iron deficiency anemia (IDA) affects about 30% of non-pregnant women worldwide. Non-anemic iron deficiency (NAID) is twice as common and can still cause fatigue. Mechanisms are unclear but may include: 1) decreased VO₂ in muscles leads to cardiopulmonary stress and fatigue; 2) iron deficiency (ID) directly affects brain function independent of hemoglobin levels. We know that iron supplementation decreases fatigue in patients who have NAID.

ID has many causes, most commonly menstrual blood loss (20-30% of IDA cases in high-income countries). Obesity is an emerging risk factor for ID, possibly due to inflammation-related elevation of hepcidin that leads to reduced iron absorption. It is estimated that overweight/obese individuals have 31% higher odds of developing ID than non-overweight counterparts.

ID is the most common micronutrient deficiency (MND) in the world, but many others exist including folate, B12, and zinc. Simultaneous MNDs in a patient may indicate food insecurity such as decreased availability of diverse foods, poverty, and poor access to nutrition education. Health care providers

should screen patients with identified MND(s) for food insecurity and provide patients with resources and education to prevent further nutritional deficits.

This case made me consider ordering iron studies for nonanemic patients complaining of fatigue, especially patients with risk factors such as obesity and food insecurity.

CONCLUSION: 1. Iron deficiency without anemia can still cause fatigue, which improves with iron supplementation.

2. Obesity is a risk factor for iron deficiency.

3. Investigate multiple micronutrient deficiencies in people with food insecurity.

A BREATH-TAKING CASE OF PULMONARY ARTERIAL HYPERTENSION

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LEARNING OBJECTIVE #1: Discuss the differential diagnosis for patients presenting with evidence of right ventricular (RV) dysfunction.

LEARNING OBJECTIVE #2: List the diagnostic criteria of pre-capillary pulmonary hypertension (PH) as outlined by The Sixth World Symposium on Pulmonary Hypertension.

CASE: 81 year old female with type 2 diabetes mellitus and microscopic colitis who presented one month of bilateral ankle edema and 2 week history of progressive dyspnea on exertion. She presented to a local hospital where she was found to be hypoxemic with a lactate 8.9, VBG 7.16/34, troponin negative, and BNP 1450. Electrocardiogram (EKG) notable for new lateral t-wave inversions. Initial concern was for pulmonary embolism (PE), and she was started on heparin and transferred to our facility. Upon arrival she was stable on 2L oxygen. Exam notable for mildly elevated JVP, 1+ pitting edema in bilateral ankles, heart rate regular without murmur gallops and rubs, and bibasilar crackles. VBG improved and both lactate and creatinine began to downtrend. Troponin remained negative. CT angiogram of her chest showed no sign of PE, but bilateral ground glass opacities and enlarged pulmonary artery (PA). COVID test was negative. Transthoracic echocardiogram (TTE) showed an elevated PA systolic pressure (PASP) to 73 mmHg with right atrium (RA) enlargement, RV dilation with mild dysfunction, severe tricuspid regurgitation (TR), and small pericardial effusion. Left ventricular (LV) function was normal, LVEF 65%. She underwent a right heart catheterization (RHC) that showed RA pressure 3 mmHg, wedge pressure 4 mmHg, mean pulmonary artery pressure (mPAP) 41 mmHg, trans-pulmonary gradient 37, Fick CI 1.9, and PVR 11 Woods Units (WU). Additional work up including cardiac MRI, VQ scan, high resolution CT chest, and serologic and infectious workup were unrevealing. Findings consistent with Group 1 Pulmonary Arterial Hypertension (PAH).

IMPACT/DISCUSSION: Dyspnea is a common presenting symptom. While the differential diagnosis is broad, hypoxemia and clinical signs of RV dysfunction should narrow the differential significantly, including myocardial infarction, PE, or PH. Once PH is suspected, TTE is the initial test of choice. Tricuspid regurgitant jet velocity (TRV) is used to calculate an estimated PASP. RHC is the gold standard to confirm PH and help to determine its cause. PH is categorized as pre-capillary (such as in group 1 primary arterial hypertension, group 3, group 4, and some types of group 5 PH), post-capillary (such as in group 2 PH from left heart dysfunction), or mixed referring to where it affects the pulmonary vascular bed. Pre-capillary PH is present when RHC demonstrates mPAP>20mmHg, PAWP ≤ 15mmHg and PVR ≥ 3WU. With no chronic lung disease and extensive negative workup, her presentation is most consistent with Group 1 idiopathic PAH.

CONCLUSION: 1) Progressive dyspnea with hypoxemia and signs of RV dysfunction should prompt concern for PH. 2) Pre-capillary PH is confirmed on RHC by a mPAP>20mmHg, PAWP<15mmHg, and PVR>3WU.

A CASE OF ACUTE PURULENT PERICARDITIS WITH A MULTIDRUG-RESISTANT ORGANISM

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LEARNING OBJECTIVE #1: Appreciate the increasing incidence of Multidrug-resistant bacterial infections.

LEARNING OBJECTIVE #2: Recognize the importance of individual patient characteristics, such as immunocompromise, when developing a complete differential diagnosis.

CASE: A 69-year-old male with a history of Waldenström's macroglobulinemia treated with ibrutinib and previous disseminated cryptococcal infection presented to an outside hospital with one day of sudden, severe upper back pain radiating to his jaw and fever in the setting of frequent outdoor activities. He denied shortness of breath, cough, or chest pain.

On presentation, the patient was febrile, his physical exam was otherwise unremarkable. His initial evaluation, including CBC, CMP, troponins, Lyme and babesia serologies, EKG, and chest x-ray were normal. He was treated empirically with ceftriaxone, azithromycin, and doxycycline. He was slated for discharge when he abruptly became hypotensive 80/56 mm/Hg and lethargic. Despite aggressive fluid resuscitation, he remained hypotensive and was transferred to our hospital's ICU.

The patient's antibiotics were broadened to vancomycin, piperacillin-tazobactam, and amphotericin; yet, he developed oliguria, worsening hypotension, and respiratory failure requiring intubation and vasopressor support. Bedside TTE revealed a large pericardial effusion with tamponade. Urgent pericardiocentesis was performed, draining 600 mL of bloody fluid. The following day, blood cultures resulted positive for gram-negative rods and his antibiotic regimen was narrowed to meropenem; however, his condition continued to deteriorate with multi-organ failure and refractory shock leading to his demise. Pericardial fluid as well as blood cultures eventually grew ESBL-producing *E. coli* resistant to aminopenicillins, cephalosporins and fluoroquinolones.

IMPACT/DISCUSSION: Acute bacterial pericarditis is a rare occurrence in the modern antibiotic era accounting for < 1% of cases. Though staphylococcus and streptococcus species predominate as causative organisms, in recent years the incidence of gram negative and anaerobic infections has increased. Furthermore, with antibiotic overuse, prevalence of multi-drug resistant gram-negative pathogens has also increased, with ESBL-producing *E. coli* accounting for a significant proportion of community acquired infections of all varieties.

Risk factors for ESBL-producing *E. coli* include advanced age, certain comorbidities, ICU stay, previous use of antibiotics and colonization with ESBL-producing organisms. Our patient was immunosuppressed which has been associated with increased risk of invasive bacterial and fungal infections. The mainstay of treatment for purulent pericarditis is urgent pericardiocentesis and antibiotics.

CONCLUSION: The incidence of infections caused by ESBL-producing *E. coli* is increasing at an alarming rate. It is paramount to consider a patient's risk factors for resistant bacterial infections when deciding upon appropriate empirical antibiotic therapy, even for community acquired infections.

A CASE OF CLIMATE CHANGE AND LEGIONELLA PNEUMONIA

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LEARNING OBJECTIVE #1: Anticipate how climate change can increase the risk of Legionella pneumonia, and how this may affect patient care and population health.

LEARNING OBJECTIVE #2: Recognize clinical findings of Legionella pneumophila infections and appreciate the influence of climate change and patient-specific lifestyle factors on the risk of infection. **CASE:** A 45-year-old male with adenocarcinoma of the right lung, chronic obstructive pulmonary disease (COPD), tobacco abuse, and alcohol abuse relocated with his family to a relative's home due to displacement from Hurricane Michael. Days after relocating, his children developed mild febrile illnesses, which were treated with azithromycin. The patient was then hospitalized for high fevers, dyspnea and malaise. On pulmonary exam, crackles were heard bilaterally. His laboratory workup was notable for a leukocytosis of 15K/mL and a mild hyponatremia of 133mmol/L. A comprehensive respiratory viral panel was negative. Computed tomography of the chest revealed multifocal areas of consolidation and patchy ground-glass opacities. He was empirically placed

on intravenous ceftriaxone and azithromycin for community-acquired pneumonia. Legionella urinary antigen testing resulted positive for Legionella pneumophila serotype 1. The patient was transitioned to oral levofloxacin and subsequently discharged from the hospital.

IMPACT/DISCUSSION: The above case describes a patient presenting with clinical, laboratory, and radiologic findings of Legionella pneumonia. Report of his children's febrile illnesses resolving with oral azithromycin suggests a cluster of infections from a common environmental source. However, the patient's cancer history, tobacco abuse, COPD, and alcohol abuse likely contributed to a more severe disease course. The timing of symptom development strongly suggests that exposure to this pathogen was related to sequelae of Hurricane Michael. Increased rainfalls accompanying higher numbers of severe storms and hurricanes have been shown to increase exposure to Legionella, possibly related to dispersal of organic sediment into municipal water supplies. Wet and humid environments have been linked to Legionnaire's Disease. Additionally, noting that Legionella species grow more optimally in temperatures ranging from 85-110°F, rising temperatures linked to climate change can further increase incidence of this disease. Recognizing the impact of warming temperatures on less traditionally seen infections, along with recognizing the clinical syndrome, will unfortunately become an invaluable skill to incorporate into clinical practice.

CONCLUSION: -The sequelae of climate change can lead to an increased incidence of Legionella pneumonia.

-Appreciating a patient's risk factors and any unique social determinants is crucial in diagnosing and initiating an appropriate treatment plan.

A CASE OF FENTANYL INDUCED SEROTONIN SYNDROME

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LEARNING OBJECTIVE #1: Recognize fentanyl and lithium as serotonin modulators

LEARNING OBJECTIVE #2: Recognize the signs and symptoms of serotonin syndrome in the sedated patient.

CASE: A 21-year-old male with bipolar depression treated with lithium and fluoxetine who recently started a highly caffeinated workout supplement was brought to the emergency room (ER) after his father found him at home minimally responsive with dilated pupils. En route to the ER, he had a seizure and his initial exam was significant for hypoxemia and seizing. Initial lab results were significant for severe lactic acidosis, leukocytosis, acute renal injury, and hypokalemia. Urine toxicology was negative. CT scan of the brain did not show any acute pathology. He was emergently intubated and admitted to the intensive care unit for acute respiratory distress syndrome, aspiration pneumonia, sepsis, status epilepticus and acute renal failure. He was placed on continuous EEG, started on levetiracetam, antibiotics, fentanyl and propofol for sedation, and midazolam for ventilator desynchrony. On hospital day 2, lithium 1200 milligrams (mg) daily and fluoxetine 60mg daily were resumed and 17 hours after beginning these medications the patient was found at bedside dyssynchronous with the ventilator and agitated. Vitals included: pulse 116, blood pressure 160/74, respiratory rate 30, temperature 101.9 F, saturation 93%. On exam he was diaphoretic, pupils were dilated at 5mm with horizontal ocular clonus, and there was diffuse muscle rigidity with spontaneous clonus of the right lower extremity. EEG did not show evidence of epileptiform activity. He was clinically diagnosed with moderate serotonin syndrome (SS). Subsequently, lithium and fluoxetine were discontinued, fentanyl was weaned off, and midazolam was given for agitation. His symptoms resolved within 24 hours.

IMPACT/DISCUSSION: Given the increasing use of selective serotonin reuptake inhibitors (SSRI's) in treating depression and other conditions, the incidence of SS will likely rise in the future. Fentanyl is a commonly used opioid in the anesthesia, critical care, and emergency medicine settings. Given its serotonin modulating properties, it must be used cautiously in patients receiving other serotonin receptor modulating medications such as SSRI's or lithium. SS can occur within 6 hours of addition of a serotonergic modulator. In the sedated patient, mental status changes may be resembled by agitation with ventilator desynchrony. The most specific finding is spontaneous clonus, most often at the patellar site. Management of mild to moderate SS includes discontinuation of

serotonergic modulators and treatment of agitation with benzodiazepines. Symptoms typically resolve within 24 hours of these measures.

CONCLUSION: Fentanyl acts as an SSRI and must be used cautiously with other serotonergic agents to avoid SS. SS should be on the differential in sedated patients on fentanyl and other serotonergic modulators who present with increasing agitation or ventilator desynchrony.

A CASE OF FEVER AND LYMPHADENOPATHY

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LEARNING OBJECTIVE #1: Recognize Kikuchi Disease (KD) as a possible diagnosis in patients presenting with fever and lymphadenopathy.

LEARNING OBJECTIVE #2: Distinguish KD from other more serious conditions through appropriate diagnostic testing.

CASE: A 27-year-old male with past medical history of childhood Lyme disease presented to the emergency department with several weeks of painful right neck swelling accompanied by low grade fever, chills, night sweats, severe fatigue, and a 10-lb weight loss. Vital signs at presentation were significant for a fever of 39°C. Physical exam was notable for several 3–4 cm firm, mobile, and exquisitely tender lymph nodes in the right upper anterior cervical chain. Initial laboratory work-up revealed only mild leukopenia (WBC 3.89 k/uL) and normocytic anemia (Hgb 11.8 g/dL). Computed tomography of the neck showed multiple abnormal heterogeneous enlarged right neck nodes with cystic/necrotic changes, the largest measuring 4 cm. The patient was admitted for broad spectrum antibiotics and further evaluation. After a negative initial infectious work-up he was switched to doxycycline for possible atypical infection. Core needle biopsy was non-diagnostic and the remainder of his extensive infectious work-up was negative. Given concern for possible malignancy, a PET-CT was obtained and demonstrated hypermetabolic right neck and right supraclavicular lymphadenopathy with focal intense FDG uptake and splenomegaly with diffuse FDG uptake. An excisional biopsy of a right cervical node was pursued for definitive diagnosis and showed necrotic tissue with a lymphohistiocytic inflammatory response and plasmacytoid dendritic cells, consistent with a diagnosis of Kikuchi Disease. The patient was discharged with a prednisone taper and was noted to have marked symptomatic improvement at outpatient follow-up.

IMPACT/DISCUSSION: The differential diagnosis for lymphadenopathy is broad, including infection, malignancy and autoimmune disorders. KD is a rare, benign and self-limited condition that typically presents with cervical lymphadenopathy and low-grade fever. Patients may also have fatigue, weight loss and hepatosplenomegaly, as in this patient. It is critical to obtain a lymph node biopsy, both to definitively diagnose KD and to exclude more serious diseases such as lymphoproliferative disorders. There are no established effective treatments and symptoms generally resolve in 1–4 months. However, patients with severe or persistent symptoms have been successfully treated with glucocorticoids, as demonstrated by this case, or IVIG. KD shares epidemiologic and histologic features with systemic lupus erythematosus (SLE). Several case reports have documented the development of SLE in patients previously diagnosed with KD, highlighting a key consideration in the follow-up of these patients.

CONCLUSION: KD is a rare, benign cause of fever and cervical lymphadenopathy. Lymph node biopsy is essential to both diagnose KD and definitively rule out other more serious diseases.

A CASE OF GUILLAIN-BARRE SYNDROME FOLLOWING COVID-19 INFECTION

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LEARNING OBJECTIVE #1: Recognize rare neurological complications of COVID-19 infection.

LEARNING OBJECTIVE #2: Manage COVID-19-related complications.

CASE: A 70-year-old Caucasian man with type 2 diabetes mellitus, hypertension, hospitalization for Coronavirus disease 2019 (COVID-19) pneumonia a month prior to admission, presented with two weeks of progressive ascending symmetrical bilateral lower extremity weakness associated with numbness and paresthesias of both feet. He denied facial droop, difficulty in swallowing, bladder or bowel incontinence, back pain, trauma, or headache. His surgical, family, and social histories were unremarkable. Physical examination was normal, except for neurological exam, which revealed areflexia, reduced motor strength (grade 2/5 both distal lower extremities, 4/5 both distal upper extremities), decreased sensation to pinprick and light touch below the knee bilaterally. Laboratory results significant for lymphocytic leukocytosis with white blood cell count 14,800/mcl (neutrophils 47.4%, lymphocytes 44.1%, monocytes 5.4%, eosinophils 2.3%, basophils 0.8%), and hyponatremia (Na 125mEq/L). Evaluation of hyponatremia was suggestive of syndrome of inappropriate antidiuretic hormone (SIADH). Cerebrospinal fluid (CSF) evaluation revealed albuminocytological dissociation (elevated protein [239 mg/dl], with normal WBC [1/mm³]), diagnostic of Guillain-Barre syndrome (GBS). MRI brain showed patchy hyperintensities in pons and MRI spine showed no acute pathology. Patient received a five-day course of intravenous immunoglobulin (IVIG) for presumed diagnosis of GBS without improvement. Hence, a decision was made to give a total of five plasmapheresis sessions. Subsequently, the patient showed gradual improvement in motor strength on both lower extremities (grade 4/5), and the patient was discharged to an acute rehabilitation facility.

IMPACT/DISCUSSION: COVID-19 emerged as a global health pandemic with primary respiratory manifestations. The common neurological manifestations with COVID-19 include anosmia, dysgeusia, headache, encephalopathy, acute cerebrovascular accidents and rare complications like parainfectious or post-infectious demyelination, encephalitis and seizure. Coronaviruses are potentially neurotrophic and neuro-invasive pathogens causing inflammation and neurodegeneration. The pathophysiology may be related to immune-mediated molecular mimicry or direct neurotoxic effects.

In most cases of COVID-19-associated GBS, symptoms developed five to ten days following COVID-19 infection. The interval period in this case was longer compared to other reported cases. Similarly, studies have shown that SIADH is a complication of GBS due to autonomic dysfunction, as was seen in this case.

CONCLUSION: An increasing number of demyelinating neurological cases have been reported during the course of the COVID-19 pandemic. It is important to be aware of rare COVID-19 related complications, as early diagnosis and treatment could result in better prognosis.

A CASE OF HYPERCALCEMIA

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LEARNING OBJECTIVE #1: Recognize the clinical features and risk factors of milk-alkali syndrome

LEARNING OBJECTIVE #2: Diagnose milk-alkali syndrome in a patient presenting with hypercalcemia

CASE: A 75-year-old female with past medical history of osteoporosis presented with nausea and vomiting associated with fatigue and unintentional weight loss. One month prior to presentation, she was diagnosed with gastroesophageal reflux disease, and prescribed omeprazole. Meanwhile, she supplemented with calcium carbonate chews and aluminum-magnesium hydroxide liquid for breakthrough heartburn. Concomitantly, she took calcium tablets for management of her osteoporosis. On admission, arterial blood gas demonstrated metabolic alkalosis, with elevated BUN and creatinine levels. Total and ionized calcium levels were elevated to 16 mg/dL and 1.79 mmol/L, respectively. Extensive workup was otherwise unremarkable. She was treated with normal saline hydration. Calcium levels and acid-base status normalized, with significant improvement in kidney function. She was discharged home with discontinuation of calcium-containing compounds.

IMPACT/DISCUSSION: Milk-alkali syndrome (MAS) results from overuse of antacid medications containing calcium and absorbable alkali. Underlying risk factors further contribute to disease burden. Here we present a case of MAS in an elderly patient with risk factors, to highlight the importance of high clinical suspicion in guiding treatment.

It is suggested that normal renal function, bone buffering, and suppression of calcitriol production create a protective mechanism against hypercalcemia and alkalemia when consuming large doses (≥ 10 g daily) of calcium carbonate. However, several risk factors exist and require high clinical suspicion and understanding to properly inform medical decision making.

Intake of calcium carbonate without phosphate supplementation leads to hypophosphatemia, which directly increases calcitriol production and may lead to hypercalcemia with alkalemia. Furthermore, concomitant use of vitamin D significantly increases this risk. Other risk factors include underlying kidney disease, volume depletion, and thiazide diuretic use, all of which reduce calcium excretion. Older age patients with decreased bone density have decreased buffering capacity for calcium, adding to this predisposition.

Diagnosis of MAS can be made based on the appearance of hypercalcemia, renal insufficiency, and metabolic alkalosis in a patient with oral intake of calcium-containing medications. It is essential to rule out malignancy, primary hyperparathyroidism, and granulomatous disease. Treatments consist of intravenous hydration and discontinuation of calcium-containing medications.

CONCLUSION: It is important for clinicians to include MAS in their differential diagnosis when encountering patients with hypercalcemia and recognize the various risk factors that may predispose patients to developing the syndrome. High clinical suspicion for diagnosis and adequate medication reconciliation for high-risk patients can improve outcomes.

A CASE OF IDIOPATHIC RECURRENT RHABDOMYOLYSIS

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LEARNING OBJECTIVE #1: Understand the diagnostic workup of recurrent rhabdomyolysis

LEARNING OBJECTIVE #2: Recognize underlying genetic factors associated with recurrent rhabdomyolysis

CASE: A 26-year-old female presenting with myalgias and dark urine was found to have an elevated creatine kinase (CK) consistent with rhabdomyolysis. She had no past medical history aside from three prior admissions for rhabdomyolysis in 2017, the first of which was complicated by compartment syndrome of her right arm requiring emergent fasciotomy. Her initial presentation was attributed to a strenuous exercise regimen although later admissions were unprovoked. She underwent extensive workup for potential etiologies. Given negative myositis panel and autoimmune serologies notable only for a mildly positive SSA, autoimmune inflammatory myopathies were thought to be less likely. Testing for genetic causes included normal serum lactate, pyruvate, carnitine levels, acylcarnitine profile, urine organic acid profile, and plasma amino acid profile. Gene testing for neuromuscular disorders showed the patient to be heterozygous for a variant of uncertain significance in the PYGM gene. Muscle biopsy was notable for a mild necrotizing myopathy. Nerve conduction studies were consistent with a non-irritable myopathy. Her presentation was characterized by fluctuating CK levels with sustained elevation despite aggressive IVF at rates of up to 700cc/hr. While CK level initially peaked at 87K and eventually downtrended to 25K, it again rose to 44K by day 19 of hospital admission.

IMPACT/DISCUSSION: Patients with recurrent rhabdomyolysis following exercise without an underlying cause are often diagnosed with benign exertional rhabdomyolysis. Evidence suggests that many patients diagnosed with benign exertional rhabdomyolysis actually have underlying genetic factors that increase their likelihood of developing rhabdomyolysis. Mutations in type 1 ryanodine receptor (RYR1), CK muscle isoform (CKMM), alpha actinin-3 (ACTN3), and myosin light chain kinase (MYLK2) have been associated with benign exertional rhabdomyolysis. In our patient with repeated episodes of rhabdomyolysis not associated with significant exertion, our suspicion for an underlying genetic metabolic disorder was high particularly given her prolonged treatment course. Genetic testing revealed a heterozygous variant

in the PGYM gene – the gene implicated in McArdle Disease – that has not yet been described as a pathogenic variant but may account for her increased likelihood of developing rhabdomyolysis.

CONCLUSION: This case presents the challenges faced in determining the etiology of recurrent rhabdomyolysis and highlights the importance of a methodical workup. The workup in our patient was overall unrevealing although genetic testing did show a possible underlying gene variant related to rhabdomyolysis. Ultimately, more research is needed to explore the genetic factors that increase predisposition to developing rhabdomyolysis in patients without a clear inherited cause.

A CASE OF NEPHROGENIC DIABETES INSIPIDUS IN A POST-RENAL TRANSPLANT PATIENT

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LEARNING OBJECTIVE #1: Differentiating causes of polyuria is key to treatment, but performing classical water deprivation test is challenging

LEARNING OBJECTIVE #2: Cidofovir is nephrotoxic causing AKI, proteinuria but can also cause DI

CASE: 41yr Asian male with a history of hypertension, hepatitis B, ESRD presented 40 days s/p renal transplant with hematuria, dysuria, urinary urgency for 3 days. His examination was benign; the graft was non-tender without a bruit. His labs were significant for Hb 7.4gm/dl, WBC count 3.0k cells/cumm, platelet count 119k cells/cumm, Na 135, K 3.7, BUN 68, Cr 3.7, Ca 8.5, Mg 2.1, Phos 4.2. BK, CMV, parvo virus-negative, Adenovirus 34,490copies/ml, blood and urine cultures were negative. UA: blood, protein: large, WBC: 32, RBC: 100, pH: 5.5. Ultrasound showed graft in the right lower quadrant, normal flow, no collections. He was started on Cidofovir to manage systemic adenovirus infection. On day 3 after the second dose of Cidofovir, he started developing polyuria to 6.5litres/day and 9.7litre/day on day 4. His Urine Na: 27mEq/L, Cr: 24.29, Osmolality was 175mmol/L, Serum Na 135meq/L and osmolality 294mEq/L. Upon strictly charting his intake, it was 7–9L of water per day. The presence of hyponatremia and polyuria were indicative of a possible diagnosis of psychogenic polydipsia over diabetes insipidus. He was fluid restricted to 2L/day and continued to make 5L of urine in the meantime. The next day he was treated with desmopressin without improvement in polyuria.

As the patient had low urine sodium, urine osmolality along with polyuria a diagnosis of DI was made; no change in urine osmolality and urine output after desmopressin made a diagnosis of nephrogenic DI more likely. His Cidofovir was stopped, urine output improved the next day to 4L, and the patient was discharged home with advice for unrestricted access to water

IMPACT/DISCUSSION: Diabetes insipidus presents with polyuria, polydipsia in the setting of hypernatremia, and low urine osmolality. Serum sodium rarely exceeds 150mEq/dl unless access to free water is impaired. Although DI presents with hypernatremia, our patient had low serum sodium due to excess free water intake due to increased thirst. A diagnosis is established based on a water deprivation test followed by desmopressin administration. Combining hypertonic saline infusion with serial measurement of copeptin levels is an alternative, safer diagnostic method but the availability makes it challenging in practice. Inability to concentrate urine in response to desmopressin suggests nephrogenic DI as reflected by urine sodium < 200 mmol/L

CONCLUSION: Polyuria is urine output exceeding 3 L/day or more than 40ml/kg/day. Common causes are primary polydipsia, DI and increased solute excretion; while the former present with low urine osmolality, the latter is associated with increased urine osmolality. Correlation of the onset of polyuria with Cidofovir initiation and a slight improvement with discontinuation suggests Cidofovir as a most likely offending agent confounded by renal dysfunction

A CASE OF PNEUMOCEPHALUS, WHAT A HEADACHE!

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LEARNING OBJECTIVE #1: Recognize pneumocephalus as a rare side effect of epidural puncture procedures

LEARNING OBJECTIVE #2: Consider pneumocephalus as a differential diagnosis of headaches in patients post epidural injections

CASE: A 23-year-old male patient with chronic low back pain, started one year after a motor vehicle accident, presented to the hospital with intractable headaches.

Three days prior, he developed a severe, progressively worsening frontal and occipital headache that started after his second epidural lumbar steroid injection at an outpatient clinic. He had associated dizziness, nausea, and vomiting.

Upon presentation, he was hemodynamically stable, with no neurological deficit, and laboratory testing was unremarkable. CT head without contrast revealed a small amount of air within the ventricles. CSF leak and pneumocephalus were then suspected, for which neurosurgery recommended to continue conservative management and to repeat head CT scan in 24–48 hours.

On day two of hospitalization, symptoms persisted, but a repeat CT head revealed regression of the pneumocephalus, and the patient was discharged home with a neurology clinic follow up in two weeks.

Two days later, the patient returned to the ER with the same complaint of worsening headaches that did not respond to analgesics. MRI brain showed a tiny focus of residual intraventricular air within the right lateral ventricle's frontal horn. Neurosurgery performed an epidural blood patch at this time, and the patient was subsequently discharged home.

After two weeks, a repeat CT head revealed complete resolution of the intraventricular air; however, the patient continued to have a frontal headache with minimal response to analgesics.

IMPACT/DISCUSSION: Pneumocephalus is commonly a result of traumatic brain injury, surgical intervention of the brain, or infections. It is very unusual for pneumocephalus to develop post epidural injections. Symptoms may vary from nausea, vomiting, headaches to seizures, and altered mental status. Headaches could be categorized as traditional post-dural puncture headaches (PDPH) or as pneumocephalus related headache (PRH)

PRH is more likely to be non-postural and resolve before the resolution of the pneumocephalus. In a literature review by Verdun et al. in 2014, PRH was inconsistent regarding the time of onset, duration, and symptoms resolution. The authors further emphasized the need to conduct further studies to clarify symptom onset, quality, duration, and resolution of PRH compared to traditional PDPH.

CONCLUSION: Despite being a safe method of treating chronic back pain, epidural steroid injections can carry rare inadvertent effects such as pneumocephalus. PRH can occur days following the epidural puncture and can persist for a few months. Treatment is usually conservative, including rest and analgesics.

A CASE OF POST-COVID-19 POLYMYALGIA RHEUMATICA

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LEARNING OBJECTIVE #1: Recognize the similarities and differences between symptoms related to the post-acute-COVID-19 syndrome and other inflammatory diseases such as polymyalgia rheumatica (PMR).

LEARNING OBJECTIVE #2: Identify COVID-19 infection as a possible risk factor for inflammatory disease.

CASE: A 63-year-old female presented for outpatient evaluation of post-COVID symptoms five months after her initial infection. She has no significant medical history. Her initial COVID infection was mild. About three months later, she developed proximal muscle pain. At our visit, she noted difficulty reaching overhead and proximal muscle morning stiffness lasting >45 minutes. Exam was significant for limited range of motion and tenderness to palpation of bilateral shoulders without edema or erythema. She demonstrated normal strength of her upper and lower extremities. Labs showed a normal creatinine phosphokinase, mild normocytic anemia (Hemoglobin 10.2 g/dL), a Creatinine protein of 40.58 mg/L (nl = < 5.1) and an erythrocyte sedimentation rate of 107 mm/hr (nl = 0–24). She had normal comprehensive metabolic and thyroid function panels, Lyme antibodies, Vitamin B12, D and folic acid levels, as well

as a negative rheumatoid factor, antinuclear antibodies, anti-centromere B antibodies, and anti-Ro/SSA/anti-La/SSB antibodies. As she met the American College of Rheumatology criteria for PMR (1), the patient was started on prednisone 5 mg twice a day with significant improvement in her symptoms.

IMPACT/DISCUSSION: Myalgia and arthritis are recognized as part of the post-COVID syndrome (2,3). This includes constitutional, neurologic, psychiatric and musculoskeletal symptoms, many of which overlap with PMR. Musculoskeletal symptoms can be localized or diffuse and are not necessarily associated with elevated inflammatory markers. This case highlights the importance of differentiating other diagnoses from the post-COVID syndrome, as with PMR treatment this patient's symptoms improved.

There is scant data in the literature around the prevalence of post-COVID rheumatologic syndromes, begging the question if this woman with no prior musculoskeletal or rheumatologic history developed PMR as a result of her COVID infection. Additional studies are needed to see if inflammatory disorders such as PMR will become more prevalent after COVID given that the post-COVID syndrome may be related to hyperinflammation (4). There is limited data that other infectious diseases, such as adenovirus, parvovirus and parainfluenza, may be linked to PMR (5,6).

CONCLUSION: The constellation of symptoms that patients experience after COVID infection is emerging in the literature as the post-acute-COVID-19 syndrome (7). Providers must be aware of this syndrome and recognize these symptoms, especially as more and more patients recover from COVID. However, it is important not to overlook other distinct diagnoses. More research needs to be done to evaluate the relationship between COVID infection and the development of inflammatory disorders such as PMR.

A CASE OF PROGRESSIVE SCLERODERMA-MYOSITIS OVERLAP SYNDROME

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LEARNING OBJECTIVE #1: Diagnose Scleroderma-Myositis Overlap Syndrome

LEARNING OBJECTIVE #2: Recognize the prognostic utility of the PM/ Scl antibodies

CASE: Our patient is a 41-year-old male with a history of cryptogenic organizing pneumonia on azathioprine, who presented with acute on chronic dyspnea. Associated symptoms included subjective fever, chronic weight loss, odynophagia, Raynaud's phenomenon, weakness, and skin lesions. Social and family history were unremarkable. Physical exam was notable for postauricular/chest/forehead hypopigmentation, bilateral sclerodactyly with fingertip ulcerations, and 4/5 proximal muscle strength. CT of the chest was consistent with Interstitial Lung Disease (ILD). Electromyography (EMG) showed generalized myopathy. Serology was positive for antinuclear antibody (ANA) and Anti-PM/Scl. Creatine kinase (CK) was markedly elevated at 2053 U/L. He was diagnosed with Scleroderma-Myositis Overlap Syndrome and required treatment with rituximab after limited response to prednisone. His course has since been complicated by worsening respiratory status requiring oxygen, gastroesophageal reflux disease, and recurrent myositis flares.

IMPACT/DISCUSSION: Scleroderma is a heterogeneous spectrum of disorders due to underlying inflammation and fibrosis affecting multiple organs. Systemic Sclerosis (SSc), one of the subtypes of Scleroderma, is characterized by widespread involvement of the skin and internal organs. SSc Overlap Syndromes may occur, wherein patients with SSc have additional signs of other connective tissue diseases, notably polymyositis. The diagnostic hallmarks of myositis in SSc Overlap include elevated CK/aldolase, myopathy on EMG, muscle edema on MRI, and inflammation on muscle biopsy. An estimated 85–95% of patients with SSc have positive ANA, and the majority (60–70%) are positive for an additional, SSc-specific, generally mutually exclusive autoantibody (e.g. centromere, topoisomerase I, and RNA polymerase III). The PM-Scl antibody, which is directed against a nuclear/nucleolar protein complex, is frequently present in SSc-Myositis overlap (31%) but also found in polymyositis (8%), dermatomyositis (11%), and SSc (2%). This antibody is

clinically associated with myositis, arthritis, Raynaud's phenomenon, and calcinosis. Furthermore, SSc-Myositis Overlap Syndrome, as compared to SSc, has been found to have an increased prevalence of ILD, however data suggest ILD associated with anti-PM-Scl is associated with more favorable lung outcomes. Recognition of this specific overlap syndrome serves as an important step in the optimization of care due to the multidisciplinary coordination these patients require.

CONCLUSION: 1. Scleroderma-Myositis Overlap Syndrome is characterized by clinical features of SSc with elevated CK/Aldolase, generalized myopathy on EMG, muscle edema on MRI, and inflammation on biopsy.

2. The PM-Scl autoantibody is associated with Scleroderma-Myositis Overlap Syndrome, Raynaud's phenomenon, calcinosis, arthritis, and ILD.

A CASE OF SIDEROBLASTIC ANEMIA MASKED BY UNDERLYING SICKLE CELL DISEASE IN A YOUNG AFRICAN AMERICAN PATIENT

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LEARNING OBJECTIVE #1: Sideroblastic anemias (SA) are a group of congenital and acquired bone marrow disorders caused by abnormalities in heme synthesis and mitochondrial function. Due to its low prevalence, the diagnosis of SA can often be challenging.

LEARNING OBJECTIVE #2: Loss of response to a previously effective long-term treatment of anemia should raise the suspicion of additional causes of anemia.

CASE: A 26-year-old African American man with Sickle Cell Anemia on chronic red blood cell exchange transfusions for pulmonary hypertension and right heart failure for >1 decade and complications of iron overload was noted to have an unusual pattern of decline in hemoglobin within two weeks of erythrocytapheresis. His peripheral blood smear showed an increased percentage of nucleated RBCs, marked basophilic stippling and large pappenheimer bodies in the red cells. Indirect Coombs test was negative and alloantibodies were not detected. An extensive anemia workup ruled out renal disease, vitamin and mineral deficiencies including copper, B12, and folate. Serum pyridoxine levels (Vitamin B6) was slightly low. Hemolysis labs including lactate dehydrogenase, haptoglobin, indirect bilirubin, and Coombs test, were normal, and other acquired causes of sideroblastic anemia, including alcoholism and lead toxicity, were ruled out by history and laboratory testing. Bone marrow biopsy was performed showing normal marrow cellularity, no dysplasia, with Prussian blue staining revealed abundant ringed sideroblasts, diagnostic of SA. Cytogenetic analysis was normal and next generation sequencing did not reveal myeloid gene mutations. 5-aminolevulinic synthase (ALAS) gene mutations that cause X-linked SA and mutations in the erythroid specific mitochondrial transporter SLC25A38, were not identified on peripheral blood targeted gene sequence analysis. The patient was started on pyridoxine supplementation with no improvement in transfusion requirement despite the normalization of serum pyridoxine level (value). The peripheral blood smear continued to show coarse basophilic stippling and clusters of Pappenheimer bodies. The patient was diagnosed with pyridoxine unresponsive idiopathic SA. He was referred for haplotype matched allogeneic stem cell transplantation.

IMPACT/DISCUSSION: This case highlights the diagnostic challenge in identifying SA in a patient with sickle cell anemia which itself causes a chronic hemolytic anemia. Due to its low prevalence, SA is often missed in the differential diagnosis of transfusion dependent anemias, especially in patients with hemoglobinopathies. We continue to consider congenital causes of SA in our patient, as congenital SA can remain asymptomatic until adulthood and causative genes are not all identified.

CONCLUSION: Additional causes of refractory anemia should be considered in patients with hemoglobin disorders and iron overload, as the therapeutic approaches may be completely different.

Early diagnosis and treatment of SA improves patient outcomes and prevents long term complications.

A CASE SERIES OF PLASMA BLASTIC MYELOMA: A LETHAL VARIANT OF MULTIPLE MYELOMA.

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LEARNING OBJECTIVE #1: Recognize a rare and aggressive variant of multiple myeloma (MM): plasmablastic myeloma (PBM).

LEARNING OBJECTIVE #2: Assess for plasmablastic transformation in a patient with long-standing myeloma.

CASE: We present a series of cases depicting plasma cell myeloma with plasmablastic features. Case 1: 44-year-old female with complaints of back and abdominal pain had multiple bulky masses involving anterior chest wall and pleural space and hepatosplenomegaly. Biopsy of sternal mass revealed plasma cell neoplasm with plasmablastic features. She eventually received treatment with cyclophosphamide and bortezomib with excellent response and resolution of mass. Case 2: 78-year-old female with a ten-year history of multiple myeloma, treated with multiple chemotherapy drugs and radiation, had progression in the form of a 7.3 x 5.3 cm pancreatic tail mass with an SUV max of 15.3. Histopathology of the pancreatic lesion was positive for plasma cell myeloma with plasmablastic features. Case 3: 66-year-old male had complaints of intractable nausea and vomiting. Workup showed 4.1cm right paraspinal mass encasing right 6th rib and involving T5-6 neural foramen. Biopsy of the paraspinal mass showed findings of plasma cell neoplasm with plasmablastic features. After a multidisciplinary approach, the patient received palliative radiotherapy and is planned to undergo systemic chemotherapy.

IMPACT/DISCUSSION: Plasmablastic Myeloma (PBM) is a terminal evolution of multiple myeloma (MM) and is characterized by $\geq 2\%$ plasmablasts in the bone marrow aspirate. PBM accounts for 5-15% of cases of MM and is cytologically characterized by the presence of large plasma cells with increased mitotic activity. PBM is rare but an aggressive subset of MM associated with extramedullary localization and poor survival. Treatment options vary depending on the disease's extent and range from surgery or local radiation to systemic chemotherapy or transplantation. A high index of suspicion and consideration for biopsy to look for plasmablastic transformation of MM in the setting of long-standing myeloma with the new evolving mass should be kept in mind.

CONCLUSION: Although PBM is rare, it is a particularly aggressive and lethal variant of multiple myeloma, with a median survival time of 10 months. Therefore, clinicians should have high clinical suspicion for patients with known multiple myeloma with new masses to achieve a prompt diagnosis and initiate treatment in order to improve mortality.

A CONCOMITANT DIAGNOSIS OF SCURVY AND LUPUS

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LEARNING OBJECTIVE #1: Early recognition of vitamin C deficiency in combination with other disease processes

LEARNING OBJECTIVE #2: Advocate for prevention of vitamin C deficiency with promotion of patient education

CASE: An 18-year-old female of Nepalese background with no significant past medical history presented with fatigue, bleeding gums, ecchymosis and petechiae. Her Hgb was found to be 4.1 without evidence of hemolysis (bilirubin 0.2, lactate dehydrogenase mildly elevated at 260 with a normal haptoglobin) requiring 2 units pure red blood cells. Additional labs revealed albumin of 1.5, INR of 1.5, partial thromboplastin time of 60 and erythrocyte sedimentation rate of 118. Serum iron and total iron binding capacity were low, but ferritin was normal. Her diet was questioned due to labs consistent with malnourishment, which was devoid of fruit and vegetables. Urinalysis further demonstrated >300 mg/dL of protein and increased red blood cells. She was positive for ANA, double-stranded DNA, with low C3 and C4 levels making lupus nephritis likely. A renal biopsy confirmed lupus nephritis. Vitamin C

levels returned at 0.2 indicating severe deficiency. The patient was started on steroids and Vitamin C supplementation in the hospital and discharged on prednisone, Vitamin C and mycophenolic acid with outpatient follow-up.

IMPACT/DISCUSSION: The presentation of Scurvy can overlap with many disorders and is often misdiagnosed. Symptoms of Scurvy can present similarly to SLE and the co-existence of the two has never been published.

Vitamin C must be obtained from dietary sources and it is essential for synthesis of collagen. It is also important for immune system function and iron absorption. Scurvy rarely affects adults, but may be seen in some individuals with malnutrition or malabsorption. Signs and symptoms usually occur by the third month and treatment is with vitamin C supplementation. Early diagnosis and treatment of scurvy can be life-saving, so recognition of the physical findings is important.

When evaluating a case, it is essential to determine if all symptoms in a specific case can be explained by a singular diagnosis or combination of diagnoses. Our clinical picture largely supported a diagnosis of Scurvy, particularly her bleeding gums without clear ulceration, numerous laboratory abnormalities suggesting nutritional deficiency, petechial rash and bruising. However, her new onset proteinuria and hematuria was not explained by this diagnosis. In this case, we have a complex array of symptoms which could not be explained by a singular diagnosis. This is also evidence of a rare diagnosis of Scurvy which is important to consider in migrant populations in America. It is important to complete a proper history and physical in which nutrition can be assessed.

CONCLUSION: Patients with autoimmune diseases such lupus can present with a multitude of symptoms so it is important to conduct a thorough history and physical. When suspecting a nutrition deficiency, it is important to ask about diet.

ACUTE GI BLEED IN A PATIENT WITH METABOLIC SYNDROME

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LEARNING OBJECTIVE #1: Recognize clinical symptomatic progression from NASH to HCC

LEARNING OBJECTIVE #2: Recognize new screening protocol for high-risk NASH patients

CASE: A 68 year old male with a PMH of HTN, hyperlipidemia, obesity, fatty liver, and DM2 presented with 1 month of fatigue, SOB, nausea, decreased appetite, hematochezia, and weight loss, with a remote history of smoking and alcohol use. Exam showed pallor, LE edema, and extensive spider angiomas. Labs showed H/H of 4.4/14.8. EGD revealed multiple large esophageal varices. Abdominal ultrasound showed hepatomegaly and cirrhosis. CT scan showed a large infiltrative hepatic lesion with scattered pulmonary and lymph nodes, indicative of metastatic stage 4b hepatocellular carcinoma.

IMPACT/DISCUSSION: Nonalcoholic steatohepatitis (NASH) is a subset of nonalcoholic fatty liver disease (NAFLD) marked by hepatic inflammation with potential development of cirrhosis. NASH is typically asymptomatic but can present as fatigue and abdominal pain, accompanied by elevated AST/ALT. Similarly, cirrhosis is often asymptomatic but clinical exam may reveal jaundice, spider angiomas, gynecomastia, or asterixis. Labs may show elevated serum bilirubin, AST/ALT, and alkaline phosphatase. NASH is more likely to occur in patients with metabolic syndrome, and cirrhotic NASH patients are at increased risk for HCC development. Biopsy is the gold standard for NASH diagnosis, but due to procedure invasiveness, cost, and low HCC risk for noncirrhotic NAFLD/NASH, biopsy is infrequently pursued in primary care. As a result, NAFLD/NASH patients do not typically undergo the 6-month ultrasounds used to surveil HBV/HCV patients for HCC.

However, NAFLD-related cirrhosis remains an established risk factor for HCC, and NAFLD-related HCC incidence is rising in the US population.

This patient had a history of fatty liver with DM2, hyperlipidemia, obesity, and a remote history of alcohol use. He was asymptomatic until dramatic increase in spider angiomas and GI bleed 3 months prior to stage 4b HCC diagnosis. In addition to routine lab and physical exams for cirrhotic sequelae, updated 2020 guidelines by the American Gastroenterology Association recommend noninvasive cirrhosis screening in NAFLD patients through at least 2 of the 3

following methods: point-of-care tests (FIB-4 scoring); specialized blood tests (Enhanced Liver Fibrosis panel); and imaging (vibration-controlled transient elastography or shear-wave elastography). For NAFLD patients with detected cirrhosis or advanced fibrosis, the new standard of care is HCC surveillance through regular ultrasound every 6 months. This patient is a candidate for the new guidelines for HCC surveillance. As detection of early stage HCC is critical in treatment, increased emphasis on NAFLD/NASH screening and surveillance may have been instrumental in his prognosis.

CONCLUSION: Recognize importance of increased surveillance in high-risk NAFLD/NASH patients

Recognize updated protocols for cirrhosis and HCC screening and surveillance in NAFLD/NASH patients

ACUTE HEPATITIS B IN PREVIOUSLY VACCINATED NON-IMMUNOCOMPROMISED ADULT

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LEARNING OBJECTIVE #1: Recognize that acute hepatitis B virus infection can present in previously immunized healthy individuals

LEARNING OBJECTIVE #2: Consider post-vaccination testing for seroconversion in high risk patients

CASE: 32-year-old male with past medical history of depression transferred to our hospital, for escalation of care, after presenting with 4-day history of nausea, vomiting, jaundice, body aches, abdominal pain, and worsening lethargy. He denied having unprofessional tattoos, IV drug use, heavy alcohol use, recent acetaminophen use, ingestion of non-commercial mushrooms or herbal supplements, but reported unprotected sexual intercourse with male partners. He received viral Hepatitis B vaccine, while serving in the armed forces. His only medication was venlafaxine. Family history was notable for hemochromatosis in his father. Upon arrival, his lethargy resolved, but >jaundice and RUQ abdominal pain persisted.

Initial labs showed elevated AST/ALT of 3075/4895 IU, respectively, bilirubin of 16.3 mg/dL, INR >2 and ferritin levels 17,000 ng/ml. Ceruloplasmin levels and alpha-1 antitrypsin clearance were within normal limits. Blood toxicology ruled out acetaminophen, alcohol, and salicylate toxicity. Evaluation for Hereditary Hemochromatosis showed a heterozygous H63D-mutation of HFE. However, Viral Hepatitis panel was positive for HBsAg, anti-HBc IgM, HBeAg, and negative for anti-HBs and a Viral Hep B DNA of 579000 copies. Hepatitis D Antigen and CMV evaluations were inconclusive.

He improved over a few days with supportive care and n-acetylcysteine, until his transaminase levels dropped below 1000. No tenofovir or entecavir were required. He was then discharged with outpatient follow up.

IMPACT/DISCUSSION: There is limited literature in regards to viral Hepatitis B infection in previously vaccinated individuals. To our knowledge many of the acute hepatitis B infections occur in unimmunized individuals and individuals with primary or secondary immunodeficiency despite vaccination.

Appropriate immune response to the viral Hepatitis-B vaccine is defined as having anti-HBs of at least 10 IU/L. 10% of adults only achieve levels below 10 IU/L which puts them at risk of future infection. Studies demonstrated the rate of seroconversion following HBV vaccination to be around 90%. 87% of non-responders developed anti-HBV titers after a booster dose. In initial responders, there is evidence of an enduring protection against HBV. Furthermore, in subjects with anti-HBV that titers were considered below a protective level, an anamnestic response developed to an HBV booster, suggestive of a long-term immune memory from the HBV vaccine. To identify non-responder's post-vaccine testing (PVT) is needed, but not routinely performed, except in Healthcare workers.

CONCLUSION: Viral Hepatitis B infection should still be considered in high risk patients despite previous immunization.

PVT could help identify vaccine Non-responders who could benefit from a booster dose.

ACUTE HIV INFECTION MANIFESTING AS ERYTHEMA MULTIFORME

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LEARNING OBJECTIVE #1: Recognize erythema multiforme as a rare manifestation of acute HIV infection

LEARNING OBJECTIVE #2: Identify the most common clinical presentations of acute HIV infection **CASE:** An 18-year-old female presented with diffuse pruritic painful rash for 1 week. The rash started on her trunk spreading to her extremities. She endorsed fatigue, malaise and dry cough but denied other symptoms. She had a history of syphilis and genital herpes treated 4 years prior. She has had 3 male partners in her lifetime and denies IV drug use. All prior HIV screening tests were negative. On examination, she was well-appearing, with diffuse hyperpigmented maculopapular lesions on her thorax, with involvement of palms and soles, no mucosal or genital involvement. No lymphadenopathy was appreciated. Labs were significant for a reactive treponemal antibody but non-reactive RPR, positive CMV IgG, positive mycoplasma IgG with negative IgM, and a positive HIV 1/2 antibody and antigen screening with a positive confirmatory testing. Other infectious screenings were negative including gonorrhea/chlamydia, QuantiFERON TB, toxoplasma IgG antibodies, and hepatitis serologies. HIV quantitative PCR was 27,198 copies/ml and CD4 count was 275 cells/mm³. Skin biopsy demonstrated interface dermatitis with numerous apoptotic keratinocytes and areas of epidermal necrosis, consistent with erythema multiforme (EM). Immunohistochemical staining with a specific anti-Treponema pallidum polyclonal antibody was negative. HIV genotype did not reveal mutations. She was started on topical hydrocortisone 1% and anti-retroviral therapy with tenofovir, emtricitabine, and raltegravir. At 5-week follow-up, there were no new lesions and residual hyperpigmentation was noted. Repeat laboratory tests showed CD4 count of 477 cells/mm³ and HIV viral load was undetectable.

IMPACT/DISCUSSION: As many as 40-90% of patients with acute HIV are symptomatic, classically presenting with mononucleosis-like symptoms such as fever, fatigue, pharyngitis, myalgias, arthralgias, rash and lymphadenopathy. Although a maculopapular rash occurs in most acute HIV cases, the rash is usually nonpruritic and limited to the face and/or trunk. EM in HIV infection is extremely rare. We are aware of only four other cases described in the literature, and most presented with a full-body rash and constitutional symptoms such as fever, fatigue, malaise, headache or lymphadenopathy. In this report, we describe a pathology-confirmed case of EM occurring in a patient with acute HIV infection.

CONCLUSION: The present case highlights that EM may occur in the setting of acute HIV infection. It is important for clinicians to recognize the unique ways that HIV can present. Early diagnosis is key to successful treatment response, reducing transmission and preventing progression to acquired immunodeficiency syndrome (AIDS). In patients who present with EM and constitutional symptoms, HIV infection should be considered in the differential diagnosis.

ACUTE LIMB NECROSIS DUE TO ARTERIAL THROMBOSIS ASSOCIATED WITH COVID-19

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LEARNING OBJECTIVE #1: Recognize and monitor arterial and venous thrombosis in COVID-19

LEARNING OBJECTIVE #2: Emphasize the role of early prophylactic and therapeutic anticoagulation in high-risk COVID-19 patients

CASE: A 61-year-old woman with medical history of DM and DLD presented with a 4-day history of cough, fatigue and worsening SOB without fever. CXR showed ground glass opacities. The SARS- COV2 test was positive. Severe hypoxia led to emergent endotracheal intubation.

At admission, her blood work showed a WBC of 13.4(N83, L11), Hgb 11.5 and platelet 230. CRP was 26.5 and procalcitonin was 0.36. Coagulation profile showed normal PT and aPTT. Fibrinogen was elevated at 244. D-

dimer was 93853 and went upto >128000 the following day. RFT showed BUN of 30 and creatinine of 1.30. LFT were normal. TropT was 0.03 with a normal EKG. She was treated with antibiotics, HCQ and steroids. She was started on the enhanced VTE prophylaxis with Lovenox at 0.5 mg/kg BID. The Anti10a levels were therapeutic after the 3rd dose of Lovenox.

On day 6, she was extubated and shifted to the floor. She complained of left lower extremity pain. On day 10, she developed ischemic changes with toe discoloration. The Anti10a levels were therapeutic. She was started on Heparin drip for ischemia. TEG studies showed decreased R time of 3.3, decreased K time of 0.8, increased alpha angle at 81.5 and elevated max amplitude at 80.6. The levels suggested a hypercoagulable state. She was started on Aspirin based upon R time as per the COVID guidelines. LE Doppler was negative for DVT but showed severe arterial disease. CTA run off showed mural thrombus in the superficial femoral artery and necrosis of left calf musculature. The limb worsened with loss of pulse and development of bullous lesions. Vascular surgery was consulted. She underwent revascularization with thrombectomy and angioplasty. She was started on dual anti- platelet therapy.

On day 16, she developed severe PE and was shifted to the ICU.

IMPACT/DISCUSSION: The COVID-19 outbreak is an unprecedented global public health challenge. The disease has spread exponentially and is complicated by multiorgan failure, DIC and death. Patients with COVID-19 are in a hypercoagulable state, with endothelial injury due to inflammation, thereby posing a higher risk of thrombosis and embolism.

CONCLUSION: The case report emphasizes the role of early anticoagulation in high-risk patients with COVID-19. It highlights a case of COVID-19 patient complicated by acute arterial thrombosis with eventual necrosis. The elevated D-dimer is an indirect marker of inflammation. TEG studies are beneficial in deciding the therapy. Anti10a levels are used to assess heparin activity. Arterial and venous thrombosis can occur simultaneously and lead to poor prognosis. Hence, they should be considered and prudently managed in COVID-19 patients. The use of anticoagulant is associated with decreased mortality, particularly in septic patients. Heparin acts as an anticoagulant and as an anti- inflammatory agent by blocking thrombin formation.

ACUTE RENAL VEIN THROMBOSIS (RVT) SECONDARY TO SARS-COV-2

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LEARNING OBJECTIVE #1: COVID-19 induced thrombosis

LEARNING OBJECTIVE #2: Atypical presentation of RVT

CASE: A 45-year-old male with no significant medical history and on no medications presented to the Emergency Department with 2 day history of an acute onset of intermittent non-radiating diffuse abdominal pain and hematuria. 2 weeks prior, he tested positive for SARS-CoV-2 and was on self- quarantine at home. He denied fever, chest pain, dysuria, vomiting or diarrhea. He had no family history of malignancy or coagulopathy and denied use of alcohol, tobacco or illicit drugs.

The patient had normal vital signs and his physical examination was unremarkable with no abdominal or costovertebral angle tenderness. His coagulation panel was normal. He had mild leukocytosis of 12k/uL, serum creatinine of 1.3mg/dl (normal 0.5-1.3) and mild transaminitis. CT angiogram of his abdomen and pelvis demonstrated decreased enhancement of the right renal vein. A follow-up doppler ultrasound of the renal vein suggested a right RVT. Urinalysis revealed numerous red blood cells with mild bacteriuria, 30mg/dl protein and pyuria. A hypercoagulability workup was negative for prothrombin gene, factor V Leiden mutation and anti-cardiolipin IgM was low positive at 60.5MPL (<12.5). The cause of his abdominal pain and hematuria was secondary to RVT possibly due to hypercoagulability from his COVID-19 infection. He was treated with intravenous heparin; his hematuria resolved and was discharged to home on direct acting oral anticoagulant. Patient was advised further work up of additional hypercoagulability and repeating anti-cardiolipin antibodies in twelve weeks as an outpatient.

IMPACT/DISCUSSION: Acute RVT is often due to trauma, severe dehydration, hypercoagulability or nephrotic syndrome. Patients with SARS-CoV-2 infection are at significant risk of developing arterial and deep venous thrombosis which can develop in almost any location. Literature search has shown that coagulopathy in these patients is due to the inflammatory response to SARS-CoV-2. It might infect endothelial cells causing diffuse endothelial inflammation and microvascular damage resulting in widespread thrombosis. Antiphospholipid (aPL) antibodies were detected in 52% of patients with COVID-19 and are potentially pathogenic. Acute RVT presents as abdominal pain with hematuria. Diagnosis is by CT angiography or MR venography. Treatment of acute RVT without Acute Kidney Injury (AKI) is therapeutic anticoagulation unless contraindicated and those with AKI should undergo thrombolysis with or without thrombectomy. Duration of anticoagulation is usually six to twelve months.

CONCLUSION: This case reflects a rare presentation of an acute RVT in SARS-CoV-2 infection and a high degree of suspicion should be maintained to rule out RVT in these patients who develop abdominal pain and urinary symptoms. A close follow up is needed to see if aPL antibodies are transient or persistent in patients who recover from COVID-19 and their future risk of thromboembolism.

ACUTE SALIVARY GLANDITIS AS A MANIFESTATION OF COVID-19 INFECTION

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LEARNING OBJECTIVE #1: Recognize the clinical features of COVID-19
LEARNING OBJECTIVE #2: Manage acute sialadenitis with pharmacotherapy

CASE: A 93 year old female presents to the emergency department with two days of neck swelling. Patient is ambulatory at baseline, but developed generalized weakness and decreased oral intake over the past week. Family noticed acutely worsening anterior neck swelling and declining mental status. Patient denied shortness of breath. Past medical history was notable for hypertension and stroke. She had no significant family or social history. Medications include anti-hypertensives. On physical exam temperature found to be 38.5 degree Celsius, heart rate 129, respiratory rate 40, blood pressure 152/86, and pulse oximetry 85% on room air, requiring 15 liters of non-rebreather. Significant bilateral submandibular swelling noted with exquisite tenderness to palpation. Lungs were clear to auscultation without stridor. Labs were significant for a WBC of 16, sodium of 153, elevated biomarkers including CRP, ferritin, LDH, and d-dimer, and positive nasopharyngeal COVID PCR. CT neck showed markedly enlarged bilateral submandibular glands, findings representing acute sialadenitis with no organized fluid collections. CT chest showed diffuse and peripheral foci of ground glass and consolidative opacities consistent with COVID pneumonia. Vancomycin and piperacillin/tazobactam were initiated, transitioned to ampicillin/sulbactam, and eventually to ceftriaxone and metronidazole given concurrent urinary tract infection. Remdesivir and dexamethasone were administered to patient for COVID pneumonia treatment. Oxygen requirements steadily improved to room air.

IMPACT/DISCUSSION: Acute sialadenitis, inflammation of the salivary glands, is manifested as sudden enlargement of the affected gland. Etiologies include obstruction, infection, or autoimmune conditions such as Sjogren's and sarcoidosis. Obstructive causes arise from salivary gland stones or strictures. Infectious causes may be due to viruses such as mumps, Epstein-Barr virus, parainfluenza, and coronavirus, and bacteria such as *Staphylococcus aureus* and *Haemophilus influenzae*. Antibiotic regimens should be initiated with *S. aureus* and anaerobic coverage. As infection may spread to the deeper fascial spaces of the head and neck, empiric intravenous antibiotics are recommended. Surgical intervention is indicated if no clinical improvement in 48 hours after initiation of antibiotics. While COVID-19 is well known to cause severe respiratory distress, there are very few reported cases of the novel coronavirus causing acute sialadenitis. SARS-CoV-2 is known to accumulate in saliva and transmission of the virus occurs through hematogenous spread. This patient had concurrent bilateral submandibular gland sialadenitis and COVID-19, suggesting that acute sialadenitis may be an early clinical manifestation of COVID-19.

CONCLUSION: Acute sialadenitis may be an early clinical manifestation of COVID-19. Treatment involves pharmacotherapy and surgical intervention if indicated.

ADRENOCORTICAL CARCINOMA PRESENTING WITH MILD HYPOKALEMIA AND ELEVATED BLOOD PRESSURE

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LEARNING OBJECTIVE #1: Evaluate a patient with hypokalemia.

LEARNING OBJECTIVE #2: Recognize that steroid excess may mimic hyperaldosteronism.

CASE: A 51-year-old woman was referred to nephrology clinic to evaluate mild hypokalemia and increased blood pressure (BP).

The patient's serum potassium (K) had decreased over the past 2 years, from 4–5 to 2.6 mEq/L. Serum bicarbonate had increased from 24 to 30 mEq/L, and BP had increased from 100/60 to 136/80 mm Hg with new-onset headaches. Past medical history was significant for a 1.9x1.1 cm left adrenal incidentaloma, diagnosed 18 months before presentation, for which the patient did not follow up with additional imaging or testing. There was no history of vomiting, diarrhea, diuretic, or laxative use.

At the time of nephrology evaluation, laboratory data showed (normal values in parentheses): serum K 3.1 mEq/L (3.5–5.0), magnesium 2.2 mg/dL (1.8–2.3), bicarbonate 30 mEq/L (21–35), creatinine 0.76 mg/dL (<1.16), AM aldosterone <3 ng/dL (<39.2), and renin 6.3 pg/mL (3.1–57.1); and urine Na 109 mEq/L, K 40 mEq/L, and creatinine 80 mg/dL. She was referred to endocrinology, and additional testing showed AM cortisol 14.1 µg/dL (4.3–22.4), adrenocorticotropic hormone 7 pg/mL (≤46), and 17-hydroxyprogesterone 2067 ng/dL (32–272). Imaging revealed a 15x11x10 cm mass involving the left adrenal gland and kidney. The patient underwent adrenalectomy and nephrectomy, and pathology revealed adrenocortical carcinoma.

IMPACT/DISCUSSION: The evaluation of hypokalemia requires documenting any vomiting, diarrhea, and prescribed and over-the-counter medications. Laboratory evaluation includes serum K and bicarbonate as well as urine K and creatinine. Spot urine K >20–25 mEq/L or urine K:creatinine ratio >15 mmol/g suggests inappropriate renal K wasting. Metabolic acidosis with renal K conservation suggests gastrointestinal K loss. Metabolic acidosis with renal K wasting may occur with diabetic ketoacidosis or renal tubular acidosis. Metabolic alkalosis with low BP may be observed with vomiting or diuretic use, with variable urine K depending on test timing. Finally, metabolic alkalosis with high BP and renal K wasting suggests renovascular hypertension or mineralocorticoid excess.

Mineralocorticoid excess should be evaluated by measuring 8 AM serum aldosterone and renin or 24-hour urine aldosterone after 2 days of oral sodium loading. Primary aldosteronism is commonly caused by bilateral adrenal hyperplasia or adenoma, or more rarely by glucocorticoid-remediable aldosteronism. When serum aldosterone is normal or suppressed, subspecialty referral is appropriate for uncommon causes of mineralocorticoid excess, such as adrenocortical carcinoma.

CONCLUSION: Subtle changes in BP, K, and bicarbonate may suggest mineralocorticoid excess and mandate additional history and laboratory evaluation.

A FATAL CASE OF RAOULTELLA PLANTICOLA SPONTANEOUS BACTERIAL PERITONITIS

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LEARNING OBJECTIVE #1: Recognize a rare and potentially life-threatening emerging bacterial pathogen (*Raoultella planticola*).

LEARNING OBJECTIVE #2: Diagnose sepsis due to spontaneous bacterial peritonitis in a medically complex patient.

CASE: A 77-year-old man with a history of alcoholic cirrhosis, pulmonary arterial hypertension, heart failure, and end-stage renal disease presented from outpatient dialysis center for shortness of breath and clinical signs of fluid overload. He required supplemental oxygen in the setting of pitting edema to the level of the abdomen. His abdomen was more distended and tense than

usual, but not tender. He had been admitted one month earlier for anasarca and hemodialysis initiation, and found to have left ventricular ejection fraction of 15–20% on echocardiogram.

Initial work-up revealed a negative cardiac troponin, reassuring EKG, and a BNP of 5.5k. Initial CRP 78 and procalcitonin 1.16, but WBC 6.1. Chest x-ray did not show overt pulmonary edema. CT scan of the abdomen revealed cirrhotic liver with moderate ascites, cholelithiasis with layering air, severe right-sided heart enlargement, and anasarca.

The patient was admitted for urgent dialysis, but quickly began to deteriorate with altered mental status, worsening shortness of breath, and hypotension requiring vasopressors. Continuous renal replacement therapy was initiated at bedside as the patient was too unstable to move to the dialysis suite. Repeat labs the morning after admission showed CRP 148, procalcitonin 6.1, and WBC 21 with 20% bands. A diagnostic paracentesis showed grossly purulent ascites fluid (10k WBC, 77% PMN's), which would grow *Raoultella planticola* along with initial blood cultures. As the patient's clinical status continued to worsen, a family meeting was held and the decision to switch to comfort measures only was made. The patient passed a few hours after active treatment cessation.

IMPACT/DISCUSSION: This case presents a lethal sepsis involving an organism infrequently reported in literature: *Raoultella planticola*. There have only been a few dozen cases described in recent decades, and most involve urinary sources of infection. *Raoultella* has also been described as a GI tract colonizer, which is likely where this patient's infection originally translocated from.

Previously classified as a member of the *Klebsiella* genus, *Raoultella* is a gram-negative rod that often shares similar reservoirs and resistance patterns as the former. However, *R. planticola* deserves particular recognition by clinicians as it poses a real threat to immunocompromised patients, particularly those with hepatic and renal insufficiencies. Additionally, there are more recent reports of increasing resistance in *Raoultella* species, including extended spectrum beta-lactamase.

CONCLUSION: 1. *Raoultella planticola* is an emerging pathogen that poses particular risk to immunocompromised patients.
2. Even when initial concern for abdominal pathology is low, the presence of ascites necessitates a timely diagnostic paracentesis.

A GREAT PRETENDER: A CASE OF PERITONEAL TB MISTAKEN FOR MALIGNANCY

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LEARNING OBJECTIVE #1: To recognize the diagnostic challenge of abdominal TB due to lack of pathognomonic findings and sensitive testing modalities.

LEARNING OBJECTIVE #2: To identify the important role of peritoneal biopsy to avoid diagnostic delay and distinguish between abdominal TB and intra-abdominal carcinomatosis

CASE: A 34-year-old female with a history of anemia, low grade cervical dysplasia, and high risk HPV presented with two months of abdominal distension, fevers and anorexia. She denied respiratory symptoms, night sweats or significant weight loss. The patient immigrated from Mexico 15 years prior, and had briefly lived with her father and brother who were both treated for TB. Her aunt and grandmother died of uterine cancer. Her physical exam was remarkable only for a distended abdomen with diffuse tenderness to palpation. Abdominal CT and MRI revealed ascites with peritoneal thickening and a 3 cm adnexal cyst. Chest CT showed scattered centrilobular sub-centimeter nodules and axillary lymphadenopathy. Further workup yielded an elevated Ca-125, and serially negative sputum smears for acid fast bacillus (AFB). Sequential diagnostic paracenteses had an elevated lymphocyte count but negative cytology, gram stain and AFB stains. MTB-PCR of sputum sample was also negative. The patient was discharged, although returned with similar symptoms one month later. Ultimately, exploratory laparoscopy revealed diffuse

miliary peritoneal implants with biopsy positive for noncaseating granulomas and AFB. Rifampin, isoniazid, pyrazinamide and ethambutol were initiated for treatment of peritoneal TB.

IMPACT/DISCUSSION: We present a case of peritoneal TB that closely resembled malignancy.

Reaching the final diagnosis in this case was challenging because the peritoneal implants, ovarian cyst, and elevated tumor markers were most concerning for malignancy. Furthermore, delay in diagnosis occurred because all minimally invasive tests were inconclusive. Tuberculosis (TB) is the leading cause of death from a single infectious agent worldwide. Approximately 33% of active tuberculosis cases are extrapulmonary, however peritoneal TB remains rare (6.5% of cases). It poses a significant diagnostic challenge due to lack of pathognomonic findings and sensitive testing modalities. One study reviewing 27 cases of confirmed peritoneal TB found the sensitivity of ascites AFB staining to be as low as 0%; the sensitivity of bacterial culture ranged from 21–35%. Gene amplification techniques such as PCR assays for bacteria may be employed when AFB testing is negative, but while they show promise for ruling in extrapulmonary TB, there is marked variability in sensitivities across tissue samples.

CONCLUSION: A high index of suspicion for peritoneal TB must be maintained in female patients who present with ascites, even when mycobacteria are not identified in bodily fluid. A lower threshold for peritoneal biopsy is warranted in such cases for earlier diagnosis and life-saving medical management.

A HIDDEN GASTRO-VASCULAR ETIOLOGY OF ABDOMINAL PAIN; A CASE REPORT OF CAST SYNDROME

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LEARNING OBJECTIVE #1: 1. Physicians should be able to consider a diagnose of superior mesenteric artery syndrome in a patient presenting with recurrent abdominal pain.

LEARNING OBJECTIVE #2: 2. Physicians should be able to appropriately investigate a patient presenting with recurrent abdominal pain.

CASE: A 51-year-old female with a medical history of COPD, Hodgkin lymphoma status post radiation and chemotherapy, non-ischemic cardiomyopathy, and breast cancer, presented with complaints of recurrent abdominal pain and nausea/vomiting. The patient had ERCP, multiple upper endoscopies, and abdominal ultrasound over the course of the last 3 years for similar complaints but no definitive diagnosis was made, and symptoms were attributed to gastritis. On examination, the patient was cachectic looking with a BMI of 15 and had mild epigastric tenderness. An abdominal CT scan was done that showed severely dilated stomach and duodenum with an abrupt transition at the point where the duodenum passes between the superior mesenteric artery and aorta. This finding was consistent with SMA syndrome in this patient who has little to no intra-abdominal fat. The patient was admitted, and gastric decompression was done with a nasogastric tube. The gastroenterology, general surgery, and nutritionist were consulted, and the patient was started on total parenteral nutrition. The patient was thought to be a poor candidate for definitive surgery to treat SMA syndrome due to very poor nutritional status. After multidisciplinary team discussion, the decision was made to place a gastrostomy tube for decompression of the stomach and a jejunostomy tube for feeding to improve the patient's nutritional status. The patient was sent to a nursing home.

IMPACT/DISCUSSION: SMA syndrome poses a diagnostic dilemma and is usually a diagnosis of exclusion. Common etiology is a loss of retroperitoneal fat from rapid weight loss resulting in narrowing of the aortomesenteric angle to approximately 6–25° (normal angle 45°) and causes entrapment and compression of the third part of the duodenum. Other rare causes include a low origin of SMA and short ligament of Treitz. Patients usually present with recurrent abdominal pain, nausea, vomiting, and postprandial discomfort. The diagnosis is generally made by upper GI series and CT scan. Conservative treatment including nutritional support, stomach decompression is recommended initially that often results in restoration of angle. Failure of conservative measures

leads to surgical options and duodenojejunostomy is the definitive surgery to bypass the obstruction.

CONCLUSION: Cast Syndrome is a rare but potentially fatal condition and physicians should be cognizant of this dreadful gastro-vascular condition when evaluating a patient with recurrent abdominal symptoms

ALCOHOL INDUCED RIGHT VENTRICULAR OUTFLOW TRACT TACHYCARDIA

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LEARNING OBJECTIVE #1: Cardiac arrhythmia can be related to alcohol use in the presence and absence of underlying organic heart disease, and can be either ventricular or supraventricular.

LEARNING OBJECTIVE #2: In any case of arrhythmia in a chronic alcohol user, the potential role of alcohol should be considered. In all cases detoxification should be cornerstone of management.

CASE: A 53 year old Caucasian male with history of alcohol abuse, end stage renal disease (ESRD) and hypertension, several episodes of unexplained sinus tachycardia but no underlying cardiac disease, presented for an elective outpatient procedure. Prior to the procedure, he had a rapid response call for tachycardia with rate of 170 bpm, accompanied by dizziness and palpitations. On interviewing, he admitted to drinking a pint of vodka the night before presentation. Electrolytes were within normal limits. Electrocardiogram showed wide complex tachycardia with a picture of right ventricular outflow tract tachyarrhythmia. Patient was given intravenous amiodarone and metoprolol after which the rhythm converted rapidly to sinus rhythm. Echocardiogram showed no structural cardiac abnormalities.

IMPACT/DISCUSSION: Right ventricular outflow tract (RVOT) tachycardia is a form of monomorphic VT originating from the outflow tract of the right ventricle or occasionally from the tricuspid annulus. It is usually seen in patients without underlying structural heart disease, or in the context of arrhythmogenic right ventricular dysplasia (ARVD). RVOT may be precipitated in both patient groups by catecholamine excess, stress, and physical activity.

Chronic administration of alcohol increases the susceptibility to cardiac arrhythmias both in animals and humans, including atrial, ventricular arrhythmias and even sudden cardiac death. Epidemiologically, this is most prominent in middle-aged men and is only partly explained by confounding traits such as smoking and social class. This could be explained by subclinical heart muscle injury from chronic heavy alcohol use which may produce patchy delays in conduction, the hyper-adrenergic state of alcohol withdrawal, as well as electrolyte abnormalities, impaired vagal heart rate control, repolarization abnormalities with prolonged QT intervals and worsening of myocardial ischemia or sleep apnea.

CONCLUSION: RVOT is the most common idiopathic ventricular tachyarrhythmia. This case illustrates a type of benign tachyarrhythmia that coincides to happen with alcohol use, most likely because of impaired vagal heart rate control and excess catecholamine excess during intoxication and withdrawal. This may open the way to study more causative relationship.

A LESSER-KNOWN CAUSE OF A PAINFUL, SWOLLEN LIMB

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LEARNING OBJECTIVE #1: Recognize diabetic muscle infarction as a microvascular complication of diabetes.

LEARNING OBJECTIVE #2: Distinguish diabetic muscle infarction from other etiologies of a painful, swollen limb.

CASE: A 31-year-old man with T1DM complicated by diabetic neuropathy, retinopathy, and nephropathy presented with one week of right arm pain and swelling. He denied any history of trauma, insect bite, fever or other associated symptoms. Physical exam revealed marked tenderness and non-pitting edema of his right arm from his triceps muscle to his hand. Pulses and sensation were

normal. Skin was intact. Admission labs showed a normal white count, hba1c 9.4, and elevated inflammatory markers (CRP 4.5, ESR 54) and muscle enzymes (CK of 619, aldolase 12.5, and myoglobin 550). Imaging was negative for DVT.

He was prescribed antibiotics as empiric treatment for cellulitis and medication for pain control; yet his symptoms did not improve over the first 72 hours of care. MRI of the right arm was ordered and revealed extensive triceps muscle edema “most compatible with cellulitis and myositis.” He remained afebrile without leukocytosis, and initial blood cultures were without growth. Rheumatologic workup, including ANA, Ro, La, RNP, Jo-1, and Sm muscle, was negative. Muscle biopsy showed extensive myonecrosis consistent with diabetic muscle infarction. Antibiotics were stopped, and the patient improved with pain management. He was given a brief course of NSAIDs, in consultation with nephrology, and continued on his home aspirin. Ten days after discharge, he again presented with similar complaints in his right lower extremity.

IMPACT/DISCUSSION: Diabetic muscle infarction (DMI) is a lesser-known microvascular complication of diabetes. DMI presents as acute-onset limb pain and swelling. It can easily be mistaken for cellulitis or DVT, which may lead to unnecessary treatment regimens such as prolonged antibiotics.

DMI is reported mostly in patients with T1DM, and 97% of these patients have other microvascular complications (Kapur et al., 2004). In 99% of patients with DMI, the lower extremity is affected and the most common laboratory abnormality is elevated ESR (Kapur et al., 2004). Diagnosis is made by integrating clinical and MRI features, including muscle enlargement and edema of the muscle, subcutaneous, and interfascial tissue. Evidence supports non-surgical treatment with the use of antiplatelet and anti-inflammatory drugs, but no definitive treatment guidelines exist. Average recovery time is one to two months, and recurrence in the same or other sites is common. Amongst reported cases, the 2-year mortality rate was 10%, primarily from macrovascular complications (Kapur et al., 2004).

CONCLUSION: 1. DMI is an important but lesser-known cause of a painful, swollen limb in patients with Type 1 DM, especially if preexisting microvascular complications are present.

2. DMI can be distinguished from other causes of a painful, swollen limb by radiographic findings and the lack of leukocytosis or improvement with antibiotics.

ALL GROUND GLASS OPACITIES MAY NOT BE COVID-19

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LEARNING OBJECTIVE #1: Diagnose HIV in patients with nonspecific pulmonary complaints

LEARNING OBJECTIVE #2: Distinguish etiologies of ground glass opacities seen on CT

CASE: A 42-year-old female with asthma and type 2 diabetes presented with 6 days of shortness of breath. She received corticosteroids for an asthma flare. A SARS-CoV-2 PCR was negative. Two weeks later, she was admitted with worsening pulmonary symptoms. A CT scan revealed peripheral ground glass opacities in the upper lobes. The presumptive diagnosis was COVID-19, despite two additional negative tests. She required intubation and was transferred to our facility for VV ECMO. On arrival, HIV screening was done and it was reactive. Labs revealed a HIV viral load of 1,080,000 copies/mL and a CD4 count of 37 cells/mm³. Beta-D-glucan (BDG) was 500 pg/mL (nl<60). A bronchoalveolar lavage (BAL) revealed PCP-positive direct fluorescence antibody.

IMPACT/DISCUSSION: *Pneumocystis jirovecii* is a fungus that causes pneumonia in the immunocompromised host. Symptoms are nonspecific including fever, cough, and difficulty breathing. On CT scan, it classically presents as extensive ground glass attenuation with an upper lobe distribution. The diagnosis should be suspected in HIV patients with a CD4 count<200 cells/mm³, BDG>80, and characteristic symptoms or imaging. A definitive diagnosis often requires a BAL for microscopic evaluation. Due to its indolent symptom course and nonspecific imaging findings, PCP is notoriously difficult to diagnose.

COVID-19 is similar to PCP in both symptomatology and imaging. COVID-19 symptoms also include fever, cough, and difficulty breathing. The predominant CT findings are bilateral, peripheral ground glass opacities primarily involving the lower lobes.

Testing for HIV should be considered in patients with unexplained pulmonary symptoms, which are common among patients with HIV. Guidelines recommend 4th generation testing which detects the p24 antigen and HIV antibody. Anchoring is a type of cognitive bias where initial information about a subject is used to make subsequent judgments, while ignoring new information that supports another decision. Here, ground glass opacities served as the focal point around which COVID-19 was misdiagnosed, despite multiple negative tests. The availability heuristic, or the overestimation of the probability that an event occurs if it is easily recalled by memory, also made diagnosing HIV difficult. When a diagnosis is as ubiquitous as COVID-19, it is more easily recalled, making it seem more likely to be correct. During a pandemic, clinicians are vulnerable to decision-making errors, both because a particular diagnosis' availability is extreme, and cognitive fatigue leads to a reliance on unexamined pattern recognition. Clinicians' awareness of their vulnerability to biases protects them against diagnostic errors.

CONCLUSION: Test for HIV in patients with nonspecific pulmonary complaints. Broaden a differential diagnosis for ground glass opacities on CT. Analyze biases in clinical reasoning leading to diagnostic errors.

ALL IN THE FAMILY: A RARE ETIOLOGY FOR RECURRENT PANCREATITIS

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LEARNING OBJECTIVE #1: Consider hereditary causes of recurrent pancreatitis

LEARNING OBJECTIVE #2: Be familiar with management of obstructing pancreatic duct (PD) stones

CASE: A 32 year-old woman with a history of recurrent pancreatitis presented to the emergency department for subacute epigastric pain. Vital signs were stable. Physical exam revealed a soft abdomen with tenderness to palpation in the epigastrium. Labs were notable for WBC 37K and lipase >10k. Abdominal ultrasound showed no biliary stones or common bile duct dilation. CT abdomen demonstrated findings supportive of acute pancreatitis with chronic pancreatic duct (PD) dilation and a previously-identified PD stone. She received intravenous fluids, analgesics, and a low fat diet. The patient suffered her first episode of pancreatitis at age 2 and developed several PD stones thereafter that required numerous ERCPs for stone removal and eventually a pancreaticojejunostomy at age 8. She reported no alcohol use, history of biliary stones, elevated triglyceride levels, and took no culprit medications. Several of her family members had also suffered from recurrent pancreatitis. A plasma pancreatitis gene panel was positive for PRSS1, an autosomal dominant gene which has been associated with hereditary causes of pancreatitis. Extracorporeal shock wave lithotripsy (ESWL) was recommended for management of the PD stone, but because its effectiveness depends on fluoroscopic visualization of the stone, which was not visible on plain radiograph, ERCP with PD stent placement was pursued post-hospital discharge instead.

IMPACT/DISCUSSION: Autosomal dominant hereditary pancreatitis is a very rare and most often associated with mutations in the PRSS1 gene that encodes cationic trypsin, which may promote pancreatic autodigestion via trypsin dysregulation. Several other genes have been implicated in the pathogenesis of autosomal recessive hereditary pancreatitis. While patients with acute episodes of hereditary pancreatitis are managed similarly to episodes from other etiologies, approximately 1/3 of patients with hereditary pancreatitis develop pancreatic insufficiency or diabetes mellitus. These individuals also have a markedly elevated risk for pancreatic cancer, so screening with a pancreatic CT is recommended, although there is no consensus regarding the age at which this should begin. Finally, awareness of these hereditary conditions is important with regard to counseling patients on lifestyle modifications, future complications, and discussion with family members.

CONCLUSION: Consider genetic testing for hereditary pancreatitis in a patient with unexplained recurrent pancreatitis or a family history of similar episodes.

Counsel patients with hereditary pancreatitis on their risk for developing pancreatic insufficiency, diabetes mellitus, and pancreatic cancer.

If a pancreatic duct stone is identified on CT scan in patients with acute or recurrent pancreatitis, obtain a plain abdominal radiograph to gauge feasibility of ESWL for its treatment.

A MACROSCOPIC VIEW ON MICROSCOPIC COLITIS: A CASE OF DIARRHEA AND JOINT PAIN

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LEARNING OBJECTIVE #1: Review an approach to chronic diarrhea

LEARNING OBJECTIVE #2: Diagnose microscopic colitis in elderly patients with chronic diarrhea

CASE: A 69 year-old man with coronary artery disease and atrial fibrillation on dabigatran presented with one month of five to ten watery bowel movements per day, fifteen pounds of weight loss, and limited mobility and pain of the right shoulder and left knee. He denied history of similar symptoms, severe abdominal cramping, fevers, bloody stools, preceding illness, antibiotic use, new medications, travel, sick contacts, or chemical exposures. Physical examination demonstrated diffuse abdominal tenderness to deep palpation and pain with active and passive movement of the right shoulder and left ankle without active synovitis. C-reactive protein was elevated at 19.5. Comprehensive metabolic panel, complete blood count, and urinalysis were unremarkable. Stool studies revealed fecal leukocytes without identifiable pathogenic organisms or fat. Tissue transglutaminase antibody was negative. Right shoulder and left knee x-rays were normal. Synovial fluid aspirations were dry. Colonoscopy was grossly normal but biopsies revealed mixed collagenous and lymphocytic microscopic colitis. Prednisone improved symptoms within 48 hours. Patient was discharged on oral budesonide therapy with complete resolution of diarrhea and arthralgias at two week follow-up.

IMPACT/DISCUSSION: Chronic diarrhea is a common manifestation of gastrointestinal disease with a broad differential that varies depending on geographic and socioeconomic setting. The most common causes can be categorized into functional, infectious, inflammatory, malabsorptive, and secretory. Initial evaluation includes history (with attention to exposures, ingestions, and medications), physical examination, and laboratory testing, including stool studies and relevant serology. Fecal leukocytes suggest inflammatory etiology but have limited sensitivity and specificity. Colonoscopy with biopsy should be considered to evaluate for inflammatory bowel disease, malignancy, and microscopic colitis, particularly in older adults. Extraintestinal symptoms may serve as important diagnostic clues.

Microscopic colitis is an inflammatory disease of the colon that presents insidiously with chronic non- bloody diarrhea. Arthralgias are a relatively uncommon but known extraintestinal manifestation, most often oligoarticular and peripheral, occurring in 7% of patients. The degree of arthralgias may correlate with the severity of diarrheal illness and typically improves with treatment of the underlying condition. Definitive diagnosis is established with colonic biopsy. For mild cases, empiric treatment with antidiarrheals is reasonable. For severe cases, treatment with oral budesonide is appropriate.

CONCLUSION: Unique extraintestinal manifestations can aid in the diagnostic evaluation and management of chronic diarrhea. Microscopic colitis should be considered in older adults who may commonly be misdiagnosed as having irritable bowel syndrome.

AMAN ASSOCIATED WITH GROUP A STREPTOCOCCUS BACTEREMIA

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LEARNING OBJECTIVE #1: Recognize bacterial infection including group A streptococcus as a possible trigger for AMAN

LEARNING OBJECTIVE #2: Nerve conduction studies and EMG can assist in finding the etiology of acute muscle weakness

CASE: 70-year-old female with a PMH of hypothyroidism was brought to the hospital with altered mental status and bilateral upper and lower extremity weakness after being found by her husband confused, weak and incontinent to urine and stool. She was last seen normal on the morning of presentation. History obtained from the patient's husband showed that she had a fever, fatigue, and an episode of non-bloody emesis on the morning of presentation. Remainder of the ROS was unremarkable.

On admission, vital signs were stable except fever with Tmax 101.6 F. Initial neurological examination was significant for decreased motor strength 2/5 in the bilateral upper and lower extremities and absent ankle reflex bilaterally. She had no sensory deficits. Remainder of the physical examination was unremarkable. CT head and MRI brain ruled out stroke. Her labs were significant for WBC count 12,000/uL, lactic acid 3.9mmol/L, and creatine kinase 4985U/L. Blood culture was positive for group A streptococcus. A careful history, physical examination and imaging studies failed to identify the source of bacteremia.

She was treated with IV fluids for rhabdomyolysis and cefazolin for bacteremia with clearing of blood culture and improvement in mental status. However, upper and lower extremity weakness worsened and she subsequently developed dysarthria. A LP with CSF analysis showed WBC 3/mm³, protein 21mg/dL and glucose 64mg/dL. Meningitis/encephalitis panel with PCR testing, CSF Lyme studies, West Nile virus was negative. EMG was performed and was suggestive of acute motor axonal neuropathy, although Anti GM1, Anti GM1b, Anti GD1a, GD1b, and C. jejuni antibodies were negative. She was diagnosed with AMAN likely in the setting of group A streptococcus bacteremia and treated with a 5-day course of IVIG. There was a significant improvement of dysarthria and complete resolution of upper extremity weakness. Lower extremities had a slower recovery and she was discharged to a rehabilitation facility.

IMPACT/DISCUSSION: GBS is an autoimmune polyneuropathy, typically presenting with ascending symmetrical motor weakness and areflexia. About 75 % of patients with GBS have a history of preceding bacterial or viral infection. AMAN is the motor variant of GBS, that has no sensory involvement and occurs because of immune related injury to the axonal membrane. Albuminocytological dissociation on CSF analysis is characteristic finding of GBS, present in approximately 50-66% of patients, however, its absence does not rule out the diagnosis and EMG should be performed to characterize the pattern of peripheral nerve injury. IVIG or plasmapheresis is the treatment of choice and should be started as soon as possible after diagnosis.

CONCLUSION: To the best of our knowledge, this is the first case of reported AMAN with Group A Streptococcus infection.

A MASS-IVE DISCOVERY

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LEARNING OBJECTIVE #1: Diagnose non-pulmonary manifestations of tuberculosis as a cause of chronic cough

LEARNING OBJECTIVE #2: Recognize the limitations of Tele-Health visits

CASE: An 82-year-old female from Bangladesh with a past medical history of asthma, hypertension, end-stage renal disease, hyperthyroidism, remote history of rectal adenocarcinoma, and a lifelong non-smoker presented to clinic for a chief complaint of a lump in her neck.

The patient reported that 2 months prior she had "lost her voice," which spontaneously improved after a few days, but she remained with a hoarse voice. In the previous 2 weeks she had difficulty swallowing, low-grade fevers, and tachycardia. Review of systems was positive for a chronic cough for approximately 2 months. This was previously addressed via telemedicine due to COVID-19 and ascribed to her asthma, for which she was prescribed oral steroids with some improvement.

On exam the patient was ill appearing, in some discomfort, with no stridor. Neck exam was significant for a right sided 3x4cm tender mass

with a hard, central nodule. No JVD was noted, and there was no neck mass on the left.

Due to systemic symptoms, palpable mass, and possible airway compression, the patient was sent from clinic to the emergency department for emergent CT scan.

Initial CT scan showed a lobulated mass on the right base of the neck with internal necrosis and mild rim enhancement measuring 2.5x2.1x2.0cm with mass effect on the right common carotid and internal jugular vein and mediastinal adenopathy. IR biopsy was performed and thick purulent fluid aspirated. Subsequent AFB smear was positive for acid fast bacillus and DNA probe detected Mycobacterium tuberculosis complex.

IMPACT/DISCUSSION: For patients born in countries where TB is endemic it should always be included in the differential for chronic cough, as even those residing in the US for years, latent forms of TB can still be the cause of a chronic cough.

This patient presented with a chronic cough, weight loss, low grade fevers, and worsening dysphagia. While these symptoms are often associated with a mass effect due to a neoplastic growth, Tuberculous lymphadenitis is an important differential to consider in patients from countries with high TB prevalence when considering a new mass.

As Telemedicine becomes an increasing part of healthcare, recognition of the limitations of virtual visits is vital. As this case highlights, subtle and non-specific symptoms like chronic cough and a growing neck mass can be challenging to diagnose over a video call without a clinical exam. For patients seen virtually without a clear diagnosis, or lack of improvement with treatment, consideration for an in-person follow-up visit should be made when safe.

CONCLUSION: With patients from endemic areas, TB should always be included in the differential for chronic cough or other, unexplained, chronic symptoms. The limitations of Telemedicine on the physical exam are an important clinical consideration to make when evaluating if patients should be scheduled for an in-person visit.

AMYLOID GALLBLADDER AS AN INITIAL PRESENTATION OF MULTIPLE MYELOMA (MM): A RARE PRESENTATION.

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LEARNING OBJECTIVE #1: Correlation between localized amyloidosis and MM

LEARNING OBJECTIVE #2: Acalculous acute cholecystitis due to localized amyloidosis of gallbladder

CASE: A 92-year-old female patient with medical history significant for coronary artery disease, hypertension, atrial fibrillation, sick sinus syndrome, status post pacemaker placement, and severe aortic stenosis, who presented to emergency department for evaluation for right upper quadrant pain and jaundice. Patient had ongoing intermittent non-radiating right upper quadrant pain for last two months which worsened with eating and was associated with nausea, vomiting and decreased appetite. She also noticed jaundice and dark colored urine for the previous week prior to presentation. She was noted to have elevated transaminases, with significantly elevated alkaline phosphatase of 1179. CT abdomen & pelvis showed stone in distal common bile duct and mildly distended gall bladder with gallbladder wall thickening. She was evaluated by gastroenterologist who performed ERCP with incomplete common bile duct stone extraction. Due to residual stone, a stent was placed, and papillotomy was performed. Surgery team evaluated the patient and performed laparoscopic cholecystectomy. Pathology results of gallbladder was positive acalculous acute cholecystitis and congo red stain positive for amyloidosis. She was referred to outpatient oncologist for gallbladder amyloidosis workup. Her bone marrow biopsy showed hypercellular bone marrow with increased plasma cells and immunohistochemical stain positive for CD 138, suggestive of MM. She is currently being treated for MM.

IMPACT/DISCUSSION: Localized amyloid deposition can be isolated to a single organ, such as kidney, heart, nervous system, hepatosplenic, intestinal tract and can be present in bone marrow (40% of cases). Localization of amyloidosis confined to the gallbladder is extremely rare and appears to be

present equally in both primary and secondary forms. Gallbladder amyloidosis typically presents as either acute cholecystitis, chronic cholecystitis, acincteric cholestasis, jaundice, or incidental gall bladder finding as a part of investigation for chronic intermittent abdominal pain thought to be due to hepatobiliary origin.

Primary systemic amyloidosis (AL) and MM are clonal plasma cell proliferative disorders. Although 10- 15% of patients with myeloma have coexisting primary amyloidosis, it is unusual for patients with primary amyloidosis to progress to myeloma at a later date. Rarely, MM can develop in patients with primary amyloidosis. Hence early diagnosis and treatment is important.

We describe a case of rare gallbladder amyloidosis as an initial presentation of MM.

CONCLUSION: The rarity and variable spectrum of the disease often cause missed or delayed diagnosis. Further evaluation is important to identify and treat the etiology underlying amyloidosis. Gallbladder localization of amyloidosis is very unusual, however it is appropriate to think about this, especially in cases of acalculous acute cholecystitis and MM.

AN ANTEMORTEM DIAGNOSIS OF PULMONARY TUMOR THROMBOTIC MICROANGIOPATHY IN BREAST CANCER

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LEARNING OBJECTIVE #1: Diagnose pulmonary tumor thrombotic microangiopathy using imaging and laboratory testing

LEARNING OBJECTIVE #2: Effectively communicate a terminal diagnosis to patients to enhance shared-decision making

CASE: A 42 year-old female with invasive ductal carcinoma presented with a 2 week history of progressive dyspnea, epistaxis, and gum bleeding. Initial presentation and work-up was significant for hypoxia, severe thrombocytopenia, an unremarkable chest x-ray, and CTPA without pulmonary embolism, but with multifocal ground glass opacities (GGOs). She was treated with antibiotics for possible pneumonia, but her hypoxia worsened precipitously. Fungal, atypical bacterial, and viral studies only yielded MSSA, for which she was treated.

A transthoracic echo showed a newly elevated pulmonary artery pressure and signs of right heart strain. A V/Q scan showed multiple small peripheral perfusion defects. Rare enlarged platelets and schistocytes were seen on blood smear. An elevated reticulated platelet fraction suggested bone marrow compensation for thrombocytopenia.

This presentation with hypoxia, new pulmonary hypertension, GGOs, perfusion defects without pulmonary embolism, and consumptive thrombocytopenia in the context of breast cancer was consistent with pulmonary tumor thrombotic microangiopathy. She was treated with solumedrol, sildenafil, and supportive platelet transfusions. Despite these therapies, her condition worsened. Following a discussion of her poor prognosis, the patient was discharged home with hospice.

IMPACT/DISCUSSION: This case highlights a rare condition among hospitalized oncology patients. Pulmonary tumor thrombotic microangiopathy (PTTM) is characterized by embolization of tumor cells to the pulmonary vasculature leading to hypoxia, rapidly progressive pulmonary hypertension, right-sided heart failure, and microangiopathic hemolytic anemia. Unfortunately, antemortem diagnosis of PTTM is difficult, and most literature is described by findings on autopsy. Since general internists are often caring for these oncology patients upon hospitalization, awareness of the disease and high suspicion is needed to improve diagnosis.

Although the condition is almost exclusively fatal, therapies including high dose steroids, pulmonary hypertension medications, and imatinib have been described with variable success. Earlier diagnosis would allow for a larger pool of candidates for more robust trials that would, hopefully, lead to discovery of effective treatment.

In addition, this case emphasizes another benefit of early recognition of PTTM. Through effective communication of the natural history of her disease, the patient was empowered to pursue hospice care, and return home to spend precious time with her family.

CONCLUSION: 1. Pulmonary tumor thrombotic microangiopathy should be considered in the differential for solid tumor patients presenting with dyspnea 2. Improved diagnosis of PTTM may aid in the study of potential therapies and help patients make more informed decisions regarding their care

ANAPLASMOSIS PRESENTING AS DYSPNEA, MYALGIAS, ARTHRALGIAS, AND ELEVATED TRANSAMINASES IN THE SARS-COV-2 PANDEMIC

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LEARNING OBJECTIVE #1: Recognize the early signs, symptoms, and laboratory findings of Anaplasmosis.

LEARNING OBJECTIVE #2: Differentiate Anaplasmosis from other tickborne infections in the Northeastern US.

CASE: A 66-year-old man with HTN and T2DM presents to his PCP in Southeastern Pennsylvania with three days of fever, myalgias, night sweats, dyspnea, and cough. Physical exam and vital signs were normal. Abnormal labs included a CRP of 52.4 mg/L, WBC of 3.5K, platelets of 139K, ALP of 139 U/L, ALT of 290 U/L, and AST of 150 U/L. SARS-CoV-2 PCR and Lyme testing were negative. Chest radiograph showed trace bilateral pleural effusions without consolidation. He was treated supportively for symptoms attributed to viral syndrome and discharged home.

He presented to the ER two days later with continued nausea, chills, and fever. Studies showed worsening ALP, ALT, and AST. Serologies for Ehrlichiosis, EBV, and viral hepatitis were negative. Abdominal ultrasound showed hepatic steatosis with mild hepatomegaly. Ceruloplasmin and anti-smooth muscle antibodies were normal. Lab findings were attributed to hepatic steatosis and the patient was discharged.

Three days later, he again called his PCP with persistent symptoms including rash and arthralgias. Given the negative infectious workup, a rheumatologic process was considered. ANA was positive, but rheumatoid factor, anti-CCP, mitochondrial, SSA, SSB, Smith, and SCL-70 antibodies were negative. Blood cultures were negative. Anti-anaplasma antibodies were positive and the patient experienced a complete resolution of symptoms with two weeks of oral doxycycline.

IMPACT/DISCUSSION: Anaplasmosis is an uncommon tick-borne infection caused by the *Anaplasma phagocytophilum* bacterium. The Ixodes scapularis tick is the shared vector of the pathogens causing Anaplasmosis, Lyme disease and Babesiosis. Due to the shared vector, geographical distribution of the pathogens is similar. Presenting symptoms of anaplasmosis are similar to a viral syndrome: fever, chills, cough, malaise, headache, and myalgias. Gastrointestinal symptoms may predominate and differentiate this from Lyme and Babesiosis. Only rarely will Anaplasmosis present with a rash, which contrasts the classic erythema migrans of Lyme and the jaundice of Babesiosis. Common laboratory findings include leukopenia, thrombocytopenia, and elevated transaminases. Though confirmatory testing should be performed, delaying empiric doxycycline initiation for infection confirmation is not recommended. Clinical suspicion for tick-borne infection should be high during the spring and summer months, even if the patient does not recall a tick bite.

CONCLUSION: Tick-borne illnesses are generally non-specific and mimic infectious and inflammatory diseases, including Covid-19. These illnesses should be considered in endemic areas, regardless of whether the patient can recall a tick bite, and can be treated empirically

AN ATYPICAL PRESENTATION OF DISSEMINATED ZOSTER IN AN IMMUNOCOMPETENT PATIENT

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LEARNING OBJECTIVE #1: Recognize an atypical presentation of disseminated zoster

LEARNING OBJECTIVE #2: Recognize the potential association between disseminated zoster and an immunocompromised state

CASE: A 64-year-old male with a past medical history of acute lymphoblastic leukemia status post chemotherapy and allogenic hematopoietic stem cell transplant 5 years prior now in remission, who presented with complaints of diffuse abdominal pain. On exam, the patient was febrile and had a diffuse papular rash with an erythematous base present throughout the body and face. The patient was noted to have no signs of ophthalmic or other retinal pathology. Our patient eventually became hypoxic requiring supplemental oxygen. Laboratory work up was significant for white blood cell count of 5 K/uL, low absolute lymphocyte count (0.7 K/uL), and positive varicella zoster IgM antibody and varicella PCR. Due to increasing oxygen requirements, a CT chest angiography was pursued and revealed a small right pleural effusion with right-sided atelectasis. Unfortunately, the patient required intubation for hypoxic respiratory failure, that was suspected to be secondary to disseminated varicella zoster with a superimposed bacterial pneumonia. The hospital course was further complicated by pulmonary hemorrhage. Given that the patient was immunocompetent, a workup was initiated to determine any underlying condition that would have predisposed him to disseminated zoster. The initial autoimmune work up was relatively negative, along with HIV. Ultimately, our patient was treated with IV Acyclovir 10 mg/kg for 14 days with improvement in symptoms.

IMPACT/DISCUSSION: Herpes varicella virus becomes reactivated when immunity wanes. In immunocompetent patients, this usually manifests as typical herpes zoster. In this immunocompetent patient, a papular rash presented diffusely, crossing dermatomes, and ultimately diagnosed as disseminated zoster. Disseminated disease is more common in immunocompromised patients and can manifest as a diffuse rash, pneumonitis, encephalitis, and hepatitis. It is important to consider the diagnosis of disseminated zoster in any patient presenting with a suspicious rash, despite their immune status, for early recognition and appropriate therapy. The diagnosis will also allow for consideration of the potential complications. For example, patients with eye lesions should undergo ophthalmic evaluation for acute retinal necrosis and herpes zoster ophthalmicus. Additionally, these patients should also be evaluated for conditions that could be compromising the immune system, making them susceptible to disseminated disease.

CONCLUSION: It is important for clinicians to consider this atypical presentation of disseminated disease in an immunocompetent patient for early recognition of disseminated disease and providing the appropriate therapy, as there may be other complications. This case emphasizes the importance of evaluating the patient for an underlying immunocompromised condition.

AN ATYPICAL SOURCE FOR FUSOBACTERIUM NECROPHORUM BACTEREMIA AND PULMONARY SEPTIC THROMBOPHLEBITIS

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LEARNING OBJECTIVE #1: Recognizing tubo-ovarian abscess/PID as a possible source of *Fusobacterium necrophorum* bacteremia

LEARNING OBJECTIVE #2: Identify the association between *Fusobacterium necrophorum* and septic thrombophlebitis outside of Lemierre syndrome

CASE: A 43 year old female with a past history of menorrhagia, anemia, and obesity presented with 3 weeks of new shortness of breath, bilateral leg edema, orthopnea, and several months of lower abdominal pain. Initially, she was tachycardic and hypoxic. Exam showed 2+ pitting edema over lower extremities, b/l LQ abdominal tenderness, decreased breath sounds, and vaginal bleeding. Labs showed a Hb of 5.4, lactate 3.9, BNP 624, AST 65, and T. bili 3.2. Renal function, coagulation profile, troponin, and VBG were normal. CXR showed cardiomegaly and mild pulmonary edema. Echocardiogram showed severely enlarged and moderately reduced RV systolic dysfunction. CTA chest revealed bilateral pulmonary emboli with right heart strain. Lower extremity dopplers revealed a totally occluding left popliteal DVT. She was transfused 2 units pRBC's. IV heparin and Bumex were administered. She did not have full resolution of hypoxia during her stay. Given her anemia, local

fibrinolytic therapy was deferred. While inpatient she developed a fever and leukocytosis. Blood cultures grew *Fusobacterium necrophorum*. CT A/P revealed bilateral adnexal masses with surrounding edematous and inflammatory changes. Findings were most concerning for bilateral tubo-ovarian abscesses, less likely ovarian neoplasm. Ceftriaxone, Doxycycline, and Flagyl were started for treatment of PID and *F. necrophorum* bacteremia. Gonorrhea/chlamydia, HIV, hepatitis C, and ANA were negative. CTA head and neck ruled out internal jugular vein thromboses (Lemierre's) or intracerebral aneurysms. Due to high surgical risk, she did not undergo I+D of the b/l TOA's. She was discharged on anticoagulation and to continue antibiotics for 4 weeks, with close outpatient follow up to monitor for clinical improvement.

IMPACT/DISCUSSION: *F. necrophorum* typically causes pharyngitis. Often there is subsequent unilateral thrombophlebitis, or Lemierre's syndrome. Current theories regarding its pathogenesis include local invasion following common oropharyngeal infections and hematogenous spread. *F. necrophorum* less commonly causes GU infections, as in this case. There are reports of uterine necrosis and menorrhagia. The discovery of PID and bacteremia tied together her comorbidities into a culpable unifying process. The possibility of GU malignancy was, indeed, a confounder. However, after completion of antibiotic therapy, the ovarian masses decreased significantly in size on CT, favoring an infectious process.

CONCLUSION: Overall, this case serves as evidence that *F. necrophorum* can cause GU infections complicated by bacteremia and warrants suspicion of PID in the appropriate clinical setting. Furthermore, our patient's case proves *F. necrophorum* can cause septic thrombophlebitis in absence of oropharyngeal infection and Lemierre Syndrome.

ANCA-ASSOCIATED VASCULITIS IN A PATIENT WITH NEW MANTLE CELL LYMPHOMA

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LEARNING OBJECTIVE #1: Recognize paraneoplastic vasculitis as a possible cause of diffuse alveolar hemorrhage in a patient with new lymphoma diagnosis.

LEARNING OBJECTIVE #2: Diagnose with tissue biopsy in suspected ANCA-associated vasculitis (AAV), but biopsy can be deferred when ANCA titers are high.

CASE: A 66-year-old female presented to the emergency department with one day of hemoptysis. The patient had been admitted to an outside hospital three weeks prior for a complicated nosebleed, at which time a lymph node biopsy was performed and she was discharged home.

On this presentation, a CT of her chest was concerning for diffuse alveolar hemorrhage. Upon transfer to the floor, the pathology results from her prior lymph node biopsy were reviewed and were consistent with mantle cell lymphoma. The presence of recent epistaxis with concurrent AKI and pulmonary symptoms raised suspicion for vasculitis. As part of their initial workup, the rheumatology team recommended antineutrophil cytoplasmic antibodies (ANCA).

Her results were notable for positive ANCA and myeloperoxidase (MPO) IgG antibodies >8 (positive ≥ 1). As a result of her clinical presentation associated with p-ANCA positivity, she was diagnosed with paraneoplastic microscopic polyangiitis (MPA). A renal biopsy was considered, but the involved consultants confirmed that she had sufficient data from her rheumatologic serologies, therefore it was canceled. The patient had a good response to her immunosuppressive regimen, and her respiratory symptoms, including hemoptysis and shortness of breath, resolved.

IMPACT/DISCUSSION: The workup of vasculitis in the presence of malignancy should not differ from that of isolated vasculitis, pending the clinical stability of the involved patient. Second, renal biopsy is usually indicated for the definitive diagnosis of AAV but it can be deferred in the right clinical context after a multidisciplinary discussion, especially when ANCA titers are high.

Diagnostic work-up should begin as soon as vasculitis is suspected. In this case, though diffuse alveolar hemorrhage can rarely be attributed to rapidly progressing lymphoma or infection, the constellation of ENT, pulmonary and renal manifestations warranted vasculitis workup. Although the diagnosis of small vessel vasculitis often requires tissue biopsy, in many cases ANCA-positive serology with a high clinical index of suspicion is sufficient. In our patient, the MPO titer was >8 times the cutoff value for a positive diagnosis. A cutoff value of ≥ 4 has been proposed as sufficient for diagnosis regardless of biopsy status, and patients with an ANCA ≥ 8 times the cutoff value have high specificity for AAV.

CONCLUSION: Although our patient's vasculitis seemed paraneoplastic, whether or not it was a result of her lymphoma is unclear. It is possible that both pathologies occurred de novo simultaneously. Regardless, treatment and inpatient consultation of rheumatology, hematology/oncology, and nephrology services should not be delayed in patients with AAV with concurrent malignancy.

A NEAR MISDIAGNOSIS: A CASE OF SHIGA-TOXIN PRODUCING E. COLI DIARRHEA

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LEARNING OBJECTIVE #1: Distinguish between clinical features of infectious acute diarrhea and diarrhea due to inflammatory bowel disease

LEARNING OBJECTIVE #2: Recognize cognitive errors such as anchoring and premature closure in diagnostic decision-making

CASE: A previously healthy 22-year-old male with a family history of Crohn's disease presented with acute onset of lower abdominal pain and bloody diarrhea. He had seven episodes of loose stools with bright red blood but no mucus for two days. He denied any fevers, emesis, recent travel history, antibiotic use, or sick contacts. He had meals from local restaurants recently, but others who had consumed the same food had no symptoms. On admission, his vitals were notable for a temperature of 36.9°C, blood pressure of 159/92, and tachycardia of 110. Physical exam was significant for mild periumbilical tenderness to palpation without rebound of guarding. There were no rashes, petechiae, erythema nodosum, joint tenderness, oral ulcers, or mucosal bleeding. Labs were notable for WBC $15.7 \times 10^9/L$, lactate 2.5 mmol/L, CRP 3.47 mg/dL, ESR 10 mm/hr, Cr 0.8 mg/dL, CO₂ 23.5 mEq/L, and chloride 100mEq/L. CT A/P with contrast showed moderate colonic thickening from the cecum to the splenic flexure with inflammatory changes compatible with colitis. The plan was to proceed with colonoscopy to evaluate for inflammatory bowel disease (IBD); however, stool studies for GI pathogens returned positive for E. coli producing Shiga toxin 1 and his colonoscopy was no longer indicated. He received supportive care and was discharged home. His symptoms resolved one week later.

IMPACT/DISCUSSION: The medical team was initially biased by the patient's family history of Crohn's disease. Crohn's disease typically presents with chronic diarrhea without gross blood, right lower quadrant pain, and constitutional symptoms like fatigue or weight loss. Ulcerative colitis (UC) presents with chronic diarrhea that may be bloody and can be associated with colicky abdominal pain, urgency, tenesmus, or incontinence. Anemia, vitamin or mineral deficiencies, and extraintestinal manifestations can be seen with both forms of IBD. However, this patient's acute symptom onset, grossly bloody stools, lack of systemic symptoms or extraintestinal manifestations, and non-specific physical exam findings lacked the cardinal symptoms of IBD and were more consistent with an infectious etiology. This is an example of anchoring, relying too heavily on one piece of data, and of premature closure, assigning a diagnosis prior to collecting all the data. This patient may have undergone an unnecessary colonoscopy and evaluation for IBD if the diagnostic evaluation for infectious diarrhea had not been completed.

CONCLUSION: Cognitive biases have been associated with diagnostic inaccuracies and suboptimal clinical management. By recognizing these biases and maintaining a broad differential diagnosis, providers may be able to reduce

unnecessary testing; thereby, practicing high-value care and providing better patient care.

A NEAR MISS: SUBCLINICAL SADDLE PULMONARY EMBOLISM DIAGNOSED BY HANDHELD ULTRASOUND

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LEARNING OBJECTIVE #1: Diagnose pulmonary embolism using handheld ultrasound

LEARNING OBJECTIVE #2: Recognize the utility of routine point-of-care ultrasound in the inpatient setting

CASE: An 80 year old female with a history of diabetes and hypertension was admitted to the intensive care unit (ICU) with hypotension and lactic acidosis following a two-week history of progressive altered mental status and physical decline. Initial blood pressure was 89/56 with a normal heart rate and oxygen saturation. No fever or tachypnea was present. **Lactic acid was 3.6 mmol/L.** There was a leukocytosis of 14.7×10^3 cells/ μ L. **Troponin peaked at 1,104 pg/mL. Wells score was 0; age was the only of the PERC criteria met.** She was admitted for presumptive sepsis and treated with fluids and antibiotics. Following these interventions, her blood pressure improved and her lactic acidosis resolved. Per family, she had reached her pre-hospital baseline. After two nights in the ICU, she was transferred to the gerontology unit for further care.

On arrival to the gerontology unit, apical 4-chamber point-of-care ultrasound (POCUS) using a handheld ultrasound device (HUD) revealed a dilated right ventricle (RV) with akinesis of the mid-RV free wall with apical sparing, consistent with **McConnell's sign**. Diastolic septal flattening was also present in the short-axis view, consistent with **D-sign**. The inferior vena cava was 3.0 cm with minimal inspiratory variation. **D-dimer was 51,190 ng/mL.** CT angiography showed a **saddle pulmonary embolus (PE) involving both main pulmonary arteries**. The patient was initiated on a heparin infusion and later transitioned to oral apixaban without further complications for the remainder of her hospitalization.

IMPACT/DISCUSSION: This case illustrates the diagnostic potential of POCUS using a HUD in patients with low pretest probabilities of disease, especially in the context of undifferentiated shock or critical illness. Since echocardiographic assessment of RV strain patterns have high specificity and low sensitivity for PE, POCUS using HUDs can be successfully used as a "rule-in" test for patients with more ambiguous presentations.

POCUS is already standard of care in most emergency departments and critical care settings. However, it is only sparingly used among non-critically ill patients in hospital wards traditionally managed by internists. With the advent of HUDs, this technology is becoming increasingly more affordable and accessible for providers. While HUDs have less spatial and temporal resolution and lack some of the more advanced features of standard echocardiography, studies have shown that HUDs have more diagnostic accuracy than physical exam alone and produce results that correlate well with standard echocardiography.

CONCLUSION: Overall, POCUS is inexpensive, carries a low risk of harm and serves as an invaluable extension of the physical exam. With the advent of HUDs, this technology adds to the diagnostic repertoire of the general internist and should be routinely used in the inpatient setting.

ANOTHER THING TO BLAME ON COVID-19: SIADH AS A MANIFESTATION OF ACUTE COVID-19 INFECTION

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LEARNING OBJECTIVE #1: Recognize that hyponatremia is a common finding in acute COVID-19 infection

LEARNING OBJECTIVE #2: Assess hyponatremia in acute COVID-19 infection and diagnose SIADH

CASE: An 81-year-old woman with a past medical history of hypertension, CAD s/p CABG, atrial fibrillation, AAA repair, diverticulitis, cholecystectomy, and untreated right inguinal hernia is admitted to the hospital after having one day of nausea, NBNB vomiting, and decreased oral intake. This was associated with mild diffuse abdominal pain and lower back pain. Review of systems was negative for fevers/chills, CP, SOB, cough, changes in bowel habits, recent travel, and sick contacts.

On admission, the patient was afebrile, hypertensive to 172/76, with normal oxygen saturation on room air. Physical examination was notable for moist mucous membranes, an irregularly irregular heart rhythm and a small right inguinal hernia. Laboratory studies revealed sodium 122 (mmol/L), serum osmolality 264 (mosm/kg), urine osmolality 428, and urine sodium 157. She tested positive for COVID-19 on nasopharyngeal PCR testing.

The patient was diagnosed with syndrome of inappropriate anti-diuretic hormone (SIADH) and was treated successfully with fluid restriction. Her serum sodium rose steadily over the next few days into the normal range, with subsequent improvement in her nausea, vomiting, and oral intake. **IMPACT/DISCUSSION:** Hyponatremia (defined as a sodium level <135 mmol/l) can be a common condition that requires careful diagnosis and management. The first step in diagnosis is ensuring it is a true hypotonic hyponatremia by excluding causes of isotonic or hypertonic hyponatremia. Hypotonic hyponatremia is next often categorized by the volume status of the patient, which then directs management of the electrolyte disturbance.

Already in the literature, it is becoming increasingly clear that hyponatremia is one of the most common electrolyte disturbances in those with acute COVID-19 infection, seen in roughly one-third of those hospitalized with the condition. However, the mechanism by which COVID-19 infection causes hyponatremia is not yet fully understood. There have been a few cases in the literature describing a possible relationship between acute COVID-19 infection and SIADH. It has been hypothesized in previous reports that this disturbance can be caused by elevation of inflammatory cytokines (particularly IL-6) leading to non-osmotic release of ADH, or by stimulation of the hypothalamo-hypophyseal axis secondary to physiological and physical stresses caused by the infection.

CONCLUSION: In this case, we present a patient with mild acute COVID-19 infection who had one day of vomiting associated with a euvolemic exam, found to have symptomatic hypotonic hyponatremia and labs consistent with SIADH, treated successfully with fluid restriction. This may add to the literature that COVID-19 is an important cause of SIADH.

A NOT-SO-SUBTLE BITE: RECOGNITION AND DIAGNOSIS OF WEST NILE VIRUS

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LEARNING OBJECTIVE #1: Recognize symptoms and signs suggestive of West Nile Virus (WNV)

LEARNING OBJECTIVE #2: Diagnose WNV based on clinical manifestations and laboratory studies

CASE: A 57-year-old physician presented to her primary care doctor in September with fever beginning 1 week prior while in WI. Days later she developed a macular, erythematous, non-pruritic rash on her arms, legs, hands, and feet as well as headache, neck discomfort and loose stools. She had no vision change, weakness, numbness or gait disturbance. She recalled mosquito bites.

Past medical history included antiphospholipid syndrome and thyroid carcinoma. Her medications were hydroxychloroquine, aspirin, clopidogrel and levothyroxine. She was allergic to oxycodone. Family history was significant for colorectal and breast cancer. She did not use tobacco, alcohol or drugs. Review of systems was unremarkable.

On exam, she appeared unwell. Vitals 126/81-90-16-102.9. Fundi revealed sharp, flat discs. There was frontal discomfort with neck flexion. Full exam was otherwise normal. She was referred to the ED.

CBC and CMP were normal except Na 134. COVID-19 PCR was negative. CT head with contrast was normal. CSF revealed 39 wbcs (60% lymphocytes),

474 rbcs, elevated protein, and normal glucose. She was admitted and treated supportively. Symptoms resolved 2 days later and she was discharged. CSF WNV IgM and IgG subsequently returned positive.

IMPACT/DISCUSSION: While the majority of patients with WNV are asymptomatic, affected patients may develop West Nile fever or neuroinvasive disease.

West Nile fever presents with fever, headache, myalgias, anorexia, and a nonpruritic, maculopapular rash of the trunk and extremities beginning at defervescence. Patients can have vomiting and diarrhea. Symptoms typically last days to weeks, with subsequent full recovery.

Neuroinvasive disease occurs in less than 1% of infected patients and consists of meningitis, flaccid paralysis or encephalitis +/- movement disorder. Possible persistent symptoms include fatigue, headache, cognitive impairment, dysequilibrium and weakness. The etiology of these long-term symptoms is more difficult to discern when WNV is not diagnosed acutely.

Diagnosis is most readily made by detecting IgM antibodies. IgM antibodies in CSF are diagnostic for WNV neuroinvasive disease, as IgM does not cross the blood brain barrier. WNV IgM antibodies persist for months following initial infection; thus, diagnosis of active infection requires both the presence of antibodies and an acute febrile illness. CSF studies generally show lymphocytic pleocytosis, elevated protein, and normal glucose. Head CT is typically normal.

CONCLUSION: WNV infection should be suspected in patients with fever, headache and rash during mosquito season.

Infection with WNV can have long term consequences for a patient's functional status, making definitive diagnosis a valuable contribution to the patient's care.

For patients who present with symptoms and signs suggestive of WNV neuroinvasive disease, a positive CSF IgM antibody is diagnostic.

AN UNEXPECTED AND DANGEROUS CARDIAC COMPLICATION OF COVID-19

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LEARNING OBJECTIVE #1: Recognize COVID-19 as an important cause of cardiovascular complications

LEARNING OBJECTIVE #2: Assess pericarditis in a patient who underwent pericardiocentesis

CASE: A 55-year-old man with a PMH of HTN, obesity, and gout was admitted in 6/2020 due to severe COVID pneumonia complicated by respiratory failure requiring prolonged intubation and a sacral pressure ulcer. He improved and was transferred to a rehab unit on 10/5. On 10/8, patient began complaining of nausea and vomiting. He was afebrile but tachycardic with exam notable for abdominal distension and tenderness. He was re-admitted to the hospital. Labs revealed new leukocytosis (WBC 16.02x10³ cells/microL), stable anemia, normal chemistries and mildly elevated transaminases (AST 81 units/L, ALT 66 units/L). Inflammatory markers increased again. EKG showed sinus tachycardia and low voltage. CT abdomen/pelvis remarked "Moderate to large pericardial effusion...mass effect on the heart chambers." Echocardiogram confirmed the pericardial effusion with signs of tamponade. Pericardiocentesis yielded 750mL of fluid. Pericardial fluid gram stain showed few polymorphonuclear leukocytes and negative culture. Fluid cytology showed acute inflammation with no malignant cells. Fluid adenosine deaminase was 4.8 units/L. Viral respiratory panel, repeat COVID swab, ANA and rheumatoid factor were all negative. Cardiac MRI showed constrictive pericarditis without late gadolinium enhancement of the myocardium. Patient was treated with colchicine and ibuprofen, and he clinically improved with no recurrence of the effusion.

IMPACT/DISCUSSION: COVID-19 infection has important cardiovascular manifestations, possibly because the virus binds to the membrane bound ACE2 receptor, which is expressed on myocardial and endothelial cells as well as the alveoli. Elevated troponin in COVID-19 is thought to occur mostly from non-ischemic causes, and it is significantly higher in those with severe COVID-19. Early COVID cohorts showed troponinemia in up to 17% of hospitalized patients. Myocarditis has been reported in COVID, but pericarditis appears

rare. In general, pericarditis is mostly due to idiopathic or viral causes. In 8/2020, 14 cases of COVID myopericarditis were reviewed with 42% having pericardial effusions and 20% showing cardiac tamponade physiology. In that review, however, the cases which included MRI did not report constrictive pericarditis, as was seen in our patient. Further, the cases report cardiac symptoms an average of 1-2 weeks after COVID diagnosis. We believe our case to be unique in that cardiac pathology occurred 3 months after our patient's COVID-19 infection.

CONCLUSION: Cardiovascular manifestations of COVID-19 are a spectrum and can occur many weeks after infection

Constrictive pericarditis may be seen in COVID-19

AN UNEXPECTED PRESENTATION OF IGA VASCULITIS IN A 70 YEAR OLD FEMALE

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LEARNING OBJECTIVE #1: Recognize the difference between purpuric rash and cellulitis.

LEARNING OBJECTIVE #2: Diagnose vasculitis with an atypical presentation.

CASE: Our patient is a 70 year old female with hypertension, obstructive sleep apnea, colon adenocarcinoma in remission status post hemicolectomy, and venous insufficiency with varicose veins. She presented to our ED with complaints of right ankle pain and a fever of 100.6°F.

She had a ~5cm diameter, tender, erythematous ulcer with central necrosis and skin sloughing above the right medial malleolus with surrounding warmth. There was a palpable, non-blanching, non-tender purpuric rash on her left leg. The left leg rash appeared more recently and the patient reports it was spreading proximally. She was admitted to the medicine service with suspected cellulitis and vancomycin was started. There was no significant change in symptoms by day 2. On day 3, the patient's renal function and purpura worsened, and her ulcer was not improved. Vancomycin was discontinued. Urinalysis revealed active sediment with numerous erythrocytes, leukocytes, and several granular and hyaline casts. There was significant proteinuria, at ~1g/day. Rheumatologic labs were ordered. A kidney biopsy was performed. She was given 1mg/kg of IV methylprednisolone on hospital day 4 which was increased to 500mg for 3 additional doses. Kidney function improved and her rash began to resolve. Labs revealed an elevated ANA titer of 1:160 in a homogenous pattern. MPO antibodies and ANCA were negative. Kidney pathology revealed focal endocapillary proliferative glomerulonephritis consistent with IgA nephropathy. She was transitioned to oral dexamethasone taper on hospital day 6 and discharged in stable condition. She continued to improve with near resolution of purpura by 14 days post discharge.

IMPACT/DISCUSSION: IgA vasculitis is traditionally taught as a childhood disease with incidence in adults of 0.1 to 1.8 per 100,000, compared to 3 to 26 per 100,000 children. Purpura is usually seen symmetrically in both lower extremities rather than unilaterally. Most studies on treatment for IgA vasculitis were conducted in a pediatric population and there is controversy in the literature as to whether steroids modify the disease course. It is suggested that end-organ damage and life-threatening sequelae occur more often in adults than in children and there are cases in which adults improved with the addition of corticosteroids with dosing extrapolated from pediatric cases. Vancomycin is known to trigger IgA vasculitis but it may also exacerbate or accelerate the course of existing IgA vasculitis: leading to spread of the purpuric rash and decline in renal function.

CONCLUSION: IgA vasculitis can present subtly in adults and be much more severe than in children.

Corticosteroids may be a safe and effective way to facilitate resolution of cutaneous and renal IgA vasculitis symptoms in adults.

Vancomycin may accelerate the course of existing IgA vasculitis.

AN UNUSUAL CASE OF BILATERAL AXILLARY LYMPHADENOPATHY WITH CONSTITUTIONAL SYMPTOMS

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LEARNING OBJECTIVE #1: Recognize unusual diagnoses in the differential diagnosis for lymphadenopathy

LEARNING OBJECTIVE #2: Treat Kikuchi-Fujimoto disease (KFD)

CASE: A 22F of African and Southeast Asian ethnicity presented with four weeks of painful bilateral lymphadenopathy, fever, chills, drenching night sweats, and an unintentional 16-lb weight loss. She had exposure to a pet hamster.

On presentation, she was tachycardic and febrile to 39.3°C. Exam demonstrated a 5cm x 5cm soft, non-mobile, tender lymph node in the left axilla and a 3cm x 3cm soft, non-mobile, tender lymph node in the right axilla. No hepatosplenomegaly was appreciated. CBC showed 144,000 platelets/uL, hemoglobin of 11.7 g/dL, and leukopenia with nadir of 2.3 cells/uL. LDH was elevated to 737 U/L, CRP to 3.5 mg/L, ESR to 73 mm/hr, and ferritin was >1500 ng/mL.

Infectious workup, including QuantiFERON TB Gold, HIV, CMV, EBV, COVID and Bartonella henselae were negative. CT chest, abdomen, and pelvis with contrast demonstrated conglomerate axillary subpectoral adenopathy, left greater than right, with heterogeneous enhancement and adjacent fat stranding. Excisional biopsy of a right axillary lymph node was performed due to concerns for malignancy. Acid-fast staining was negative. Final pathology results noted histiocytic necrotizing lymphadenitis consistent with Kikuchi-Fujimoto disease (KFD).

She was initially treated with a course of 30mg prednisone and rheumatology follow-up. Due to persistent symptoms this dose was increased, and hydroxychloroquine was added.

IMPACT/DISCUSSION: KFD is a rare cause of lymphadenopathy, most commonly occurring in young females of Asian ancestry. It usually presents with unilateral cervical lymphadenopathy with constitutional symptoms; this case represents an atypical bilateral axillary presentation. Examination of an adequate lymph node biopsy remains critical for diagnosis. Both infectious and autoimmune causes have been hypothesized as an etiology.

Differential diagnosis with KFD includes Lymphoma, SLE, EBV, Bartonella, TB, non-TB mycobacteria and toxoplasmosis. It is difficult to distinguish KFD and SLE because of an association between KFD and later SLE development. Variable autoantibody expression in KFD further complicates diagnosis.

Treatment is generally supportive with self-resolution. Although steroids and hydroxychloroquine are treatment options along with close monitoring for development of SLE. Recurrence has been reported.

This vignette highlights the uncertainty of the diagnostic process when evaluating a patient with KFD, particularly because we believed our patient had malignant lymphoma. KFD should be added to the internist's repertoire of differential diagnoses for lymphadenopathy as a mimic of serious conditions.

CONCLUSION: 1. Be aware that KFD is on the differential for lymphadenopathy

2. Kikuchi disease is an often-self-limited condition but can be treated with steroids or hydroxychloroquine.

AN UNUSUAL CASE OF STREPTOCOCCUS PNEUMONIAE SPINAL INFECTION

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LEARNING OBJECTIVE #1: Recognize epidural abscess as a possible cause of back pain refractory to pain medication.

LEARNING OBJECTIVE #2: Include unusual organisms as possible causes of epidural abscesses in patients with no obvious risk factors.

CASE: The patient is a 51-year-old woman with a history of hypertension who presented with lower back pain for a month before hospital admission. She had no medical history of trauma, type 2 diabetes mellitus (DM), IV drug use, or immunodeficiency. Initially, she presented to the ED of another facility where she was diagnosed with degenerative disc disease. She was discharged with a non-steroidal anti-inflammatory drug (NSAID) and a follow-up with an orthopedic surgeon. The orthopedic surgeon incidentally discovered uterine fibroids on an MRI and referred her to OB/GYN. The OB/GYN repeated a CBC and MRI prior to surgical intervention which showed leukocytosis and a right iliopsoas abscess. She was told to visit the nearest ED.

Upon admission, the patient was afebrile and tachycardic with leukocytosis and lower extremity weakness on physical exam. She was started on empiric vancomycin and piperacillin/tazobactam (Zosyn). A repeat MRI showed a right psoas muscle epidural abscess with severe spinal canal stenosis. Labs showed elevated erythrocyte sedimentation rate (ESR) at 114 mm/hr, C-reactive protein (CRP) >8 mg/dL, negative serology for syphilis and human immunodeficiency virus (HIV). The psoas abscess was drained and neurosurgery performed a laminotomy. Cultures from both procedures grew *Streptococcus pneumoniae* susceptible to ceftriaxone.

Initial labs showed a protein gap of 7.2 not previously noted. The patient was scheduled for a follow-up appointment with hematology/oncology after discharge. She was also evaluated for hypogammaglobulinemia given the invasive pneumococcal infection. However, her immunoglobulins were normal. On discharge, the patient was able to stand and walk on her own. She was afebrile with no leukocytosis and no complications with her surgical management. She was discharged with a peripherally inserted central catheter (PICC) line in place for an 8-week course of IV Ceftriaxone.

IMPACT/DISCUSSION: *S. pneumoniae* rarely causes spinal and paraspinal infections. Current literature shows that *S. pneumoniae* spinal infection rates were highest for age groups of 3 months–15 years and 50–79. Localized vertebral pain was a hallmark clinical manifestation. Other notable symptoms included spinal epidural abscess, vertebral osteomyelitis, and neurological symptoms. An extensive workup from several specialties and imaging did not detect the infection. However, due to appropriate diagnosis and treatment, the patient drastically improved.

CONCLUSION: Going forward, clinicians should include in their differential unusual organisms as a cause of epidural abscess and, subsequently, lower back pain. We hope that outcomes in similar patients are improved as a result of earlier and more accurate diagnosis and treatment.

A PATIENT-CENTERED APPROACH TO LIFESTYLE MANAGEMENT OF HYPERTENSION

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LEARNING OBJECTIVE #1: Teach a patient how to change eating patterns to reduce blood pressure

LEARNING OBJECTIVE #2: Use a concise model of patient counseling to help patients set goals to change

Adopt a coach mindset, knowing that anyone who is ready, confident, and supported can make changes to their lifestyle

CASE: Mr. and Mrs. PJ are 75 and 72 y/o husband and wife with multiple cardiovascular risk factors being treated for hypertension. The primary care provider counseled the patients about specific dietary changes they could make to improve blood pressure. They agreed to reduce salty snacking (chips and salsa) as well as processed store-bought bread consumption. They also increased their intake of fruit and vegetables, especially from their garden. After nearly six months, Mr. PJ's BP dropped a few points and then remained stable around 110/70, but on half the dose of losartan as before. He had lost about 10 lb. Mrs. PJ's blood pressure was down from 130/80 on two medications, to 112/68 on only a low dose diuretic. Her weight had also dropped from 179 to 170 lb at home and she had started to exercise. She reported increased energy and sense of well-

being. In both cases there was a need to reduce blood pressure medications to maintain adequate control and avoid adverse effects.

IMPACT/DISCUSSION: BP is influenced by lifestyle factors, with diet being a dominant factor in this and many other chronic illnesses. A highly processed diet is high in salt and low in various vitamins and mineral which influence the regulation of blood pressure. (See ***). Adopting a more whole-food plant-forward diet, as seen in the DASH and DASH + Sodium trial as well as the Premier Trial showed improved BP ctrl in patients who adopt these eating patterns. But how do we help them adopt those patterns? Through appropriate counseling using coaching and motivational interviewing principles. We must help patients recognize the threat of the current behavior, and the benefits of adopting healthier habits. We must help them set achievable goals and with frequent follow-up and support from us and friends and family, they can make lasting changes to improve their overall health, including their blood pressure.

CONCLUSION: Through proper counseling, coaching and support, patients can make lasting changes to their eating habits which result in a lower pill burden and improved control of chronic disease such as hypertension.

A PERPLEXING DIAGNOSIS OF MDA5 DERMATOMYOSITIS

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LEARNING OBJECTIVE #1: Distinguish typical from atypical clinical features of dermatomyositis.

LEARNING OBJECTIVE #2: Recognize and prognosticate the respiratory complications of dermatomyositis.

CASE: A 52 yo Hispanic male from Argentina with a history of hypertension and diabetes presented with three month history of rash and joint pain. The rash was of varying quality, began in the chest then asymmetrically involved the dorsal aspects of large joints. The migratory polyarthralgia symmetrically involved large and small joints. He had pronounced and evolving alopecia, hyperkeratotic hand changes, synovitis and exquisite tenderness of the metacarpophalangeal and distal interphalangeal joints, and scaling erythematous plaques on extensor surfaces, most notably the elbows and knees. He lacked the classic skin findings of dermatomyositis. He had difficulty swallowing liquids and solids, and was breathless to the point of fatigue. It became prudent to rule out an infectious or malignant process prior to pursuing further diagnostics for a rheumatologic process. Initial workup was notable for thrombocytopenia of 129 (ref range 150-450 10³/mcL), diminished neutrophil count of 2.22 (ref range 2.30-8.10 10³/mcL), transaminitis with AST 88 (ref range 5-34 U/L) and ALT 118 (ref range < 55U/L), elevated aldolase 15 (ref range < 8.1 U/L), and hyperferritinemia of 2,348 (ref range 15-275ng/mL). Initial antibody screening was negative for ANA, dsDNA, Sm/RNP, and SSA/SSB. ESR was elevated at 62 mm/h (reference range < 20mm/h) and CRP was normal at 5 mg/L (reference range < 5 mg/L). CK was normal at 172 U/L (reference range < 200 U/L). Broad infectious workup was negative. Bone marrow biopsy was normal. High resolution CT scan was unremarkable. Skin biopsy revealed an interfaced pattern with increased mucin, which is consistent with a connective tissue disease such as SLE or dermatomyositis. This, in conjunction with repeat myositis panel positive for anti-melanoma differentiation gene-5, confirmed a diagnosis of MDA5 dermatomyositis. He was started on high dose oral prednisone. IVIG and rituximab were initiated due to concern for progressive dysphagia and lung involvement. Pneumocystis jirovecii pneumonia prophylaxis was initiated. Calcium channel blockade with dihydropyridines was started for persistent severe fingertip pain thought to be due to ischemia.

IMPACT/DISCUSSION: The diagnosis of MDA5 is rare. Many of the features were consistent with some aspects of dermatomyositis, but the lack of musculoskeletal features such as overt proximal muscle weakness was misleading. Had he not persistently sought care, and had not been admitted to the hospital for expedited workup, the outcome could have been dire.

CONCLUSION: Dermatomyositis can present sine-myositis, without classic proximal muscle weakness. Pulmonary involvement in dermatomyositis can be severe. MDA5 dermatomyositis is ominous, associated with rapidly progressive interstitial lung disease and poor prognosis unless quickly recognized and aggressively treated.

A PUZZLING CASE OF PANCYTOPENIA: PERNICIOUS ANEMIA
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LEARNING OBJECTIVE #1: Identify pernicious anemia as a cause of pancytopenia and intramedullary hemolysis

LEARNING OBJECTIVE #2: Discuss the association between pernicious anemia and other autoimmune conditions

CASE: A 51-year-old woman with past medical history of vitiligo was brought to the hospital for confusion. On admission, she was oriented only to self. Labs were notable for hemoglobin 2.2, MCV 93, platelets 47, WBC 0.8, a change from a normal CBC done five months prior. She was admitted to the ICU and transfused 4 units of pRBC with good response. There were no overt signs of bleeding.

Hemolysis labs showed LDH >4000, haptoglobin <8, and reticulocyte 2.4. Peripheral blood smear revealed schistocytes, decreased RBCs, decreased platelets with normal morphology, and hyper-segmented neutrophils. Vitamin B12 was low at 66. Given her history of autoimmune disease, pernicious anemia was suspected, and parietal cell antibody and intrinsic factor blocking antibody were obtained and found to be positive.

After initiation of vitamin B12 1000 mcg IM daily, her mental status improved drastically. She provided additional history, including worsening vitiligo, persistent nausea and vomiting, 70 lb weight loss, memory problems, and paresthesias. With treatment, her blood counts and LDH improved.

She remained hospitalized through the initial seven days of treatment and was discharged with hematology follow-up for IM B12. In the following weeks, there was interval improvement in her neurological symptoms, including paresthesias and memory.

IMPACT/DISCUSSION: Studies show that prevalence of multiple autoimmune conditions in one patient, including pernicious anemia, vitiligo, and thyroid disease, ranges from 8.2%-23%.

Specifically, the prevalence of pernicious anemia in those with vitiligo is eight times higher than in the general public. In pernicious anemia, autoantibodies target intrinsic factor and/or gastric parietal cells, leading to vitamin B12 malabsorption. Symptoms include fatigue, cognitive decline, paresthesias, and gait problems. Moreover, because B12 is needed in hematopoiesis, deficiency leads to megaloblastoid changes in cell precursors and causes pancytopenia. Severe erythrocyte deformability results in intramedullary hemolysis with extremely elevated LDH and inappropriate reticulocyte response, as seen in this case. Hematologic abnormalities in pernicious anemia can mimic other pathologies; pancytopenia can mimic myelodysplastic syndrome, while hemolysis can mimic TTP. One way to differentiate pernicious anemia from TTP is through an extremely elevated LDH and reticulocytopenia. Narrowing to B12 deficiency by associating with other autoimmune conditions and pinpointing extreme lab values can prevent invasive tests, allow for inexpensive treatment, and achieve rapid improvement in neurocognitive deficits.

CONCLUSION: Severe vitamin B12 deficiency can present with vague symptoms that mimic other disorders. A careful interpretation of history and data can lead to the proper diagnosis and treatment while avoiding unnecessary testing.

A RARE CASE OF AEROCOCCUS URINAE ENDOCARDITIS AND DESMOID FIBROMATOSIS IN A YOUNG PATIENT

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LEARNING OBJECTIVE #1: Recognize potential risk factors for aerococcus urinae endocarditis.

LEARNING OBJECTIVE #2: Diagnose desmoid fibromatosis, a rare, locally-aggressive, connective tissue tumor.

CASE: We present a 34-year-old man with history of hypospadias repair who presented to an emergency department with cough, myalgias, and headaches. Workup was unremarkable other than chest x-ray with peripheral bilateral opacities. COVID19 testing was negative, he was discharged on azithromycin

for community acquired pneumonia. Two weeks later he returned to the ED with polyuria, polydipsia and fatigue. Labs were significant for WBC 32k, platelet count 34k, blood glucose of 734 with anion gap of 26. He was admitted to the intensive care unit for diabetic ketoacidosis. Later that evening he developed altered mental status, with CT head revealing intraparenchymal hemorrhage in the left temporoparietal region with associated midline shift.

The patient was transferred to a tertiary hospital for neurosurgical evaluation and underwent embolization of multiple mycotic aneurysms. Blood cultures grew aerococcus urinae and he was started on intravenous penicillin. Initial transthoracic echocardiograph (TTE) did not show valvular vegetations. He then began having severe abdominal pain with CT revealing marked dilation of ascending and transverse colon, terminating abruptly at the splenic flexure, concerning for mechanical obstruction. He underwent exploratory laparotomy with resection of ascending and transverse colon, splenectomy and ileostomy. Pathology report later revealed desmoid fibromatosis at the splenic flexure. The remainder of his hospital course was complicated by embolic right middle cerebral artery CVA, acute ischemic limb requiring emergent thrombectomy, mixed cardiogenic/septic shock and hypoxic respiratory failure. Repeat TTE revealed a 1.3 cm anterior mitral valve vegetation and he subsequently underwent mitral valve replacement. He later received tracheostomy and was eventually discharged to acute inpatient rehab.

IMPACT/DISCUSSION: This vignette describes a rare case of aerococcus urinae endocarditis and desmoid fibromatosis presenting in the same patient. There have been over 40 prior case reports of aerococcus urinae endocarditis, however none have shown simultaneous involvement of a desmoid tumor. Additionally, aerococcus urinae endocarditis typically presents in older men (average age 70), with urologic comorbidities. This younger patient had history of hypospadias repair with possible stricture formation that may have placed him at higher risk. Increased awareness of both of these rare diseases will hopefully lead to expedited diagnosis and treatment of future cases.

CONCLUSION: ■ Aerococcus urinae is a potentially virulent organism, that can cause endocarditis in patients with urologic comorbidities.

■ Desmoid fibromatosis is a generally benign connective tissue tumor, but can occasionally present with bowel obstruction.

A RARE CASE OF AN ACTH-PRODUCING PHEOCHROMOCYTOMA PRESENTING AS CUSHING'S SYNDROME

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LEARNING OBJECTIVE #1: Recognize the clinical features of severe Cushing's syndrome.

LEARNING OBJECTIVE #2: Manage the pre-op pheochromocytoma patient.

CASE: A 77-year-old woman with type 2 diabetes on metformin presented with worsening hyperglycemia despite increasing insulin doses and one month of lower extremity edema, a 10 lb weight loss, and progressive weakness. Her PCP ordered a CT Chest/Abdomen/Pelvis which identified a 1.1 cm spiculated right lower lobe lung mass, and a 3.8 cm left adrenal mass suspicious for malignancy. Shortly after, the patient developed acute onset confusion and disorientation and presented to the ED for expedited evaluation. On admission, the patient's vital signs were notable for mild hypertension (143/75). Her labs were significant for blood glucose 209, potassium 3.0, WBC 22.9, random cortisol >100, and ACTH 719 (normal 6-50). Urine studies identified marked elevations in catecholamines and metanephrines. The elevated cortisol was unresponsive to a dexamethasone suppression test. Head MRI was unremarkable, and PET-CT demonstrated enhancement in the lung and left adrenal lesions and right adrenal gland. The patient was admitted to the ICU and emergently started on IV etomidate with good response over the next 48 hours before transition to oral metyrapone and dexamethasone. She was started on prazosin for alpha blockade and metyrosine to inhibit catecholamine synthesis for surgical optimization. Repeat urine studies prior to surgery identified an expected >50% decrease in metanephrine/catecholamine levels. The patient underwent a laparoscopic left adrenalectomy with removal of a 7.5

x 4.0 x 3.0 cm left adrenal gland encompassing a spherical medullary neoplasm 3 cm in diameter. Immediately following her surgery, ACTH levels dropped to <5 and AM cortisol dropped to 1.1. Pathologic analysis of the tumor was consistent with a diagnosis of pheochromocytoma. The tumor cells showed patchy positivity for ACTH, confirming the source of ectopic production. The patient's mental status and lab abnormalities recovered well, and she was discharged to a rehab facility in stable condition on a hydrocortisone taper.

IMPACT/DISCUSSION: This case demonstrates a rare presentation of pheochromocytoma as severe Cushing's syndrome due to extra-pituitary ACTH production. Although the patient presented with significantly elevated metanephrines and catecholamines, she did not exhibit the classic intermittent episodes of headache, tachycardia/palpitations and diaphoresis, and similarly did not display any cushingoid features on exam. Despite the critically elevated cortisol and ACTH on admission, the patient achieved a successful outcome through prompt diagnosis and aggressive medical management prior to curative surgery.

CONCLUSION: Although very rare, a pheochromocytoma can be a source of ectopic ACTH production. Aggressive treatment with inhibition of catecholamine and cortisol synthesis alongside alpha blockade is essential for survival in these patients.

A RARE CASE OF CRYOGLOBULINEMIC VASCULITIS SECONDARY TO MIXED CONNECTIVE TISSUE DISEASE

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LEARNING OBJECTIVE #1: To be able to diagnose mixed connective tissue disease(MCTD) in a patient with cryoglobulinemic vasculitis

LEARNING OBJECTIVE #2: To be able to distinguish between MCTD and other autoimmune conditions in patients with cryoglobulinemic vasculitis by checking for anti-RNP antibodies and using the available diagnostic criteria.

CASE: We present a 56-year-old woman who came to the emergency room on account of increasing pain in her fingers with worsening digital ischemia. She also had symptoms of fatigue, weight loss, night sweats and multiple joint pains. Examination showed unremarkable vital signs but significant bilateral axillary lymphadenopathy and fingers that were cold and tender to touch with left ring finger ischemia. Rheumatology work-up showed positive ANA, elevated anti-SCL, anti-dsDNA, anti-Smith, and anti-RNP antibodies. She had low C3 and C4 complements and positive cryoglobulin. HIV screen, hepatitis B and C panel were negative. Lymph node biopsy showed reactive follicular hyperplasia with no definite morphologic or phenotypic evidence of lymphoma. She was diagnosed with cryoglobulinemic vasculitis secondary to mixed connective tissue disease. She was treated with calcium channel blocker for Raynaud's phenomenon, steroids, and rituximab for vasculitis

IMPACT/DISCUSSION: A lot is known about the association between cryoglobulinemic vasculitis and autoimmune diseases such as Systemic sclerosis, polymyositis, SLE, Sjogren's syndrome and Rheumatoid arthritis but there is paucity of data on its association with MCTD.

We found this unusual association in a middle-aged female whose primary complaint was disabling Raynaud's phenomenon, on further work up she met the diagnostic criteria for both MCTD and cryoglobulinemic vasculitis.

It is important to appropriately diagnose these patients to enable them receive the right treatment and also for prognostication.

We know that patients with MCTD may sometimes differentiate into other connective tissue diseases, we wonder if this is the reason for the lack of literature on MCTD/cryoglobulinemic vasculitis or this rare overlap is undiagnosed because anti-RNP antibodies which is the hallmark of MCTD is often not checked in patients suspected to have other autoimmune conditions

CONCLUSION: We present a rare case of cryoglobulinemic vasculitis secondary to MCTD that was responsive to steroid and also treated with Rituximab. To fully understand the prognostic implication of this uncommon association, there is a need for long term follow up of reported cases.

We encourage Internists to consider checking for anti-RNP antibodies in patients with cryoglobulinemic vasculitis who are investigated for connective tissue disease.

A RARE CASE OF LEMIERRE SYNDROME FOLLOWING BLUNT NECK TRAUMA

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LEARNING OBJECTIVE #1: Recognize the extent of widespread organ involvement in Lemierre Syndrome

LEARNING OBJECTIVE #2: Assess and Treat Lemierre Syndrome in a timely fashion.

CASE: A 63 years old male presented several days following blunt neck trauma after a motor vehicle accident. He complained of left-sided neck pain and swelling. His vitals revealed a heart rate of 133/min, a respiratory rate of 36/min, oxygen saturation of 89% on RA, and blood pressure of 117/66 mmHg. Labs showed a high WBC count of 28.4 k/ul, high Lactic acid, and an elevated procalcitonin. Blood cultures were drawn and the patient was started on Vancomycin and Piperacillin Tazobactam. MRI scan of the neck showed a left-sided neck abscess involving the paraspinous region and internal jugular thrombophlebitis. The patient became unresponsive and was intubated for airway protection. He underwent abscess drainage and neck exploration for source control and abscess fluid was sent for culture and sensitivity. Blood and Abscess cultures grew Methicillin-Resistant Staphylococcus Aureus (MRSA). MRSA seeded lungs and kidneys by hematogenous spread as evidenced by multiple cavitary ill-defined lesions on CT Chest and urine culture growing MRSA. The patient's neurological status after weaning of sedation showed quadriplegia, MRI of the spine demonstrated septic embolic infarction of spinal cord at C4/C5 level and osteomyelitis of spinous processes at the C3 and C4 vertebrae. Blood cultures cleared on vancomycin with a plan to continue antibiotics for 8 weeks.

IMPACT/DISCUSSION: Lemierre's syndrome is characterized by internal jugular vein thrombophlebitis due to Oropharyngeal and neck infections with resulting septic emboli. Most cases are due to gram-negative organisms, most commonly *Fusobacterium necrophorum*. Other causative organisms such as *Staphylococcus aureus*, *Streptococcus pyogenes* and *Haemophilus influenzae* can also be found. Lemierre's Syndrome, First described by famed French Physician and Bacteriologist Lemierre in 1936 in a case series of 20 patients, the syndrome has been termed the forgotten disease due to the advent of antibiotics. It affects about 1 in 1 million people. Lemierre's syndrome is characterized by an initial oropharyngeal or neck infection with spread to surrounding neck spaces resulting in thrombophlebitis of the Internal jugular vein (IJ). Our case is one of a few cases due to MRSA bacteremia leading to the seeding of the Lungs, Kidneys, Vertebrae, and Spinal cord. This is the second case in the literature associated with blunt neck trauma. The likely mechanism in our case was the transfer of bacteria from the oral cavity and surrounding tissue after trauma. Treatment is always with appropriate antibiotic therapy.

CONCLUSION: Physicians should be able to diagnose atypical presentation of Lemierre syndrome in a timely fashion. It can happen without oropharyngeal infection. Any of the body organs can be involved with the seeding of bacteria. The prompt source control and antibiotics administration are successful treatments.

A RARE CASE OF MULTIORGAN SARCOIDOSIS PRESUMABLY CAUSED OR TRIGGERED BY REMOTE SILICONE IMPLANTS.

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LEARNING OBJECTIVE #1: To recognize a multiorgan sarcoidosis.

LEARNING OBJECTIVE #2: To recognize all factors contributing to multiorgan sarcoidosis.

CASE: A 38-year-old transwoman with history of silicone injections to both hips, hypercalcemia, nephrolithiasis, and sarcoidosis presented for

preoperative exam prior to silicone removal from her hips. Patient had silicone oil injection to both hips in 1999 by untrained provider. After injections she developed persistent cutaneous granulomatous skin changes on her hips required multiple incisions and associated with unbearable pain controlled with opioids. As early as in 2011 she had findings suspicious for ILD and large pelvic, para-aortic, and inguinal lymphadenopathy on CT. Sarcoidosis was confirmed in 2015 after axillary lymph node biopsy. She initially was taking prednisone with variable compliance and then stopped. Preoperative evaluation revealed worsened interstitial lung changes, significant transaminitis: ALT91; AST132; AP 759, and persistent granulomatous skin changes on both hips. She was promptly referred to pulmonologist, gastroenterologist, and rheumatologist, cleared for silicone implants removal surgery and scheduled for transjugular liver biopsy, and PFT to be done after the surgery.

IMPACT/DISCUSSION: Sarcoidosis is a multisystem granulomatous disease of unknown etiology. It most frequently presents with bilateral hilar lymphadenopathy, pulmonary infiltration, cutaneous manifestations, or eye lesions. Subclinical involvement of other organ systems is not uncommon. However, the simultaneous development of clinically apparent multisystem sarcoidosis is rare. Silicone has been used for more than 5 decades in medical implants as an adjuvant material. Despite its considered safety, reports are emerging regarding the development of foreign body immune-mediated reactions, which can yield or trigger the onset of systemic granulomatous or autoimmune disorders. There are only a few available reports of sarcoidosis after implantation of silicone material. It has been assumed that the foreign body response to the silicone or a direct silicone action contributed to systemic activation of macrophages and Th cells can either serve as a stimulus in the progression of sarcoidosis or sarcoid develops as a result of the implants. The resolution of the illness after removal of the implants can support both hypotheses. Our patient, who sought help for her skin defects and severe hip pain, was found to have sarcoidosis with skin, lungs, peripheral lymphatic nodes, and liver involvement.

CONCLUSION: This case not only points out the possible rare etiology of sarcoidosis versus contributing factor to its progression but also brings to attention the importance of timely systematic evaluation and treatment of multiorgan sarcoidosis. As shown in literature, clinical condition dramatically improves following removal of silicone implants.

A RARE CASE OF MYELODYSPLASTIC/MYELOPROLIFERATIVE OVERLAP SYNDROME

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LEARNING OBJECTIVE #1: Recognize the clinical presentation of Myelodysplastic (MDS)/ myeloproliferative (MPN) overlap syndrome, a rare clonal myeloid neoplasm

LEARNING OBJECTIVE #2: Identify the laboratory abnormalities and molecular mutations which can aid in making this challenging diagnosis

CASE: 73-year-old female with COPD presented with 6-month history of progressive fatigue, dizziness, dyspnea, episodic palpitations and chest pain. Physical examination showed conjunctival pallor and palpable spleen. Laboratory studies revealed normocytic anemia with hemoglobin of 7.5 gm/dL, thrombocytosis of 495 thousand/uL, elevated reticulocyte of 2.6%, elevated LDH of 543U/L, normal haptoglobin of 142 mg/dl, iron level of 37 mcg/dl, transferrin level of 155mg/dl and elevated ferritin of 493.62 ng/ml. Peripheral smear showed marked anisopoikilocytosis with dimorphic RBCs, microcytes and tear drop RBCs, mild thrombocytosis, and normal WBC. CT abdomen/pelvis showed massive splenomegaly of 20.7 cm and mild T11 vertebral body compression deformity. SPEP showed normal albumin with reduced alpha-2, beta, and gamma chains with no evidence of monoclonal gammopathy. Serology showed low IgG of 519 mg/dL and IgM of 51 mg/dL. Bone marrow biopsy showed hypercellular marrow with erythroid hyperplasia and left shift, atypical megakaryocytic hyperplasia, left shifted myeloid lineage, and increased reticulin fibrosis (3+), consistent with MDS/MPN-U(Unclassified). Flow cytometry showed no immunophenotypic evidence of lymphoproliferative disorder. Fluorescence in-situ hybridization (FISH) was negative for gene rearrangements. Molecular studies detected JAK2 (V617F) and SF3B1

mutations, most consistent with MDS/MPN, JAK 2+. Presence of SF3B1 prompted consideration of MDS/MPN-RS; the presence of ringed sideroblasts could not be evaluated due to iron stained smear. Treatment options such as hypo-methylating agents, erythroid stimulating agents, or treatment with Ruxolitinib and allogenic stem cell transplantation were offered to the patient. **IMPACT/DISCUSSION:** MDS/MPN overlap syndrome has clinical, laboratory or morphologic features of myelodysplastic syndrome and proliferative features of myeloproliferative neoplasm. MDS involves presence of cytopenia, cellular dysplasia and <20 percent blasts forms suggestive of bone marrow hyperplasia. MPN are characterized by terminal myeloid cell expansion in peripheral blood. Our patient had splenomegaly, anemia seen in MDS along with thrombocytosis and JAK2 mutation seen in MPN. Recent developments in molecular studies play a significant role in diagnosis and development of targeted molecular therapy for these disorders. JAK2 is a non-receptor tyrosine kinase mutation, commonly seen in MDS/MPN patients. Mutations in KIT, FLT3, CSF3R, SETBP1 are other molecular derangements which may be detected.

CONCLUSION: Given the rare presentation and poor prognosis of MDN/MPN overlap syndrome, Identification of these signature mutations would enable tailored targeted therapy and potentially increased survival in the future.

A RARE CASE OF NECROTIZING PNEUMONIA AFTER INCIDENTAL LIGHTER'S FLUID INGESTION

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LEARNING OBJECTIVE #1: Physicians should be able to recognize hydrocarbon pneumonitis that progress into necrotizing pneumonia

LEARNING OBJECTIVE #2: Physician should be able to treat patients with hydrocarbon pneumonitis who failed medical treatment promptly to avoid devastating outcomes.

CASE: The patient is a 43-year-old caucasian female with a past medical history of major depressive disorder presents with increased shortness of breath, bilateral pleuritic chest pain and productive cough after accidentally swallowing lighter fluid from a water bottle. On admission, vitals were stable except for a temperature of 100.4 F. Physical exam showed diminished lung sounds bilaterally, epigastric and left-sided abdominal tenderness; other systems were normal. Lab revealed leukocytosis of 17K without other abnormalities. Initial chest x-ray showed small extraluminal gas adjacent to the right posterior trachea with a concern for perforation; however, esophagram and esophagogastroduodenoscopy were both normal. The patient was initially thought to have aspiration pneumonitis and treated with Unasyn; however, her symptoms worsened in 3 days, repeated CT chest showed moderate complex bilateral pleural effusion (Left >Right) with multiple fluid loculations concerned for possible necrotizing pneumonia. The antibiotics were broadened to vancomycin, cefepime, and metronidazole. In addition, a chest tube was placed on the left side and drained serosanguinous fluid for four days. Light's criteria revealed exudative pleural effusion and no organisms seen on pleural fluid culture. On repeated ultrasound, no loculation found. The patient completed a seven-day course of Vanc, Cefepime and Metronidazole prior to discharge, and symptoms resolved.

IMPACT/DISCUSSION: Liquid hydrocarbons are ubiquitously spotted in household items, including petroleum solvents, kerosene, gasoline, lighter fluids and waxes. One can be exposed in the form of inhalation, ingestion, or dermal exposure. Hydrocarbon was hypothesized to impaired the mucociliary clearance and inhibited the cough reflex which increased the risk for aspiration and superimposed bacterial infection, in its severe form, necrotizing pneumonia as in our case. In terms of treatment, empiric antibiotic is standard practice; however, its role can be limited in certain cases. It was hypothesized that hydrocarbons lead to the compromise of bronchial and pulmonary vascular supply which decreased the perfusion and bioavailability.

CONCLUSION: Even though only 1% of hydrocarbon pneumonitis developed into necrotizing pneumonia, physician should still be extremely vigilant of the disease progression, as the mortality of necrotizing pneumonia can be as high as 56% with a median survival time of only 10 days. In addition, aggressive treatment options such as chest tube placement, surgical

pneumonectomy should be initiated early for those with deteriorating stability and failing medical therapy to avoid devastating outcomes.

A RARE CASE OF NON-VALVULAR INFECTIVE ENDOCARDITIS WITH SEEDING OF DIALYSIS GRAFT.

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LEARNING OBJECTIVE #1: Recognize and diagnose right-sided nonvalvular infective endocarditis.

LEARNING OBJECTIVE #2: Treat Infective endocarditis with seeding of grafts and role of suppressive antibiotic therapy.

CASE: A 59 years old male with a history of End-stage renal disease on Haemodialysis through right HERO Graft, Complete heart block status post-dual-chamber pacemaker presented to the emergency department with a complaint of fever and shortness of breath. He had multiple failures of Dialysis AV Graft Fistula. On presentation, vitals revealed a heart rate of 100/min, a respiratory rate of 22/min, a Temperature of 100.9 F, oxygen saturation of 92% on RA, and blood pressure of 134/62 mmHg. Labs showed a WBC count of 24.1 k/ul with high Lactic acid and procalcitonin. Blood cultures were collected and Vancomycin and Piperacillin-Tazobactam were started. Blood cultures grew methicillin-resistant *Staphylococcus aureus*. Antibiotics were tailored down to vancomycin, while repeat cultures continue to grow MRSA. Transesophageal Echocardiogram showed large 3cm x 1.7cm vegetation on the atrial lead of pacemaker at the level of the right atrial appendage that was intimately associated with the tip of HERO Graft. Doppler Ultrasound of Graft showed peri graft fluid collections. For source control patients underwent removal of Pacemaker along with leads and angiovac suction thrombectomy with the removal of thrombus in order to avoid pulmonary embolization along with temporary pacemaker placement. HERO graft was left in place due to a history of failure of dialysis excess and patient decision. After source control, Blood cultures turned negative, and a permanent pacemaker was placed. Antibiotics were tailored to daptomycin and ceftaroline per sensitivity data for a planned total of 8 weeks followed by suppressive therapy with Trimethoprim/Sulfamethoxazole

IMPACT/DISCUSSION: Infective Endocarditis is more common in End-stage renal disease patients, with nonvalvular right-sided endocarditis being rare. Having a vascular access device or Transvenous pacing wires do increase the risk. Right-sided endocarditis makes up for only 5-10 percent of the total cases of endocarditis. Transvenous pacer leads associated endocarditis are very rare but serious with a reported incidence of 0.13 to 7 percent. HERO graft when compared to a Tunneled dialysis catheter that has a significantly lower rate of a catheter-related infection (0.7 events/1000 days). The presence of HERO graft with Pacer wires increased the risk of infection in our patients. Our case is the first of its kind in which both HERO graft and pacer wires were involved simultaneously and removal of vegetation removal with angiovac was done.

CONCLUSION: Infective Endocarditis can seed any body organ in an infected patient along with all foreign objects in the body. The treatment is with the removal of infected hardware and appropriate antibiotics for 6-8 weeks. If any hardware can not be removed then lifelong suppressive therapy will be needed.

A RARE CASE OF STAPHYLOCOCCUS. AUREUS SEPTIC ARTHRITIS OF THE COSTOTRANSVERSE AND COSTOVERTEBRAL JOINT

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LEARNING OBJECTIVE #1: Diagnose septic arthritis of the costotransverse (CT) and costovertebral (CV) joints after excluding vertebral osteomyelitis.

LEARNING OBJECTIVE #2: Recognize the importance of discussing the MRI findings with radiologists.

CASE: A 40-year-old man with a history of panic disorder presented to the emergency room with a fever and lower back pain for one week. He visited a dentist only for routine oral checkups without tooth extraction and injection three weeks ago. His medications include only olanzapine and alprazolam. On the physical examination, his vital signs were normal. He had percussion tenderness on the left side of the paravertebral region at the Th10-12 level without tenderness on the spinous processes. Laboratory studies showed an increased white blood cell count of 9,500/ μ l with 79% neutrophils, C-reactive protein (CRP) of 14.7 g/dl, erythrocyte sedimentation rate (ESR) of 47 mm/h, and mildly elevated liver enzyme (AST 125 U/L, ALT 206 U/L). A computed tomography (CT) demonstrated a soft tissue density on the left side of the 11th vertebra suggestive of an abscess. The magnetic resonance imaging (MRI) revealed the same place hyperintensity in T2, DWI, STIR in the same area, and hypointensity in T1 suggesting the inflammation of the left 11th CT and CV joints. Though we couldn't perform the puncture of the area due to the risk of the injury of the spinal nerve and vessel, his blood culture was positive for methicillin-sensitive *Staphylococcus aureus* (MSSA). Therefore, the septic arthritis of the left 11th CT and CV joints were diagnosed. He was treated with cefazolin 6g/day IV for four weeks followed by oral sulfamethoxazole-trimethoprim for two weeks. We determined the duration of the treatment based on the previous case report of septic arthritis of the CV joint since no other reports were available. His symptom had resolved and his CRP and ESR had returned to normal.

IMPACT/DISCUSSION: Septic arthritis of the CT and CV joints are very rare and challenging to diagnose due to the small size of the lesions. Differential diagnoses include vertebral osteomyelitis and septic arthritis of the facet joint, which is much more common than the septic arthritis of the CT and CV joints. We should obtain the MRI in patients with fever, lower back pain, and increased inflammation marker. If radiologists were focusing only on excluding vertebral osteomyelitis, those diagnoses could be missed. Also, we need to discuss with radiologists about possibilities of those septic arthritides of small joints even when the initial report was normal if clinical suspicion is high.

CONCLUSION: Septic arthritis might occur in the CT and CV joints. This diagnosis might be considered in patients with fever, lower back pain, and elevated inflammatory markers in the absence of vertebral osteomyelitis or facet joint arthritis. Through discussion with the MRI findings with radiologists might lead to the diagnosis.

A RARE CASE OF VERY LONG NMO-IGG-NEGATIVE LONGITUDINALLY EXTENSIVE TRANSVERSE MYELITIS IN A FEMALE

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LEARNING OBJECTIVE #1: Recognize NMO-IgG-negative longitudinally extensive transverse myelitis (LETM) as a rare type of neuromyelitis optica spectrum disorders (NMOSD)

LEARNING OBJECTIVE #2: Identify plasmapheresis as an effective second-line treatment option for LETM in cases refractory to steroid therapy

CASE: A 54-year-old woman presented to the ED with a 3-day history of fever, low back pain, bilateral lower extremity weakness and urinary retention. Examination was remarkable only for absent deep tendon reflexes and decreased sensation to light touch in bilateral lower extremities. Initial laboratory workup was normal, except for lactic acidosis. MRI of the thoracic spine showed diffuse intramedullary T2 hyperintensity and mild fusiform cord expansion extending from T4 to T12, which was suggestive of longitudinally extensive transverse myelitis (LETM). Lumbar puncture was performed; CSF showed pleocytosis but was otherwise negative for infectious processes. Additional labs/imaging ruled out HIV, syphilis, SLE, tuberculosis, Sjogren's syndrome, hepatitis, Lyme disease, West Nile encephalitis, and sarcoidosis. IgG autoantibodies to aquaporin-4 (AQP4) were negative. Preliminary

diagnosis of LETM was made and, on day 3, the patient was started on IV methylprednisolone 1g daily. After 5 days on high-dose steroids with no improvement in symptoms, plasmapheresis was initiated on day 7, with gradual improvement in her neurological function. After completing 5 sessions of plasmapheresis on alternate days, her strength had improved remarkably. She was discharged on day 16 to an acute rehabilitation facility with neurology follow-up.

IMPACT/DISCUSSION: Neuromyelitis optica spectrum disorders (NMOSD) are CNS disorders with severe autoimmune demyelination of the optic nerves and spinal cord, characterized by the presence of certain neurologic symptoms, AQP4 (NMO-IgG) antibodies, and MRI findings. Presence of NMO-IgG antibodies has >90% specificity for NMOSD. A hyperintense spinal cord lesion involving ≥ 3 vertebral levels on sagittal T2 weighted spinal MR imaging is pathognomonic for LETM, a rare subtype of NMOSD. Testing for NMO-IgG antibodies in suspected LETM has diagnostic and prognostic implications, as NMO-IgG-positivity portends more severe disease, >60% risk of optic neuritis and relapse within 12 months. Seronegative LETM has only seldom been reported in the literature, usually with a young male predilection. Our case highlights seronegative LETM involving >6 contiguous vertebral levels in a middle-aged female. High-dose IV steroid therapy for 3-5 days is the first-line treatment for LETM, with most patients experiencing at least partial recovery. Our patient fulfilled criteria that have been shown to predict good outcomes with plasmapheresis – minimal disability at onset, preserved reflexes, and short disease duration – so, we initiated plasmapheresis early.

CONCLUSION: It is important to consider NMO-IgG-negative LETM in a middle-aged woman presenting with fever and neurological deficits and start appropriate treatment early.

A RARE ITCH: DILTIAZEM INDUCED EXFOLIATIVE DERMATITIS

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LEARNING OBJECTIVE #1: Recognize the potentially severe, life threatening skin reactions to common medications such as diltiazem.

LEARNING OBJECTIVE #2: Diagnose drug-related exfoliative dermatitis and rule out other possible etiologies of diffuse rash for appropriate management.

CASE: A 73-year-old male presented to our facility with complaints of an oozing rash. He reported the rash to be pruritic in nature which initially started on the lower extremities and progressively spread to involve the entire body. He denied any associated fevers, chills, myalgias, arthralgias, recent travel and tick bites. He denied the use of any new soaps, lotions or detergents. His past medical history was significant for ischemic cardiomyopathy and atrial fibrillation for which he was recently started on diltiazem 3 days prior to his presentation. On evaluation, his vital signs were within normal limits. Physical examination revealed a diffuse exfoliating rash with mucosal sparing, and ruptured bullae were noted on his lower extremities. Laboratory investigations including work up for infectious, vasculitis and autoimmune disorders were negative. Subsequently, he underwent a skin biopsy which was consistent with drug induced inflammatory changes. However, all things considered a diagnosis of diltiazem induced Exfoliative Dermatitis (ED)/Stevens-Johnson Syndrome (SJS)-like condition was established. The medication was immediately discontinued and therapy with intravenous steroids and antihistamines was initiated. The rash gradually improved and the patient was discharged on an alternate class of antiarrhythmic medication.

IMPACT/DISCUSSION: Drug induced exfoliative dermatitis (ED) are a group of rare and severe drug hypersensitivity reactions involving skin which usually manifest days-weeks after drug initiation. SJS is one of the main clinical presentations of ED. Calcium Channel Blockers (CCB) can be associated with a wide spectrum of cutaneous reactions ranging from simple exanthems to severe life-threatening reactions such as ED/SJS which has been reported with all three agents- nifedipine, verapamil, and diltiazem. These reactions are uncommon and mostly seen within the first two weeks of drug initiation. The diagnosis is challenging and can be made using a combination of history, clinical features and epicutaneous skin tests. Our patient presented

with ED/SJS like appearance without any mucosal involvement. Drug discontinuation and symptomatic therapy with steroids and antihistamine often leads to complete resolution. Cross reactions among CCB is a possibility however there is limited literature on it.

CONCLUSION: CCB are commonly used cardiac medications which can rarely cause a wide range of cutaneous reactions. Physicians should be cognizant of this rare reaction for early recognition and discontinuation of the offending agent

A RARE SIDE EFFECT OF METHIMAZOLE

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LEARNING OBJECTIVE #1: Diagnose serum sickness.

LEARNING OBJECTIVE #2: Recognize the pathophysiology and clinical presentation of serum sickness.

CASE: A 50-year-old woman with recently diagnosed hyperthyroidism presented with migrating polyarthralgias and fever for several days. She also noted a rash on her chest that resolved with hydrocortisone cream 1 week prior. She denied sexual activity, sick contacts, recent travel, or known tick bites. Her only medication was Methimazole started 1 month prior for hyperthyroidism. On admission, her temperature was 102 degrees Fahrenheit. She had right wrist swelling and pain several joints. Labs showed mildly elevated ESR, CRP of 19.9, no leukocytosis and negative cultures. During hospitalization, the patient's right wrist swelling resolved, but left wrist swelling developed. She also developed an urticarial rash. Further lab work showed normal complement levels. Additional autoimmune and infectious workup was negative, and there was a growing concern for a serum sickness reaction due to the timing of her symptoms. Methimazole was stopped. Two weeks after discharge, her ESR and CRP normalized and her arthralgias had resolved.

IMPACT/DISCUSSION: Serum sickness is a rare but known side effect of several different medications, one of which is Methimazole. Other common drugs that cause serum sickness include antibiotics (cephalosporins/penicillins), antivenoms, and monoclonal antibodies (rituximab/infliximab). The most common features are rash, fever, and polyarthralgias. These symptoms often begin 1-3 weeks after exposure to the medication responsible and improve after discontinuation since this clinical syndrome is a type III/immune complex mediated hypersensitivity reaction. The mechanism is mostly mediated by IgG, but complex formation can also be with IgM or IgE. The immune complex formation activates the complement system, inflammation, and leads to the delayed clinical symptoms. Although normally the immune complexes would be cleared by the mononuclear phagocyte system, excess complexes may deposit in tissues or joints. In fact, arthralgias occur in approximately 2/3 of patients. The diagnosis is usually a clinical one after exclusion of other potential etiologies. Complement levels may be depressed during severe episodes, however levels may be normal in mild cases and are not required for diagnosis. Risk factors for serum sickness include female sex and autoimmune conditions. There have been limited reported cases of Methimazole induced serum sickness. In one case, a teenager had joint pain and swelling of his ankles and knees after starting Methimazole 3 weeks prior for hyperthyroidism that resolved upon stopping Methimazole. Another case reports a female with multinodular goiter who was treated with Methimazole for thyrotoxicosis and 3 weeks later developed sore throat, pruritus, arthralgias and fever.

CONCLUSION: Immune complex deposition is the mechanism of serum sickness. Medication induced serum sickness should always be considered as a cause of polyarticular joint pain.

A SHIFTING TARGET: CUTANEOUS MANIFESTATIONS OF LYME DISEASE

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LEARNING OBJECTIVE #1: Recognize the importance of a detailed history for the early diagnosis of Lyme disease

LEARNING OBJECTIVE #2: Recognize the clinical signs of early Lyme disease, including the evolution and variety of cutaneous lesions

CASE: A 64-year-old male with diabetes mellitus presented with a 4 cm erythematous lesion on his right thigh. Temp of 103, muscle aches, and nausea. The prior week he was at a park in north central Missouri where he thought he may have been bitten by an insect, but was unsure. CMP and CBC were unremarkable. For presumed cellulitis, he was given trimethoprim/sulfamethoxazole and mupirocin ointment.

One week later he returned with increased fever, malaise, myalgias, as well as onset of shoulder and neck pain. He reported multiple new non-pruritic red ovoid plaques on his trunk. The thigh lesion had expanded to 14 cm and had a new 3 cm central ulcer. He was admitted for further workup and started on vancomycin. Labs were notable for WBC of 11 and elevated LFTs (alk phos 171, AST 55, ALT 122).

The following day the right thigh lesion was noted to have central clearing. Upon further questioning, he reported hiking in Wisconsin 3 weeks prior. Testing for Lyme disease was sent, and the patient was started on doxycycline treatment. Lyme serology was positive.

IMPACT/DISCUSSION: Lyme disease, caused by species in the spirochete family Borrelia, is the most common vector borne disease in the US, occurring most frequently in the upper Midwest, Northeast, and mid-Atlantic regions. A thorough travel history is key to rapid diagnosis. A cutaneous lesion is the presenting manifestation in approximately 80% of Lyme patients. Fever, malaise, myalgias, nausea, stiff neck, and arthralgias are often present.

Erythema migrans is classically associated with Lyme disease, but it is important to realize that early cutaneous lesions are often homogenous in color or have central erythema. Targetoid appearance is seen in only 19% of US patients, with central clearing more likely to develop as the lesion enlarges. Although rare, ulcerations or vesicles may appear at the center of the primary lesion. While primary lesions occur at the inoculation site, roughly 20% of cases progress to have multiple cutaneous lesions throughout the body suggestive of hematogenous spread from the initial site of infection. Early recognition and treatment of Lyme is critical. Antibiotic treatment during the acute stage can prevent widespread dissemination and subsequent sequelae including neurologic and cardiac complications.

CONCLUSION: While a bullseye lesion is stereotypic of Lyme, it is seen in a minority of early cases.

Early Lyme cutaneous lesions are often homogenous in color or are centrally erythematous and can be confused with cellulitis, with central clearing more likely to appear as the disease progresses.

A detailed travel history and consideration of Lyme is crucial for early diagnosis and should be performed in all patients presenting with a rash.

Early recognition and treatment of Lyme are critical to prevent serious sequelae.

A STICKY CASE OF A PYOGENIC LIVER ABSCESS – KLEBSIELLA PNEUMONIAE

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LEARNING OBJECTIVE #1: Recognize Klebsiella invasive syndrome features

LEARNING OBJECTIVE #2: Examine the association of Klebsiella with colon cancer

CASE: A 49-year-old Hispanic man with diabetes presented to the emergency room with worsening right upper quadrant (RUQ) pain and shortness of breath for 2-3 weeks. He denied nausea, vomiting, changes in bowel habits, history of gallstones, or chest pain. The patient also denied recent travel history, sick contacts, animal exposures, or any intravenous drug use.

On presentation, the patient was afebrile with normal vital signs. Physical exam was notable for RUQ tenderness on palpation and a positive Murphy's sign. Labs showed a leukocyte count of 16.2 K/uL (neutrophil predominance of 86.5%), alkaline phosphatase of 656 U/L, an aspartate aminotransferase of 24 U/L, and an alanine aminotransferase of 46 U/L. An abdominal CT revealed multiple septated, multiloculated hypodense lesions within the right hepatic

lobe, the largest measuring 13.8 x 13.8 x 11.1 cm. The patient was empirically placed on intravenous ceftriaxone and metronidazole for broad-spectrum gram negative and parasitic coverage. Blood cultures grew no microorganisms over 5 days. Entamoeba histolytica and Echinococcus granulosus antibodies were negative.

The patient's course was notable for rising leukocytosis to 22.4 K/uL and fever to 101.2F. He underwent image-guided aspiration which drained purulent material with cultures growing Klebsiella pneumoniae (K. pneumoniae) with a positive string sign. After drainage, the patient's fevers and RUQ pain resolved. The patient was discharged to complete 28 days of oral sulfamethoxazole-trimethoprim. In addition, an outpatient colonoscopy for colorectal cancer (CRC) screening was scheduled.

IMPACT/DISCUSSION: This patient's cultures grew K. pneumoniae with the hypermucoviscosity positive string sign; the string sign refers to the stretching of a Klebsiella colony from the blood agar plate using a plastic loop that results in a string greater than 5 millimeters. String sign is associated with the hypervirulent strain of Klebsiella that can cause Klebsiella invasive syndrome which results in endophthalmitis, meningitis, and other metastatic infections and is more commonly reported in Southeast Asia. Studies show the greatest risk factor for the hypervirulent strain is diabetes mellitus, seen in this patient. Additionally, there is an association with occult CRC and pyogenic liver abscess caused by K. pneumoniae; studies have found a 2.7 times higher risk of CRC in patients with pyogenic liver abscesses caused by K. pneumoniae than those caused by other organisms. Therefore, this patient is scheduled for an outpatient colonoscopy.

CONCLUSION: K. pneumoniae should be considered in the differential of a pyogenic liver abscess. Klebsiella invasive syndrome is due to a hypervirulent strain of K. pneumoniae that can also cause endophthalmitis, meningitis, and other serious metastatic infections.

There is a potential association between K. pneumoniae and occult colorectal cancer.

ATYPICAL PRESENTATION OF INTERSTITIAL LUNG DISEASE WITH POSITIVE ANTI-KU ANTIBODIES

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LEARNING OBJECTIVE #1: Atypical presentation of ILD

LEARNING OBJECTIVE #2: Correlation of Anti-ku antibodies and ILD

CASE: A 57-year-old female with a past medical history of Atrial fibrillation, idiopathic chronic cough, COPD, hypothyroidism, cirrhosis from ETOH abuse, and a former smoker with 40 pack-year history presented with worsening dyspnea on exertion and cough. She also complained of fatigue, myalgia, arthralgia, hair loss, dry mouth, and dry eyes. Physical exam was negative for any pertinent findings and lungs sounded clear on auscultation. CT chest during that hospitalization showed diffuse hazy ground-glass opacities on bilateral lung fields. All laboratory tests for infection including bacterial and viral antibody serologies were negative. She was initially treated with IV Lasix with no significant relief. She underwent both right and left heart catheterization and transthoracic echocardiogram which was unremarkable. She had elevated ANA but other autoimmune panels were negative. She was discharged home with a steroid taper dose along with pulmonary and rheumatology outpatient referral.

Outpatient rheumatology and pulmonary workup showed positive ANA and Anti-Ku antibodies but all other vasculitis and rheumatological studies were negative. Pulmonary function test (PFT) showed a restrictive lung pattern. She also had bronchioalveolar lavage (BAL) which was unremarkable, pathology studies were negative for malignant cells but showed abundant benign macrophages and scattered mixed inflammatory cells.

She was diagnosed with atypical interstitial lung disease (ILD) due to possible connective tissue disorder (CTD) and was enrolled for a clinical trial for treatment.

IMPACT/DISCUSSION: The patient had ground-glass opacities on the CT chest and BAL showed nonspecific inflammatory cells and macrophages suggestive of ILD. PFTs showed a restrictive pattern supporting ILD as a

possible cause. Our patient also had positive results for ANA and anti-Ku antibodies in the serum and multiple clinical features suggestive of CTD. Anti-Ku antibodies are rare, with an estimated prevalence of 0.5% of all ANA-positive serology, they are present in patients with systemic sclerosis, polymyositis or dermatomyositis, systemic lupus erythematosus, and mixed CTD. Lung involvement is rare in positive anti-Ku antibodies. This is a case of ILD associated with CTD and positive anti-Ku antibodies.

CONCLUSION: This is a case of atypical presentation of interstitial lung disease with positive anti-Ku antibodies with other negative rheumatological studies. Anti-Ku antibodies remain rarely detected, but their presence can be frequently associated with ILD. This case highlights the importance of the correlation between anti-Ku antibodies and ILD.

A UNIQUE CASE OF IDIOPATHIC PORTAL VEIN THROMBOSIS NOT RELATED TO HEPATIC DISEASE OR MALIGNANCY

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LEARNING OBJECTIVE #1: Identify the risk factors of portal venous thrombosis (PVT)

LEARNING OBJECTIVE #2: Recognize the diagnostic modalities and management of PVT

CASE: Our 27-years-old woman with no significant past medical history presented to the emergency department with sudden and progressively worsening epigastric pain for two days. There was no personal or family history of miscarriages, oral contraceptive use or thromboembolism. Beside her ectopic pregnancy surgery two years ago, she had C-section and cholecystectomy four years back. Ultrasound of the abdomen was performed and showed nearly occlusive left portal vein thrombosis with no evidence of cirrhosis. A CT scan was performed thereafter and confirmed the diagnosis. Liver function tests, INR and aPTT were normal. Diagnostic workup for genetic and acquired causes of hypercoagulability, including factor V Leiden, antiphospholipid antibody, beta-2 glycoprotein, protein C and S, and JAK2, came back negative. Heparin-warfarin bridge therapy was initiated and patient was discharged 48 hours after INR/PTT had been therapeutic. Diagnosis of Idiopathic PVT was established as the workup didn't yield an etiology.

IMPACT/DISCUSSION: Acute PVT is an unusual thrombotic condition defined by the sudden occlusion of the portal vein, which could be partial or complete. Thrombosis may extend to the mesenteric or splenic vein leading to intestinal ischemia and splenomegaly, respectively. The prevalence of PVT ranges from 0.7 to 1/100,000 in the general population. However, it is seen more commonly in chronic hepatic disease and underlying malignancy. Prothrombotic states, inherited or acquired, are thought to be the cause in non-cirrhotic patients. The most common inherited conditions include factor V Leiden, prothrombin gene mutation, protein C and S deficiency, and antithrombin deficiency. Acquired conditions beside malignancy include antiphospholipid syndrome, oral contraceptive use, abdominal infection, pancreatitis, and inflammatory bowel disease.

Patients who develop acute PVT may be asymptomatic and are often diagnosed incidentally. However, the most common presentation is sudden or progressive abdominal pain. The best diagnostic modality to evaluate suspected PVT is contrast-enhanced abdominal CT scan as it can identify predisposing factors, assess the extent of the thrombus, and detect evidence of intestinal infarction. Management is composed of treatment of the underlying cause, hydration, anticoagulation, which is the mainstay of therapy. The recommended duration of anticoagulation, in the absence of hypercoagulable state, is six months as recanalization occurs within that time. Monitoring for recurrence of symptoms and repeating imaging in three months after discontinuing anticoagulation is preferable.

CONCLUSION: Although PVT is associated with hypercoagulable state, it is important to remember it may occur with no underlying cause. Anticoagulation is the mainstay of therapy to avoid the extension of the thrombus; the earlier the anticoagulation the better the outcomes

A UNIQUE CASE OF PANCREATOGENIC DIABETES MELLITUS PRESENTING AS HYPEROSMOLAR HYPERGLYCEMIC STATE

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LEARNING OBJECTIVE #1: Diagnose and identify the clinical presentation of hyperosmolar hyperglycemic state

LEARNING OBJECTIVE #2: Recognize underlying pancreatic disease to optimize management of hyperosmolar hyperglycemic state

CASE: A 50-year-old female with a history of alcohol use disorder and chronic pancreatitis presented to the hospital with abdominal pain and vomiting. Patient reported that she developed sharp epigastric pain two weeks ago. She denied fever, chills, change in bowel or bladder habits, recent travel or sick contacts. On admission, blood pressure was 133/96 mmHg, heart rate 103, RR 18, oxygen saturation of 95% on room air. Physical examination was notable for epigastric tenderness. Patient was hyperglycemic with a blood glucose greater than 1500 mg/dL, pH 7.32, osmolality 331, ketones in the urine, beta-hydroxybutyrate of 3.99, an anion gap of 26, lipase of 229 and hemoglobin A1c (HbA1c) of 12.1. The patient had no history of diabetes and hemoglobin A1c was 6.4 one month prior to admission. She was admitted for hyperosmolar hyperglycemic state and was treated with aggressive hydration and intravenous insulin. Computed tomography scan of the abdomen demonstrated peripancreatic inflammatory changes consistent with pancreatitis. Autoimmune workup for diabetes was negative. Patient was discharged on insulin and pancreatic enzyme replacement.

IMPACT/DISCUSSION: Hyperosmolar hyperglycemic state (HHS) is characterized by severe hyperglycemia and may rapidly deteriorate into life-threatening complications such as neuromuscular dysfunction and cardiac arrhythmias. The etiology is extensive and can be precipitated by a variety of factors including infection, myocardial infarction, stroke and inadequate insulin therapy. However, HHS is a unique manifestation of diabetes mellitus type 3c (DM3c) which occurs due to loss of both alpha and beta islet cell function in the setting of chronic pancreatitis. Most cases of DM3c are underdiagnosed or misclassified as Type 2 diabetes, which highlights the under recognition of pancreatitis to the development of diabetes. Early diagnosis and prompt treatment of the underlying condition with insulin therapy, alcohol cessation and pancreatic enzyme replacement is crucial to prevent fatal consequences.

CONCLUSION: Although HHS is one of the more unique manifestations of chronic pancreatitis, physicians should promptly recognize and not miss the underlying pancreatic disease to optimize long-term management and achieve favorable outcomes.

A VASCULOPATHY-VEILED POLYCYTHEMIA VERA

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LEARNING OBJECTIVE #1: Diagnose Polycythemia Vera (PV) and recognize its symptoms.

LEARNING OBJECTIVE #2: Manage and treat PV and its risk of thromboembolic events (TE) with co-existing neuro-vasculopathy.

CASE: A 71-year-old female with hypertension, hyperlipidemia, diabetes mellitus, and stable meningioma presented to the ED with 3 days of diffuse throbbing headache, bilateral neck pain, dizziness, and decreased appetite. In the ED, the patient was initially hypertensive 210/99 but otherwise hemodynamically stable. Physical exam was unremarkable except for left neck pain and stiffness. Initial labs showed WBC 12.1, Hgb 20.3, Hct 63.3, Plt 529. CT and MRI modalities revealed a 20x15 mm right parietal meningioma with interval enlargement, moderate to severe stenosis of the mid-basilar artery, severe stenosis of the right internal carotid artery bulb, and a hypoplastic right vertebral artery. Vascular surgery, neurology, and neurosurgery teams were urgently consulted; based on their recommendations the patient did not require acute surgical intervention and was managed with Aspirin, Clopidogrel, Atorvastatin, Meclizine, with titration of diabetes and hypertension medications. In the following days, symptoms improved but CBC demonstrated persistently

elevated cell lines. Labs for polycythemia workup revealed a decreased EPO (2 mIU/mL) and a positive JAK2 V617F missense mutation confirming a diagnosis of PV. Hem/Onc was consulted, and the patient was subsequently discharged to complete outpatient phlebotomy, bone marrow biopsy, and follow-up with the appropriate consultants.

IMPACT/DISCUSSION: This is a unique case of a patient presenting with nonspecific neurological symptoms initially attributed to posterior circulation vasculopathy and meningioma however later diagnosed with PV. Our case illustrates the importance of early recognition, diagnosis, and management of TE risk in PV with concurrent vasculopathy, both of which predispose our patient to potential CVA. PV can present with facial plethora, erythromelalgia, pruritus, and thrombotic events but may also include nonspecific symptoms like dizziness, numbness, and abdominal discomfort. Goals of management include symptom relief, thrombosis risk reduction, prevention of bleeding events, optimization of medical treatment for other comorbidities, and monitoring for evolution to myelofibrosis, AML, or myelodysplastic syndrome. Risk stratification based on age > 60 place our patient in a high risk category, for which treatment specifically involves cytoreductive therapy typically hydroxyurea, phlebotomy to maintain hematocrit <45, and antiplatelet therapy. Although recent research has focused on understanding predictive markers and best novel cytoreductive therapies for thrombotic risk reduction, mortality from TE in PV patients remains high.

CONCLUSION: Timely diagnosis of PV in the setting of other ASCVD risk factors decreases complications and improves mortality.

Treatment of TE, symptom amelioration, and monitoring for transformation of PV are mainstays in disease management.

A WALLED-OFF PANCREATIC NECROSIS (WOPN) AFTER COVID-19 INFECTION

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LEARNING OBJECTIVE #1: To identify walled-off pancreatic necrosis (WOPN) as a sequelae of acute pancreatitis which can be potentially life threatening.

LEARNING OBJECTIVE #2: To differentiate WOPN from a simple pseudocyst so that it can be managed aggressively for better outcomes.

CASE: A 58-year-old female with a past medical history of hypertension and diabetes presented to our facility with complaints of abdominal pain. The patient reported pain in the epigastric region which was constant, sharp with radiation to the back, This was associated with fever, nausea, non-bilious vomiting, and loss of appetite. She denied any trauma, recent procedure or alcohol consumption. She had been recently diagnosed with COVID-19 induced pancreatitis 3 weeks prior to her presentation.

On presentation, she was febrile and tachycardic. On physical examination she had significant epigastric tenderness without any guarding or rigidity. Labs were significant for white blood cell count of 20,000 cells/dL, lipase 685 U/L. Consequently a Computerized Tomography(CT) Scan of the abdomen was performed which showed a large low-density fluid collection with multiple locules of gas surrounding the pancreatic tail. Within the next 24 hours, her condition deteriorated requiring mechanical ventilation and pressor support. She subsequently underwent an endoscopic ultrasound which confirmed the diagnosis of a pseudocyst with walled off pancreatic necrosis(WOPN) within the pancreatic body and tail. She initially underwent radiologically guided percutaneous drainage of the pseudocyst. However due to incomplete evacuation she eventually required a transgastric stent placement along with necrosectomy. Culture from the pseudocyst aspirate and the blood cultures grew extended spectrum beta-lactamase E. coli and she was started on appropriate antibiotics. She recovered with complete resolution of her symptoms.

IMPACT/DISCUSSION: Pancreatic pseudocyst and WOPN are complications of acute pancreatitis usually occurring 4 weeks after an episode of pancreatitis. WOPN is a rare but lethal complication of acute pancreatitis. They both have mature well-defined wall, however, WOPN has pancreatic or per- pancreatic necrosis with both solid and liquid components unlike a

simple pseudocyst. If the patient has symptomatic pseudocyst or WOPN, it should be aggressively managed by drainage. The drainage of collections can be done percutaneously, endoscopically or surgically. An endoscopic ultrasound guided drainage using seldinger technique is the preferred method of drainage these days due to higher success rate. Direct endoscopic necrosectomy is often required in WOPN similar to our patient. Follow up imaging is done to confirm complete cyst drainage.

CONCLUSION: Patients with acute pancreatitis should be followed up closely to monitor for sequelae. Simple and asymptomatic pseudocyst should be managed medically, however, patients with WOPN need the drainage procedure. WOPN should be aggressively treated and the resolution of cyst should be confirmed with follow-up imaging.

BAD BLOOD: A CATASTROPHIC PRESENTATION OF ACUTE PROMYELOTIC LEUKEMIA

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LEARNING OBJECTIVE #1: Recognize intracranial hemorrhage as a fatal and often overlooked complication of Acute Promyelocytic Leukemia (APL)

LEARNING OBJECTIVE #2: Treat patients with high suspicion for APL with immediate administration of all-trans retinoic acid (ATRA) as a potential life-saving treatment

CASE: A 26-year old Haitian man presented with 3 days of acute, left-sided, non-radiating headache with no known exacerbating or remitting factors. His headache worsened 5 hours prior to presentation with nausea, vomiting, photophobia, and phonophobia. He denied fever, neck stiffness, visual changes, recent travel or sick contacts. Exam was notable for a diaphoretic man in acute distress, sluggishly reactive pupils and right-sided diminishment to light touch. Labs were significant for WBC $1.1 \times 10^3/\mu\text{L}$, Hgb 7.7 g/dL, Plt $8 \times 10^3/\mu\text{L}$, elevated d-dimer, LDH 315 U/L, INR 1.7. CT Head showed active hemorrhage at the left posterior parietal lobe with 3 mm midline shift. During the workup, he became more somnolent and confused, prompting intubation. Repeat exam revealed a newly fixed and dilated left pupil with repeat CT showing worsening intraparenchymal hematoma with an increased midline shift requiring an emergent decompressive hemicraniectomy. Peripheral smear showed hypergranular promyelocytes without Auer rods. Despite initiation of all-trans retinoic acid (ATRA), continued administration of blood products, hypertonic solutions, and initiation of pressors, patient clinically deteriorated and was terminally extubated after pronouncement of brain death. Postmortem, FISH confirmed the diagnosis of APL with translocation of PML (chr 15) and RARA gene (chr 17).

IMPACT/DISCUSSION: Prompt exploration of pancytopenia and immediate intervention for unremitting headache is crucial. In our case, this was due to APL – a distinct subset of acute myeloid leukemia due to its unique pathophysiology and its high cure rate with treatment. First described in 1957 in patients with severe bleeding and fibrinolysis who had rapid deterioration of their clinical condition, this condition had the presence of increased promyelocytes. Advances in molecular pathology led to the understanding of the pathognomonic translocation between genes on chr 15 and 17 (PML-RARA) that causes developmental arrest at the promyelocytic stage. ATRA is highly effective at releasing this block leading to maturation of the leukemic cells. Despite effective treatment, hemorrhagic complications account for the major cause of morbidity and mortality, due to increased thrombin generation, activation of coagulation, and abnormal fibrinolysis. Early introduction of ATRA at the first suspicion of a diagnosis of APL can prevent these complications in most cases and should be administered even prior to confirmation of the diagnosis.

CONCLUSION: 1. This case illustrates the importance of prompt diagnosis and recognition of hematological malignancies, specifically APL.

2. Despite the curable nature of APL with ATRA, early mortality is still prevalent due to bleeding complications.

BILATERAL MACRONODULAR ADRENAL HYPERPLASIA: AN UNUSUAL CASE OF CUSHING'S SYNDROME

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LEARNING OBJECTIVE #1: Diagnose Cushing's syndrome secondary to BMAH

LEARNING OBJECTIVE #2: Recognize clinical features of Cushing's syndrome

CASE: Endogenous Cushing's syndrome is a rare disorder with an incidence of 2-4 cases per million annually. Bilateral macronodular adrenal hyperplasia (BMAH) accounts for less than 1% of these cases, making it uncommon and easy to miss. We present a case of a 56-year-old female who was found to have bilateral adrenal masses later diagnosed as BMAH.

A 56-year-old female presented for preoperative evaluation for an elective surgery. During workup, she was incidentally found to have bilateral adrenal masses, measuring 6.5 cm (left) and 7.5 cm (right). Her medical history included obesity, thyroid nodule, parathyroidectomy, hypertension (HTN), and diabetes (DM). She was never able to conceive and reached menopause at age 53. On exam, she had hirsutism on the cheeks and chin, nodular thyroid and normal fat distribution without striae. The initial biochemical workup was unremarkable for pheochromocytoma, hyperaldosteronism, or hyperandrogenism. She required supplementary suppression analysis after labs demonstrated a suppressed ACTH, equivocal 24-hour urinary cortisol and morning cortisol of 18.6 mcg/dL. Her cortisol was not suppressed with low or high dose dexamethasone testing. Adrenal washout CT was consistent with nonspecific heterogeneity of the bilateral adenomas. She ultimately underwent bilateral adrenalectomy with pathology revealing bilateral adrenal cortical hyperplasia. Considering her concomitant thyroid, parathyroid, and adrenal disease, she was screened for 20 genetic mutations, including indicators of familial tumor syndromes such as APC and MEN1, all of which were negative. Unfortunately, ARMC5 testing was cost-prohibitive as it was not covered by insurance. Her postoperative course was uneventful, and she remains compliant with hydrocortisone and fludrocortisone. In follow-up, she lost 13 kilograms, her anti-hypertensive regimen was reduced from three agents to one, and her A1c improved.

IMPACT/DISCUSSION: Cushing syndrome due to BMAH has a variable presentation, oftentimes only producing mild symptoms leading to diagnostic delay. The long-term consequences of Cushing syndrome (obesity, HTN, osteoporosis, and DM) can be devastating and persist even after the causative agent is treated. Adrenocortical production of corticotrophin and aberrant hormone receptors have been attributed to the pathogenesis of BMAH. ARMC5 germline alterations are a potential culprit as they are attributed to 25-50% of cases of BMAH and have been noted as a marker of familial forms. **CONCLUSION:** This case illustrates the importance of early recognition in Cushing syndrome and necessity to evaluate for the underlying pathology. It also demonstrates the importance of further evaluating and bringing ARMC5 screening into standard practice in cases such as this one: it could allow for screening of family members, early treatment and prevention of devastating long-term consequences produced by diagnostic delay.

BREAK FOR BIAS

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LEARNING OBJECTIVE #1: Identify fat embolism syndrome

LEARNING OBJECTIVE #2: Recognize how COVID-19 can lead to cognitive bias

CASE: A 20 year old man presented with right leg pain following a motor vehicle collision. He had no past medical, surgical, or family history and took no medications.

His initial vital signs were unremarkable. His physical exam was notable for a seatbelt sign, tenderness of the right lateral hip, and gross deformity of the right ankle. CT of the head, chest, abdomen, & pelvis revealed a right acetabular fracture. X-ray of the right lower extremity showed a pilon (distal tibia) fracture. Screening SARS-CoV-2 PCR was positive. He underwent external fixation of the right ankle.

Two days later, a rapid response was called. SpO₂ was 70% on room air. His vital signs were normal. On exam, the patient was in mild distress with clear lungs and expected post-surgical changes of the right leg. Over the next 30 minutes, his oxygen requirement increased from 2L to 15L.

Chest x-ray revealed new diffuse, bilateral, multifocal airspace opacities. Arterial blood gas showed pH 7.38, pCO₂ 48, and pO₂ 74.

His hypoxia was initially attributed to SARS-CoV-2 infection, but the team noted the lack of viral symptoms and absence of findings on initial CT chest to be atypical. A CT pulmonary embolism study was obtained and revealed bilateral dense consolidations, subpleural ground glass opacities, nodular interlobular septal thickening, and equivocal left lower lobe subsegmental pulmonary embolism. The patient's clinical syndrome and imaging findings were felt to be most consistent with fat embolism syndrome. He recovered with conservative management.

IMPACT/DISCUSSION: While circulating fat emboli are found in >70% of patients with blunt trauma and/or those undergoing major orthopedic surgery, fat embolism syndrome (FES) - defined as those at risk for fat emboli presenting with respiratory distress, petechial rash, and/or neurologic symptoms - is rare, occurring in <4% of those cases.

The pathophysiology is unknown, but there are two proposed mechanisms. First is the mechanical theory, where fat globules released from damaged tissue lodge in a distal vascular bed, leading to symptoms. Second is the biochemical theory, where end organ damage occurs secondary to the inflammatory and prothrombotic response induced by the presence and breakdown of circulating fat.

FES typically manifests 24 to 72 hours after the initial insult. The triad of symptoms need not all be present. Pulmonary symptoms typically occur earliest and range from insidious dyspnea to ARDS. Neurologic manifestations are variable. Other organ systems may also be affected.

Diagnosis is primarily clinical, as imaging findings can be highly variable. Treatment is supportive. Prognosis is generally good, with most patients recovering spontaneously.

CONCLUSION: In the time of COVID-19, SARS-CoV-2 infection should be considered in patients with dramatic respiratory decline. However, we must remain vigilant to avoid premature closure even in those who have tested positive.

BROWN BOWEL SYNDROME: A RARE COMPLICATION OF VITAMIN E DEFICIENCY

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LEARNING OBJECTIVE #1: Recognize brown bowel syndrome as a rare but significant complication of vitamin E deficiency.

LEARNING OBJECTIVE #2: Describe the importance of evaluating for nutritional deficiencies in alcohol use disorder and cirrhosis.

CASE: A 45-year-old woman with a past medical history of anemia, gastroesophageal reflux disease, and asthma presented to the hospital with progressive dyspnea and fatigue over one week. Her history is significant for 32 years of heavy alcohol use (16 drinks daily) and 30-pack-year smoking history. Initial workup showed a hemoglobin 4.1, white blood cell count 18.8, lactate 4.0, total bilirubin 7.3 (direct bilirubin 4.5), AST 92, ALT 27. Physical exam was notable for hypotension, tachycardia, scleral icterus, hepatomegaly, mild ascites, and ataxia.

A right upper quadrant ultrasound demonstrated hepatic cirrhosis and steatosis, biliary sludge, and possible chronic pancreatitis. She did not have clinical evidence of bleeding and denied any recent hematemesis, hemoptysis, melena, or hematochezia. Subsequent endoscopy showed a gastric ulcer (without stigmata of recent bleeding), esophageal ulceration and portal hypertensive gastropathy. Biopsy of the antrum of the stomach, esophagus and colon showed lipofuscin pigment deposition within smooth muscle on lipofuscin and PASD special stains, consistent with brown bowel syndrome (BBS). Further evaluation for vitamin deficiencies showed Vitamin E 2.5 (5.5-18.0 mg/L), Vitamin A <0.06 (0.30-1.20 mg/L), Vitamin D 25-OH <3 (25-80 ng/ml), Zinc 25.9 (60-120 ug/dl), Copper 74 (80-155 ug/dl). She was immediately started on vitamin replacement therapy.

IMPACT/DISCUSSION: This case describes the extremely rare manifestation of brown bowel syndrome in the setting of chronic malnutrition. Brown bowel syndrome involves the deposition of lipofuscin pigment in the muscularis propria. Lipofuscin deposits may be widespread, as seen in this patient, with case reports involving the small intestine, appendix, and prostate. BBS is thought to be associated with chronic Vitamin E deficiency due to decreased uptake of fat-soluble tocopherol, which is often seen in malabsorptive disorders and may result in ataxia and peripheral neuropathy. Concurrent Vitamin A and D deficiencies are also commonly reported. Initial treatment of BBS is immediate Vitamin E supplementation, but surgical intervention is often necessary in patients who do not improve. BBS commonly leads to delayed gastrointestinal motility in affected areas and may result in partial or total colectomy.

CONCLUSION: Long-standing heavy alcohol use, liver and pancreatic disease can lead to chronic malabsorption and vitamin deficiencies. In patients with cirrhosis, malnutrition must be closely assessed due to a hypermetabolic state. Vitamin E deficiency can lead to lipofuscin deposition in the gastrointestinal tract, thus worsening malabsorption if not corrected. Correcting vitamin deficiencies early in brown bowel syndrome with aggressive supplementation may provide a therapeutic effect and should be evaluated for.

CARDIAC TAMPONADE SECONDARY TO INFLUENZA B

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LEARNING OBJECTIVE #1: Identify Influenza B as a cause of pericarditis and pericardial effusion

LEARNING OBJECTIVE #2: Recognize clinical features of early cardiac tamponade for timely intervention

CASE: A healthy 29-year-old Caucasian lady presented to a nearby emergency room (ER) during the fall months with retrosternal chest pain and no other symptoms during the COVID-19 pandemic. She was discharged home with diclofenac for pleurisy and famotidine for possible GERD after a normal CT Angiogram of the chest and a normal troponin. However, her pain did not improve, and she went to her primary care physician 15 days later, where she also had fever, chills, and myalgias. She tested positive for Influenza B, and negative for Influenza A and COVID-19. She was given 5 days of oseltamivir along with azithromycin. However, her chest pain continued to worsen and was now accompanied with exertional dyspnea. She then presented to our ER 3 days later. She was visibly uncomfortable, was tachycardic and had a BP of 110/70. She did not have a pericardial rub but had muffled heart sounds. EKG showed a low voltage and a classical electrical alternans. A chest x-ray showed cardiomegaly after which a bedside ultrasound was done that showed a large pericardial effusion with right ventricular collapse. Cardiologist emergently removed 920ml of serous fluid which had increased number of mononuclear cells representing an inflammatory process. Bacterial, viral and fungal cultures of the fluid were negative. Blood urea was normal and, HIV, ANA and drug screen were negative. Her chest pain resolved over the next day and effusion had decreased in size. She was discharged on colchicine and ibuprofen. An outpatient echocardiogram after 1 week showed no re-accumulation of fluid. She was also seen in our primary care clinic 10 days after discharge, by which time her symptoms had resolved and she was also administered a flu shot.

IMPACT/DISCUSSION: Influenza related complications requiring hospitalizations are rare (about 1%). Influenza B is considered a milder form of flu and only rarely causes non-respiratory complications. Pericarditis is an even rarer complication of Influenza B and a Pubmed search only reveals a handful number of cases. A high clinical index of suspicion is, therefore, needed to look for pericardial effusion due to Influenza B. Our patient's illness duration and progression to cardiac tamponade could have been significantly shortened if she had been evaluated for pericardial effusion at prior ER and/or clinic visits. Not all pericardial effusions produce classic clinical and EKG findings, and therefore, such a diagnosis should be strongly considered if there is a history of Influenza infection

with worsening chest pain. Bedside ultrasound can be a crucial modality for a faster evaluation and management.

CONCLUSION: Pericardial effusion and cardiac tamponade are rare complications of Influenza B and should be high on the differential in an otherwise healthy patient presenting with chest pain, especially during the flu season.

CASE OF INFECTED CALCIPHYLAXIS IN A DIALYSIS PATIENT

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LEARNING OBJECTIVE #1: Early recognition of Calciphylaxis

LEARNING OBJECTIVE #2: Discuss about approach to Calciphylaxis

CASE: 74 year male with history of diabetes, hypertension, hyperlipidemia, chronic kidney disease (CKD) on dialysis presented to emergency for intermittent fever reaching up to 103 Fahrenheit for 2 weeks. Around the same time, he had occasional malodorous drainage from the wound on right hand with intermittent pain. Wound was chronic for about a year, without preceding trauma and smoking history was negative. On follow-up a month back, the wound was described as superficial ulceration without concern for infection. On exam, there was a large ulcer 1x2 cm in size with black eschar at the base on the right-hand third finger middle phalanx along with redness and swelling surrounding the ulcer. Black eschar was also on tip of right index finger. Capillary refill time and peripheral pulses were normal. Initial labs showed elevated white count, creatinine and phosphorus. X-ray of hand showed soft tissue swelling on third finger and arthritic changes. Infectious disease empirically started patient on vancomycin and piperacillin-tazobactam. Blood cultures grew Methicillin-sensitive Staphylococcus aureus and antibiotic switched to only vancomycin; source of bacteremia being right-hand third finger which was probably calciphylaxis complicated with infection. He underwent amputation of the distal phalanx of the third digit. Surgical pathology came back as acute osteomyelitis and skin ulceration with soft tissue necrosis. Patient received sevelamer to lower the phosphorus level and vancomycin for total of 4 weeks.

IMPACT/DISCUSSION: Calciphylaxis is a serious and rare disorder which has continued to challenge the medical community. Infection is the primary cause of high mortality. It is predominant in CKD patients on dialysis but can occur with early stages of CKD. Skin lesions of calciphylaxis result from arteriolar blood flow reduction due to calcification, fibrosis, thrombus formation and tissue infarction. Diagnosis is by examination finding of classic painful ulcerated lesions covered by black eschar. Skin biopsy is an option but not without adverse effects, and there are no definitive histologic criteria for the diagnosis. Treatment approach focuses on wound and pain management and consideration for sodium thiosulfate (STS). STS has been used during dialysis, as intravenous infusions or as intralesional injections. Maintaining serum calcium and phosphorus levels within normal range is advised. High-quality evidence for evaluation and management of calciphylaxis is still lacking. Calciphylaxis should be considered as a differential in patients presenting with classic dry necrotic appearing wound in CKD patients. If identified before complication with infection, we can address it earlier.

CONCLUSION: Vigilant physical examination of wounds and consideration of calciphylaxis especially in CKD patients. Risk factor management and treatment before complication with infection to prevent invasive management like amputation.

CASE OF PSYCHOSIS AND RHABDOMYOLYSIS SECONDARY TO CANNABIS ABUSE

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LEARNING OBJECTIVE #1: Patient care: Diagnose acute-onset psychosis secondary to marijuana

LEARNING OBJECTIVE #2: Medical knowledge: Recognize substance-induced psychosis may be a risk factor for developing marijuana-induced psychosis

CASE: 21-year-old African American male without any significant past medical or psychiatric history was brought to the hospital by EMS for evaluation of altered mental status, combativeness, and agitation. Upon speaking to family, they reported the patient had become acutely confused, combative, with delusional speech a few hours prior to presentation, without obvious reason. As patient became more agitated and aggressive, the family called 911 with concern for patient being a harm to himself or others. On initial presentation, no additional history was able to be obtained due to patient's mental state and aggressive behavior. He was kept on 1:1 observation in restraints and was given haloperidol as needed until his psychosis had subsided. The initial laboratory workup revealed rhabdomyolysis, with creatine kinase (CK) 7791 U/L, and acute kidney injury (AKI). Urine drug screen was only positive for marijuana, negative for other illicit substances, with the patient also later denying any other drug abuse. The patient was started on intravenous (IV) fluid hydration for rhabdomyolysis and AKI, with levels monitored closely. Psychiatry evaluated the patient and deemed his presentation to be secondary to substance-induced psychosis as being most likely. After further discussion with family, it was discovered patient had a prior episode of similar symptoms which were managed by lorazepam at home. Most interestingly, we discovered the patient's father had a very similar reaction to marijuana after a single use during youth.

The patient's mental status improved throughout the next 24 hours, with his mentation returning to baseline with no further psychotic symptoms. He admitted that he had used marijuana only for the second time in his life prior to the onset of symptoms. Patient's CK levels and creatinine levels improved with IV fluid hydration and patient was discharged home once he was cleared by psychiatry.

IMPACT/DISCUSSION: Marijuana is not typically known to cause psychosis, however as our case illustrates, it should be considered in cases of acute psychosis, especially when no other cause is elicited. Development of psychosis immediately following the use of marijuana with no prior marijuana use should support the findings of substance-induced psychosis. Family history of similar incidents should be considered as a risk factor.

CONCLUSION: Marijuana should be considered a cause of acute onset psychosis, despite its low incidence.

Family history of acute psychosis, as a result of substance abuse, should be considered a risk factor.

CASE REPORT- A CASE OF ROTHIA DENTICARIOSIA ENDOCARDITIS WITH SEVERE COMPLICATIONS

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LEARNING OBJECTIVE #1: Assess need for multidisciplinary approach managing IE complicated by systemic sequelae.

LEARNING OBJECTIVE #2: Identify *R. denticariosa* as a rare cause of IE and considerations to antibiotic treatment with surgical intervention.

CASE: A 61-year-old male patient with HCV and IV drug use presented with 3 days of weakness, chills, and headache. The patient endorsed a 45+ year history of methamphetamine/cocaine use with 3 months of active IV drug use. Bedside ultrasound revealed vegetations. Patient was admitted with a diagnosis of infective endocarditis and started on Vancomycin. TEE revealed a large, irregular, mobile 1.7x1.4cm mitral leaflet vegetation with severe regurgitation. Blood cultures returned positive for *Rothia Denticariosa*. With CT surgery plans in place, a CT A/P showed acute splenic infarct and CT/MRI head showed scattered diffusion lesions suggestive of acute/subacute infarcts, likely septic emboli given the history.

Patient was also found of to have acute angle-closure glaucoma requiring topical therapy with iridotomy. Dental recommendations were two extractions as the infection likely stemmed from dental caries. With new hemorrhagic cerebral bleed and ophthalmic/dental management taken into consideration, surgery was pushed to after 6-weeks of antibiotics. With clearance for surgery, patient underwent total valve replacement without complications. Post op echo

showed mild ventricular dysfunction with ejection fraction of 60%. Patient made a full recovery to discharge on post-op day five.

IMPACT/DISCUSSION: *R. denticariosa* is a rare gram+ organism found in the oral/respiratory tract that rarely causes disease. Documented cases occur chiefly in those with valvular or dental disease, or both.⁵ Few cases have been reported to date, almost exclusively with underlying heart conditions as a risk factor.⁶ This case introduces a unique setting in which cardiac structural abnormality is absent in the mechanism of spread. History of IV drug use with dental caries-facilitated bacterial seeding poses a more opportunistic narrative of the organism further substantiated by embolic sequelae that suggests the organism's invasive potential, proving *R. denticariosa* can cause IE in patients lacking structural heart conditions, which were previously known to be the exclusive source of IE caused by this organism. Uncertainty surrounds treatment regimen as no definite guidelines are available, but antibiotic agents have been recognized, of which penicillin is the treatment of choice.^{6,7}

CONCLUSION: Despite that more than 80% of bacterial IE cases are caused by streptococci and staphylococci, clinicians should be aware of the remaining 20% of rarer IE causing organisms such as *R. denticariosa*, as it has caused severe, widespread extra-cardiac sequelae and as such, management warrants an interdisciplinary approach with a treatment care plan facilitated among cardiac, neurological, dental, ophthalmic, infectious and surgical disciplines, as needed.

CEPHALIC VEIN THROMBOSIS AS AN UNSEEN ETIOLOGY OF PULMONARY EMBOLISM

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LEARNING OBJECTIVE #1: Recognize the risk factors for upper extremity superficial vein thrombosis in the inpatient setting.

LEARNING OBJECTIVE #2: Risk stratify patients with superficial vein thrombosis according to proximity adjacent to deep veins

CASE: A 72 years old male was admitted to the hospital for bacterial pneumonia and was being treated with intravenous antibiotics. During his hospitalization, he was treated with enoxaparin sodium at the prophylactic dose for deep vein thrombosis(DVT) prevention. On the 8th day of admission, a rapid response was called as the patient was hypoxic and experiencing shortness of breath. Earlier that day he was complaining of left arm pain around his intravenous cannulation site. Computed tomography angiography of the chest was done which showed bilateral segmental pulmonary embolism(PE) in the upper and lower lung lobes. Further evaluation with bilateral lower extremity(LE) venous duplex did not show evidence of DVT. However, the upper extremity(UE) left- sided venous duplex showed proximal and distal cephalic vein thrombosis without DVT. He was treated with unfractionated heparin infusions and transitioned to oral apixaban at discharge.

IMPACT/DISCUSSION: Superficial vein thrombosis (SVT) is considered to be a benign, self-limiting condition. SVT most frequently involves the LE and has a yearly incidence of 0.64 per 1000 patients. However, in the inpatient setting, UE SVT has an estimated frequency of 25-35% which has been associated with the abundant usage of peripheral intravenous catheters. Prolonged duration of catheterization is associated with increased risk for UESVT. Among the virchow's triad Internal endothelial damage from intravenous catheterization and prolonged immobilization from hospitalization were strongly implicated in our patient. LE venous doppler ultrasound is critical in distinguishing the source of thromboembolism, as LE SVT and DVT are more commonly implicated in PE compared to UE SVT. SVT is managed symptomatically with anti-inflammatory agents and intravenous catheter removal. Anticoagulation is not recommended because of the minimal incidence of subsequent PE. However rare instances of thromboembolism arising from UESVT have been reported in the literature. The risk for thromboembolism is determined by the proximity of the thrombosis, as those in close proximity to the deep venous system carry increased risk. In the evaluation of LE SVT, proximity within 3 centimeters of the saphenofemoral junction or saphenopopliteal junction is considered to carry the same risk for embolism as

proximal femoral DVT. In our patient, one of the two thrombi found on imaging was located proximally with close proximity to the axillary-cephalic vein junction.

CONCLUSION: Although intravenous catheters are a necessary component of inpatient care, clinicians should be cognizant of the risk for UE SVT. This case illustrates that prompt diagnosis and risk stratification based on the location of UE SVT is important in order to evaluate thromboembolic risk.

CERVICAL LYMPHADENOPATHY: THE DIFFERENTIAL BECOMES TIGHTER WITH THE TITER

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LEARNING OBJECTIVE #1: Describe the differential diagnosis for cervical lymphadenopathy in patients with HIV.

LEARNING OBJECTIVE #2: Discuss the value of multi-specialty collaboration in atypical presentations.

CASE: A 47-year-old man with history of HIV and hypertension presented to his PCP with “swollen neck glands.” He denied fever, sore throat, mouth sores, cough, voice change, rhinorrhea, weight loss, sweats, rash, or bruising. He had moderate dysphagia due to a sense of obstruction and mild ear pain.

He was diagnosed with HIV 5 years prior; since starting antiretroviral therapy, CD4 count was >500 and viral load was undetectable. He was treated for syphilis 3 times in the past 5 years with a persistent RPR titer of 1:32. Home medications were emtricitabine-tenofovir alafenadate- rilpivirine 200-25-25mg, metformin 850mg, and nifedipine 60mg all daily.

Vital signs were normal. He had non-tender nodular enlargement near the right mandible and an ipsilateral non-tender, rubbery, mobile lymph node. Oral exam showed normal tonsils and no oropharyngeal lesions, gingival erythema, or dental abnormalities. Ears, nose, and overlying skin were normal.

Neck ultrasound revealed a complex, 3.4cm, cystic mass between the angle of the mandible and submandibular gland. Neck CT showed an enlarged right submandibular gland and 2 necrotic-appearing cervical lymph nodes.

After discussion with his infectious disease doctor, labs revealed WBC 6.2, CD4 578, HIV VL <20, QuantiFERON gold negative, and RPR 1:256. We referred to otolaryngology for fine needle aspiration (FNA) to rule out tuberculosis and lymphoma. FNA showed necroinflammatory debris and positive AFB stain. Warthin-Starry stain was difficult to interpret. The 3 physicians agreed that tuberculosis was unlikely. We treated for secondary syphilis with benzathine penicillin G. In two weeks, the neck mass was one third of its prior size. Six weeks later, AFB culture was negative, and the mass had resolved.

IMPACT/DISCUSSION: Cervical lymphadenopathy (CL) may be reactive, infiltrative, rheumatologic, or neoplastic. Among patients with HIV, CL may also be a sign of opportunistic infections (OI) (e.g. MAC, CMV, toxoplasmosis, fungal infections), tuberculosis, or non-Hodgkins lymphoma. Our patient’s CD4 count made OI unlikely. Patients with HIV and significant CL should undergo FNA.

Skin lesions or ulcerations are the most common symptoms of syphilis reinfection. Syphilis commonly causes lymphadenopathy, however isolated syphilitic cervical lymphadenopathy, as in our patient, is rare. CL in secondary syphilis is typically accompanied by tonsillar lymphadenopathy, lung lesions, rash, fever, oro- or nasopharyngeal lesions.

CONCLUSION: The differential for CL is broad. Diagnostic workup may include imaging, laboratory studies, and FNA. The latter is especially important in patients with HIV. Although rare, secondary syphilis may cause isolated cervical lymphadenopathy.

A multi-specialty approach with verbal communication is useful for atypical disease presentation.

CHEMOTHERAPY-INDUCED ENCEPHALOPATHY IN A PATIENT WITH RELAPSED MARGINAL ZONE B CELL LYMPHOMA WITH CENTRAL NERVOUS SYSTEM (CNS) INVOLVEMENT

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LEARNING OBJECTIVE #1: Recognize a broad differential diagnosis of encephalopathy

LEARNING OBJECTIVE #2: Recognize presentation and management of chemotherapy-induced encephalopathy

CASE: A 70-year-old woman with a history of relapsed marginal zone B cell lymphoma (MZL) presented with 1-week of progressive cognitive decline, confusion, and generalized weakness. Upon admission, she had *Citrobacter* and *Proteus* urinary tract infection and was treated with ceftriaxone. Despite antibiotic treatment, patient continued to have fluctuating encephalopathy and episodes of neurological focalities prompting multiple stroke codes with unremarkable brain imaging findings. Electroencephalogram showed diffuse slowing but no definite epileptiform activity. Patient was started on levetiracetam empirically with no improvement.

Other workup was notable for cerebrospinal fluid (CSF) studies with lymphocytic pleocytosis, moderate protein elevation and normal glucose levels. Cytology and flow cytometry repeatedly revealed presence of increased number of atypical lymphocytes with absence of an immunophenotypic evidence of a lymphoproliferative disorder. CSF meningitis/encephalitis panel, paraneoplastic panel, JC virus PCR, cryptococcal antigen, CSF cultures, blood cultures, and repeat urine culture were negative. MRI spine showed nonspecific diffuse mild enhancement of the cauda equina nerve roots.

Patient’s past medical history was notable for MZL diagnosed in 2012. She was treated with intravenous (IV) high dose methotrexate (HDMTX) and rituximab, followed by maintenance rituximab. One month prior to hospitalization, patient had recurrent disease with CNS involvement and received IV HDMTX and intrathecal (IT) cytarabine.

Given unrevealing workup, it was speculated that patient’s presentation may have been caused by a chemical meningitis/CNS toxicity from concurrent IV HDMTX and IT cytarabine. Patient was treated with dexamethasone which resulted in marked improvement in her mental status.

IMPACT/DISCUSSION: The differential of encephalopathy is broad. The possibility of CNS involvement from MZL was low given negative CSF studies. An infectious etiology was also unlikely given many negative cultures and viral studies. No metabolic derangements were noted. EEG and brain MRI were not suggestive of seizure or other neurologic etiology. Given concern for neurotoxicity from systemic chemotherapy, patient was treated with steroids to reduce the inflammation and speed up neurological recovery.

CONCLUSION: We report an interesting case of an elderly woman with relapsed MZL with CNS involvement who presented with fluctuating encephalopathy and underwent a negative hematologic, neurologic, infectious, and metabolic workup except CSF studies with lymphocytic pleocytosis, moderate protein elevation and normal glucose levels and MRI spine with mild enhancement of the cauda equina nerve roots. This case emphasizes the importance of maintaining a high clinical suspicion for chemotherapy-induced encephalopathy in patients who recently received systemic chemotherapy.

CHRONIC MIGRAINES: WHEN TO WORRY ABOUT SECONDARY CAUSES

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LEARNING OBJECTIVE #1: Recognize red flag symptoms of headaches

LEARNING OBJECTIVE #2: Distinguish symptoms of intracranial mass from primary headaches

CASE: A 51-year-old woman with PMH of hypertension presents to clinic with one week of daily headaches. The pain was described as global, throbbing in quality, and constant. Her headaches were worse with sneezing/coughing, associated with photosensitivity and reported taking Excedrin daily for symptomatic relief. She has a history of seasonal allergies and intermittent headaches but has never required daily medication. Neurologic exam was non-focal. At this outpatient visit, PCP discussed starting sumatriptan for migraine termination, loratadine for allergies, and stopping Excedrin to eliminate medication overuse headaches. Given patient’s age and worsening of previous headaches, MRI head was ordered to rule out secondary causes.

Four days later, patient presented to the ED with progressive worsening of her symptoms and photophobia, nausea, and vomiting, as well as dizziness. There

were no additional focal neurologic findings. CT scan showed an extra-axial brain mass with mass effect to the right lateral frontal lobe, with no midline shift or ventriculomegaly. Patient was symptomatically managed and was diagnosed with right parietal meningioma; she was discharged with neurosurgery follow up to discuss surgery and short duration imaging follow-up.

IMPACT/DISCUSSION: This patient's case highlights the significance of thorough history-taking in the workup of headache. Our patient was greater than 50 years old and described progressive worsening with positional component to her symptoms. The SNOOP10 mnemonic can help provider remember red flag symptoms for secondary headaches including systemic symptoms, neoplasm history, neurologic deficit, abrupt onset, older age, pattern change, positional headache, precepting by sneezing, coughing, or exercise, papilledema, progressive headache, pregnancy or postpartum, painful eye, posttraumatic, immunodeficiency, and painkiller overuse headache. Unfortunately, the sensitivity and specificity of these red flags are not well established and even in patients with red flags the majority will have negative imaging. For most headaches with red flag signs or symptoms, MRI or CT with contrast will aid in diagnosis. One exception is if intracranial hemorrhage is on the differential, in which case CT without contrast should be performed first.

CONCLUSION: Red flag warning signs for headache warranting imaging include photophobia, nausea, vomiting, and changes in mental status. New-onset and progressive headaches, especially in middle-aged patients are concerning for secondary etiology, namely intracranial neoplasm. Symptoms between headache episodes or discomfort > 72 hours warrants further workup.

CIPROFLOXACIN-INDUCED MYASTHENIA GRAVIS

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LEARNING OBJECTIVE #1: Recognize medications that can induce myasthenic syndromes, including fluoroquinolones (FQ)

LEARNING OBJECTIVE #2: Recognize dysphagia as a rare initial presentation of myasthenia gravis (MG)

CASE: A 70-year-old woman with COPD with intermittent inhaler use, depression on bupropion, and tobacco use disorder presented to clinic with dysphagia. Nine months prior, she was prescribed ciprofloxacin for pyelonephritis. After 2 doses, she had intermittent oropharyngeal dysphagia which initially resolved but recurred after 4 months. She experienced a hypernasal voice with prolonged speaking and diplopia after reading one line of text.

At a 2-month follow-up, she had bilateral ptosis, orbicularis oculi weakness, and ataxia, prompting direct admission to the hospital for further evaluation. Physical exam showed palatal weakness, hyperactive gag reflex, and tongue fasciculations. No fatigable weakness was noted. Bilateral hyperreflexia was present in the biceps, brachioradialis, and patellar regions. She was unable to count to 20 in a single breath and had protrusion of her abdomen with coughing. Strength and sensation were intact.

A modified barium swallow study showed a weak swallowing mechanism without significant epiglottic motion. MRI of the brain and cervical spine were unrevealing. AChR antibodies were positive. Chest CT showed no thymoma. Electromyography testing was not performed.

The patient was diagnosed with MG and completed 2 days of IVIG prior to initiation of pyridostigmine 60 mg four times daily and prednisone 60 mg daily. She markedly improved and was discharged home with neurology follow-up. She did not tolerate immunosuppressive therapy, but still takes pyridostigmine.

IMPACT/DISCUSSION: Many drugs exacerbate existing MG and cause myasthenic crises. Less commonly, some medications induce myasthenic syndromes that resolve upon medication withdrawal or de novo MG with positive AChR antibodies requiring lifelong treatment. FQs block neurotransmission at the post-synaptic membrane and stimulate production of AChR antibodies, leading to de novo MG.

Mumford et al describes a 73-year-old man who developed bulbar symptoms within 48 hours of initiating ciprofloxacin for chronic osteomyelitis with improvement after withdrawal of the FQ. He had mild dysphagia for months prior, suggesting unmasking of subclinical MG. Because our patient developed new-onset bulbar symptoms within 48 hours of FQ exposure without improvement after discontinuation, we suggest she is the 2nd reported case of ciprofloxacin-induced de novo MG.

CONCLUSION: Though our patient identified ciprofloxacin as the cause of her symptoms, MG was not on the initial differential diagnosis since few cases of FQ-induced de novo MG exist in literature. The diagnosis was delayed even after evaluation by multiple specialists. Additionally, dysphagia as a presenting complaint is rare, though more common in the elderly. In patients presenting with bulbar symptoms in the setting of recent FQ use, it is important to consider MG on the differential diagnosis.

COIL TOOK MY MEMORY

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LEARNING OBJECTIVE #1: Manage unruptured intracranial aneurysm.

LEARNING OBJECTIVE #2: Recognize and diagnose anterograde amnesia.

CASE: A 57-year-old African American woman with a past medical history of hypertension, type 2 diabetes mellitus, and pulmonary sarcoidosis underwent an MRI of the brain for evaluation of headaches. An incidental finding of a four-millimeter right-sided bilobed anterior communicating artery (Acomm) aneurysm was noted. The patient was referred to Neurosurgery for evaluation. Stent-assisted coil embolization was performed and her post-op hospital stay was uneventful. The patient was then seen by her Primary Care Physician seven days after the procedure due to the emergence of profound memory difficulties and was sent to the ED for further workup. She couldn't recall coming to the hospital, basic events that occurred earlier in the day, or her recent procedure. Her long-term memory remained intact.

A repeat brain MRI revealed acute ischemia involving the anterior column of the fornix bilaterally as well as several tiny early subacute infarcts in the right corona radiata and centrum semiovale. Her transthoracic echocardiogram was negative for a patent foramen ovale or cardiac thrombus, and her carotid arteries were normal. The patient was diagnosed with acute anterograde amnesia secondary to ischemic complications from her recent procedure.

She received occupational therapy and showed some improvement in her mentation during her hospitalization. She was discharged on dual antiplatelet therapy with plans to pursue cognitive and occupational therapy in the hopes of further improving her memory and functionality.

IMPACT/DISCUSSION: This may be the first report documenting anterograde amnesia with stent-assisted coil embolization. The fornix is a part of the hippocampus that helps to encode new episodic memory. The anterior columns of the fornix are supplied by the subcallosal artery, which arises from perforating branches off of the posterior AComm. Occlusion or damage to these perforating arteries leads to a fornix stroke.

Two large prospective studies have shown that the risk of aneurysmal rupture only increases with a size of more than seven millimeters. Given that the size of this patient's aneurysm was four millimeters, a conservative approach would have been more beneficial. This case highlights the burden of morbidity and mortality associated with undue interventions for incidental findings.

CONCLUSION: -Not all unruptured intracranial aneurysms require surgical intervention.

-Such interventions, even though considered relatively safe, come with a variety of lesser-known complications about which patients need to be educated.

COMPASSIONATE CARE FRAMEWORK FOR THE PATIENT WITH FUNCTIONAL GASTROINTESTINAL DISORDER (FGID) OR IRRITABLE BOWEL SYNDROME (IBS)

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LEARNING OBJECTIVE #1: Describe a low FODMAP diet in patient friendly terms and identify patients who may benefit from this diet

LEARNING OBJECTIVE #2: Explain how compassionate care can independently improve symptoms of FGID and IBS

CASE: A 27-year-old female with anxiety and depression presented to her PCP for five years of worsening GI symptoms. She described intermittent nausea and non-bloody emesis associated with epigastric pain, not precipitated by eating nor relieved with defecation/flatus. She denied fever, chills, weight loss, diarrhea, melena, hematochezia, acholic stools, or dysuria. A GI consult three years prior resulted in an extensive work-up including an unremarkable colonoscopy and upper endoscopy (biopsies negative for *H. pylori* or celiac sprue). Additional normal tests included HIDA scan, gastric emptying study, upper GI series, CT A/P and CT head. Labs including CMP, lipase, TSH and toxscreens remained negative or normal. She trialed omeprazole, dicyclomine, a lactose-free diet, and a gluten-free diet without remedy. Her PCP advised she trial a low FODMAP diet. At a 4-week follow-up visit she described near resolution of symptoms. Her gastroenterologist determined functional gastrointestinal disorder (FGID) was the most likely diagnosis.

IMPACT/DISCUSSION: FODMAP is an acronym for specific short-chain sugars that can be poorly absorbed in people with a sensitive intestinal tract. A 2-week diet low in FODMAP can reduce GI symptoms; then these foods are slowly reintroduced as tolerated. Low FODMAP diet should be recommended to any patient where suspicion for FGID or IBS is high including lack of alarm features, diagnostic work-up remains negative, or patient meets diagnostic criteria for IBS. Evidence from prospective trials demonstrate adherence to a low FODMAP diet can improve GI symptoms in up to 75% of cases. Physicians' efforts to find an "organic" etiology and cure for patients with FGID or IBS can often lead to the provider feeling drained or frustrated and can damage the therapeutic relationship. Listening uninterrupted for a few minutes and displaying empathy can independently help relieve the patient's symptoms. Providing simple physiologic explanations for symptoms such as "sensitive intestinal tract" while reassuring the patient they do not have a diagnosis such as cancer and evaluating for psychosocial factors can also lead to improvement. Upon reflection, the physician should not feel burdened with nor responsible for finding a "cure" for patients with FGID or IBS, but rather attempt to listen with a compassionate ear while continuing to trial multicomponent symptom management strategies without abandonment.

CONCLUSION: * FODMAP are specific sugars that can be poorly absorbed in certain people with sensitive intestinal tracts.

* A low FODMAP diet should be trialed in any patient where suspicion for diagnosis of FGID or IBS remains high.

* Providing compassionate care to a patient with FGID or IBS can independently improve GI symptoms.

COMPLEX REGIONAL PAIN SYNDROME: A SHINGLES SEQUELA

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LEARNING OBJECTIVE #1: Prevent misdiagnosis by recognizing that complex regional pain syndrome (CRPS) is a chronic sensory condition that should be maintained in the differential when diagnosing shingles.

LEARNING OBJECTIVE #2: Manage and treat CRPS as a sequela of shingles.

CASE: A 79 year old female presented to the clinic with radiating groin pain down the posterior surface of the left leg to the dorsum of her foot. Imaging was negative for fracture or deep vein thrombosis but did reveal arthritic changes. A steroid taper was given.

The patient returned two days later stating that a rash with visible crusting vesicles had now appeared along the distribution of the original pain. She was diagnosed with shingles and given gabapentin and valacyclovir. The patient returned about a week later with improvement but was still experiencing significant dorsal foot pain. She was given lidocaine 5% external ointment with modest efficacy.

A month later the patient presented with progressive left foot drop. This deficit had begun within a few days of her initial symptoms but had been insignificant to her at that time. She required a cane to ambulate and had unilateral numbness

and diminished muscle strength below the left knee. The foot was plantarflexed and erythematous. Achilles and patellar reflexes were 0/4 on the left leg. The gabapentin was increased, the prednisone was restarted and she was referred to physical therapy. About a week later the patient was diagnosed with CRPS due to pain, erythema, swelling and continued motor deficits in the lower extremity. Compression stockings and foot elevation were added.

IMPACT/DISCUSSION: CRPS is a clinical diagnosis based on the budapest criteria that requires three of four conditions to be present. One, chronic pain disproportionate to any inciting event. Two, symptoms in at least three of the following subgroups: sensory (hyperesthesia, skin changes), vasomotor (skin temperature), sudomotor (edema) and motor (weakness, tremor or dystonia). Three, on physical exam, signs in two or more of the following subgroups must be present: sensory, vasomotor, sudomotor and motor. Four, the diagnosis must be of exclusion.

The literature suggests that the treatment of CRPS requires a multifaceted approach. Gabapentin at 900-3600mg per day might be necessary to target symptoms but should be weighed against the frequently occurring side effects. Glucocorticoids appear to be more effective in the acute phase than in the chronic phase. Lastly, physical therapy is a widely accepted and encouraged treatment in CRPS.

CONCLUSION: CRPS is a possible complication of shingles that can initially be mistaken for post-herpetic neuralgia. The patient may present typically but will develop further symptoms that are consistent with the budapest criteria for diagnosing CRPS. The standard treatments are gabapentin, steroids, topical lidocaine and physical therapy. Clinicians would be wise to maintain CRPS on the differential when evaluating for shingles and sequela as this will allow for prompt diagnosis and accurate treatment.

CONSERVATIVE MANAGEMENT OF SPONTANEOUS CORONARY ARTERY DISSECTION

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LEARNING OBJECTIVE #1: Diagnose non-atherosclerotic forms of acute coronary syndrome (ACS) in patients presenting with anginal symptoms.

LEARNING OBJECTIVE #2: Recognize cases of spontaneous coronary artery dissection (SCAD) that can be managed medically, without the need for surgical or catheter-based intervention.

CASE: A 40-year-old woman presented to the emergency department with retrosternal chest pain at rest, associated with diaphoresis, palpitations, and nausea. Her past medical history was significant for hypertension and type 2 diabetes.

On presentation, blood pressure was elevated to 150/81 mmHg, remaining vitals were normal. Initial electrocardiogram (ECG) showed normal sinus rhythm with no ischemic changes. Laboratory tests revealed an elevated high sensitivity troponin level to 104 ng/L (ref: <19 ng/L). Echocardiography displayed an ejection fraction of 60% and no regional wall motion abnormalities. Coronary angiography was performed, which revealed non-obstructive coronary artery disease (CAD) with dissection of the mid-to-distal right posterolateral branch of the right coronary artery (RCA). No intervention was performed given mild extension of dissection and location. Of note, she did have recurrent chest pain with subsequent resolution. Given her overall symptomatic improvement, she was eventually discharged on metoprolol succinate, aspirin, and a moderate dose statin.

IMPACT/DISCUSSION: SCAD involves dissection of an epicardial coronary artery that is not secondary to atherosclerosis, trauma, or iatrogenic causes. It is the cause of up to 1-4% of ACS cases, occurs mostly in women, and is the most common cause of pregnancy-associated myocardial infarction (MI).

The pathogenesis of SCAD involves the sudden disruption of the intimal layer, leading to dissection of the tunica media and subsequent formation of an intramural hematoma within a false lumen, and eventual compression of the true lumen. This leads to reduced coronary blood flow and MI. Clinical manifestations of SCAD can range from stable angina, to cardiogenic shock

and life-threatening arrhythmias. Coronary angiography should be the first-line diagnostic imaging study.

Management of SCAD varies depending on the case presentation and the severity of the condition. Patients with extensive dissections resulting in recurring symptoms and myocardial ischemia usually require percutaneous coronary intervention (PCI), while surgery is preferred for multi-vessel disease. Medical therapy is indicated for cases with mild involvement, and may include aspirin, P2Y₁₂ inhibitors, beta blockers, and nitrates.

Generally, patients with SCAD have a good prognosis especially with early detection and treatment. Recurrence of SCAD occurs in a minority of cases.

CONCLUSION: Acute coronary syndrome (ACS) does not solely arise from coronary atherosclerosis, but instead encompasses various etiologies with different management.

Management of SCAD is dependent on severity, location and extent of dissection, which is based on clinical presentation and findings on coronary angiography.

CORONARY ARTERY THROMBI AS INITIAL PRESENTATION OF ANTIPHOSPHOLIPID SYNDROME

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LEARNING OBJECTIVE #1: Recognize acute myocardial infarction as presentation of Antiphospholipid Syndrome (APS) in young patients.

LEARNING OBJECTIVE #2: Define appropriate treatment in patients with APS and acute coronary syndrome.

CASE: A 32-year-old male prisoner with a past medical history of PTSD and depression was found in his cell minimally responsive covered with vomitus. Naloxone was administered, which resulted in minimal improvement of his mental status, so he was transferred to our ED. On presentation, the patient was lethargic, tachycardic, hypotensive, and hypoxemic. He was started on high flow oxygen by nasal cannula and isotonic IV fluids with improvement in his blood pressure and oxygenation. Initial lab results were significant for WBC 21.9, lactic acid 5.3, and troponin 6.19. Urine toxicology screen was negative. Chest x-ray showed bilateral infiltrates concerning for multifocal pneumonia. EKG showed ST elevations in leads II, III, and aVF. The patient was admitted to the ICU and empirically started on treatment for pneumonia and STEMI with vancomycin, piperacillin-tazobactam, IV heparin drip, aspirin, atorvastatin, and metoprolol. Echocardiogram showed EF 57% with no wall motion abnormalities. Cardiac catheterization revealed multiple thrombi in the right coronary artery without evidence of endothelial lesions. He was continued on IV heparin and started on dual antiplatelet therapy. Repeat cardiac catheterization on day 2 revealed significant improvement in thrombus burden. On day 5, he suddenly developed severe right upper extremity pain. Emergent US with arterial doppler showed acute thrombosis of the mid and distal segments of the right radial artery. Further testing for hypercoagulability was consistent with APS, including positive lupus anticoagulant, anticardiolipin antibody, anti-beta 2 glycoprotein I, and elevated partial thromboplastin time. Patient completed the antibiotics. He was discharged on day 6 on warfarin, cardiology core medications, with follow-up with hematology.

IMPACT/DISCUSSION: APS is characterized by the development of venous and/or arterial thromboses. The most common thrombotic events associated with APS are deep vein thrombosis and pulmonary embolus (type I syndrome) and coronary or peripheral artery thrombosis (type II syndrome). APS and acute coronary syndrome are rarely reported. In our case, angiography showed acute in-situ thrombosis without evidence of an underlying atherosclerotic coronary artery disease.

The management of coronary thrombosis without underlying coronary artery disease remains unclear. In our patient, heparin infusion and dual antiplatelet therapy were pursued with excellent clinical results.

CONCLUSION: Unprovoked venous or arterial thrombotic events in young patients should prompt suspicion for APS, such as coronary artery thrombi in the setting of normal coronary arteries. Prompt diagnosis and treatment are required to prevent the development of complications, as

anticoagulation types and goals for patients with APS differ from the general population.

CREATINE SUPPLEMENTATION IN A POSTMENOPAUSAL WOMAN: HERCULEAN OR HARMFUL

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LEARNING OBJECTIVE #1: Recognize the impact of creatine supplementation on serum creatinine and renal function in postmenopausal women.

LEARNING OBJECTIVE #2: Engage in shared decision-making using individualized risk-benefit assessments for supplements such as creatine.

CASE: A 63-year-old postmenopausal woman presented to the general medicine clinic to establish care. She had a history of breast cancer that was treated with lumpectomy, radiation, and anastrozole, gastroparesis which was well-controlled with metoclopramide, and osteopenia, for which she was taking calcium and vitamin D supplements.

She had no active complaints, and her review of systems was negative. She exercised regularly, with 4 days per week of resistance training and 3 days of cardiovascular exercise. She consumed 25 g whey protein daily and had recently increased her creatine supplementation from 5 g, 3 days per week to 5 g daily, which she cited as markedly beneficial to her exercise performance.

Her vital signs and physical exam were within normal limits. Serum creatinine concentration was 1.01 mg/dL (ref. 0.57-1.00), an increase of 0.14 from her baseline of 0.87. Her estimated glomerular filtration rate (eGFR) was 59 mL/min/1.73 m² (ref. >59), a decrease of 12 from her baseline of 71.

The history, physical, and laboratory evaluation did not reveal any risk factors for intrinsic renal disease. She was normotensive, euglycemic, and without a history of infection or systemic conditions associated with renal pathology. Her medications were not nephrotoxic. Dehydration was unlikely due to her consistent water intake. Her elevated creatinine was attributed to recently increased creatine supplementation; however, a repeat measurement 5 weeks later returned to her baseline, 0.87 mg/dL.

IMPACT/DISCUSSION: Creatine supplements increase muscle mass and strength across multiple groups, including older adults. As creatine is renally excreted and can be metabolized to cytotoxic substances, there are concerns for potential nephrotoxicity. However, direct metabolism of creatine to creatinine may result in benign increases in serum creatinine.

Elevations in serum creatinine attributed to creatine intake are not widely reported in postmenopausal women. Most studies of creatine supplementation in healthy populations have not demonstrated significant increases in creatinine, although there are reports of elevations in young athletes, particularly with higher doses and during loading phases. Our patient's elevated creatinine after increasing her creatine dose resolved spontaneously, suggesting a transient effect that may precede renal compensation, rather than true nephrotoxicity.

CONCLUSION: Interpret serum creatinine with caution in patients taking creatine, including postmenopausal women.

Transient elevations associated with creatine initiation or dose increases are not likely to reflect true nephrotoxicity.

Creatinine measurements should be repeated before discontinuing supplements that provide functional benefits.

CREATING A WIN-WIN: MITIGATING AVOIDABLE UTILIZATION OF HEALTHCARE RESOURCES BY SOLICITING PATIENT'S PERSPECTIVE

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LEARNING OBJECTIVE #1: Recognize impact of patient-centered communication in medical interviewing.

LEARNING OBJECTIVE #2: Assess patient's perspective to provide holistic care.

CASE: A 31-year-old male with a medical history that included generalized anxiety disorder, depression, polysubstance abuse, and bipolar disorder presented to our internal medicine clinic with diffuse abdominal pain, nausea (N), vomiting (V), and non-bloody diarrhea with intermittent constipation of 6 months duration. During the first visit, he reported N/V following fatty foods. He was advised to keep a food diary, implement a low-fat diet, and obtain labs. Fourteen days later, he presented again with two days of constipation, which improved after taking over-the-counter laxatives. Previously ordered labs had not been completed and were re-ordered. 8 days later, he reported continued gastrointestinal discomfort and new non-productive cough, subjective fevers and sweats, and exposure to several COVID-19 positive co-workers. In addition to previously ordered blood and stool studies, COVID-19 testing was ordered and found to be negative. 6 days later, he presented for his fourth visit with continued symptoms. After this visit, additional comprehensive labs including testing for auto-immune and infectious etiologies revealed normal values. At his fifth and sixth visit, each 8 days apart, he presented with persistent symptoms and worsening N/V in the morning. A thyroid stimulating hormone was ordered, and he was again encouraged to keep a food and symptom diary. Reassurance was provided with plans to continue conservative management until seen by gastroenterology. 9 days later, he presented for his seventh visit with persistent symptoms.

At this visit, the physician inquired specifically about his perspective on his illness, including his goals and expectations for care. An open-ended discussion ensued, revealing that his goal all along was to obtain a work excuse. A chronological symptom was reviewed to ensure shared understanding and revealed a previously unreported use of cannabis to alleviate abdominal pain and N/V.

IMPACT/DISCUSSION: This case demonstrates the critical importance of soliciting the patient's perspective. Physicians frequently do not explore patients' expectations during visits (1) and overlook patients' context leading to a "contextual error" in medical decision making (2) as depicted in this case. Quality care with appropriate use of health care resources would have been provided for this patient, if his perspective was solicited earlier in the visit. Utilization of patient-centered communication techniques (3) for medical interviewing is a necessary, but a not naturally occurring skill for physicians that allows physicians to provide high value care.

CONCLUSION: Patient-centered communication in medical interviewing allows for a holistic approach towards care and results in overall improved health outcomes (4) and patient satisfaction (5).

CROWNED DENS SYNDROME MIMICKING POLYMYALGIA RHEUMATICA

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LEARNING OBJECTIVE #1: Avoid anchoring to a diagnosis of polymyalgia rheumatica (PMR) in the setting of high inflammatory markers while on steroids.

LEARNING OBJECTIVE #2: Consider crowned dens syndrome in the differential for acute neck pain and elevated inflammatory markers in the elderly.

CASE: A 75-year-old man with a history of cervical spine arthritis presented to his local clinic for acute on chronic neck and shoulder pain. Erythrocyte sedimentation rate (ESR) was elevated at 76 mm/hr and C-reactive protein (CRP) high at 110 mg/L. PMR was diagnosed and prednisone 20mg/day was initiated. Symptoms improved and prednisone was tapered. He then had another "flare" of neck pain on low dose prednisone. Despite an increase in prednisone to 15mg/day, ESR and CRP remained elevated at 39 mm/hr and 121 mg/L. PET-CT was negative for extra-cranial Giant Cell Arteritis (GCA) or an occult malignancy, and steroids were continued for "refractory" PMR. He then sought subspecialty consultation at our center for new onset ankle pain. Arthrocentesis yielded 25,000 WBCs and calcium pyrophosphate (CPP) crystals. On further review of the PET-CT, FDG-avidity was seen at the

atlanto-axial joint. The history, labs, and compatible imaging, led to a unifying diagnosis of pseudogout. Prednisone was tapered and initiation of ibuprofen led to resolution of ankle pain and a return to his baseline neck pain.

IMPACT/DISCUSSION: PMR is a common inflammatory disease in the elderly characterized by pain and stiffness in the hip and shoulder girdle. Many inflammatory conditions mimic PMR because of its nonspecific symptomatology and lack of specific diagnostic tests. While PMR can present with elevated inflammatory markers, these are not required for diagnosis. PMR is typically responsive to anti-inflammatory doses of corticosteroids.

In patients who are treated for PMR, failure to respond clinically to steroids or persistently high inflammatory markers should prompt consideration of an alternate diagnosis, such as GCA, inflammatory arthritis, or rarely, malignancy.

Pseudogout is a common type of crystalline arthritis in the elderly that frequently presents as episodic pain and swelling in knee, ankle or wrist joints. A rare but painful clinical manifestation of pseudogout is crowned dens syndrome, in which pseudogout affects the atlanto-axial joint. Calcification of the atlanto-axial joint on open-mouth or odontoid x-ray can be diagnostic; however, x-rays can be negative early in disease course. CPP crystals on aspiration of an accessible joint can provide a definitive diagnosis. Flares are typically treated with 7-14 days of anti-inflammatory drugs.

CONCLUSION: High inflammatory markers and a flare of peripheral arthritis called into question the initial diagnosis of PMR, and led to a unifying diagnosis of pseudogout. Although crowned dens syndrome is a rare cause of neck pain, it is one of several conditions that may be mistaken for PMR.

In this case, reevaluating the diagnosis led to a reduction in chronic steroid exposure.

CRYPTOCOCCAL MENINGITIS: THE CLOT THICKENS

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LEARNING OBJECTIVE #1: Recognize cerebral venous thrombosis as a rare complication of cryptococcal meningitis.

LEARNING OBJECTIVE #2: Identify clinical and radiographic features of cerebral venous thrombosis.

CASE: A 41-year-old man with HIV/AIDS and a history of cryptococcal meningitis (CM) presented to the ED with 3 days of worsening left frontal/parietal headaches. He had been diagnosed with CM 2 months prior and re-hospitalized for recurrence 3 weeks prior, on both occasions treated with amphotericin B/flucytosine induction therapy; he reported compliance with maintenance fluconazole and prophylactic trimethoprim/sulfamethoxazole. On arrival, he was tachycardic to 115 bpm but was afebrile with otherwise stable vital signs. His neurologic exam was intact with no focal deficits. A lumbar puncture was performed with minimal headache relief and a normal opening pressure of 18 cm H₂O. CSF studies were notable only for mildly elevated protein of 62 mg/dL with no pleocytosis.

CSF and blood cultures were negative, though CSF cytology was positive for *Cryptococcus neoformans*. However, cryptococcal antigen titers were 1:640, unchanged from prior, and previous fungal cultures demonstrated susceptibility to fluconazole and amphotericin. MRI of the brain was performed, revealing a left temporal gyriform signal increase and a low gradient echo signal along the left cortical vein draining into the transverse sinus, suspicious for venous thrombosis. The diagnosis was confirmed on CT venogram. The patient was started on a heparin drip and transitioned to low molecular weight heparin (LMWH). Repeat CT venograms and MRI confirmed stability of the thrombus, and with improvement of his headaches and no new neurologic findings, the patient was discharged on warfarin with LMWH bridging.

IMPACT/DISCUSSION: Cerebral venous thrombosis (CVT) is a rare complication of CM, with few cases reported in the literature.¹ It is critical to recognize given the significant morbidity and mortality from potential sequelae

such as seizure, infarction, hemorrhage, and herniation. A potential mechanism for the development of CVT in cryptococcal infections is cryptococcal expression of urease promoting sequestration in microcapillaries and formation of microemboli.² Additional procoagulant risk factors in this patient included elevated anticardiolipin IgG/IgM antibodies, low CD4:CD8 ratio, high viral load, and lack of antiretroviral therapy.¹

CONCLUSION: This case demonstrates the importance of avoiding anchoring biases; though the patient had a known diagnosis of CM, it was necessary to broaden the differential diagnosis and evaluate for additional causes of his persistent symptoms.

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CRYPTOGENIC STROKE, NOT SO CRYPTOGENIC ANYMORE – A CASE SERIES OF ISCHEMIC STROKE AND PATENT FORAMEN OVALE

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LEARNING OBJECTIVE #1: Recognize patient foramen ovale (PFO) in cryptogenic stroke patients.

LEARNING OBJECTIVE #2: Manage PFO with personalized approach.

CASE: Case 1

29-year-old male previously healthy without significant medical history had transient right-sided weakness and blurry vision for one day. Head CT scan was normal. CT angiogram (CTA) of head and neck did not reveal arterial lesion. MRI of brain revealed small acute ischemic changes in the left posterior frontal lobe. No Hypercoagulable state was identified. Echocardiogram revealed atrial septal shunt. Transesophageal echocardiography (TEE) confirmed the presence of PFO. Lower-extremity venous duplex ultrasound (VDUS) was negative. He was discharged with dual antiplatelet therapy (DAPT) with aspirin and clopidogrel, atorvastatin and the appointment for PFO closure.

Case 2

59-year-old man without cardiovascular disease presented for intractable occipital headache and gait instability. CT of the head revealed right posterior inferior cerebellar artery (PICA) territory infarction. CTA of head and neck showed vertebral arteries were right dominant and distal left vertebral artery was atretic. Echocardiogram revealed an atrial left-to-right shunt. TEE identified the PFO with an interatrial septal aneurysm and a bidirectional shunt. Lower-extremity VDUS did not identify any thrombus. The patient was started with aspirin, atorvastatin and a 30-day cardiac monitor to screen for paroxysmal atrial fibrillation before proceeding with PFO closure.

Case 3

75-year-old man with a past medical history of hypertension presented with acute expressive aphasia.

The word-finding difficulty lasted for an hour. CT of the head was normal. Bilateral carotid duplex scan was unremarkable. Echocardiogram showed PFO with right-to-left shunting and aortic sclerosis and calcification. TEE showed an intra-atrial septal aneurysm with PFO and bidirectional shunt. The patient was discharged with aspirin, atorvastatin and a 30-day loop monitor.

IMPACT/DISCUSSION: We demonstrate different approach to patients of various age groups that were found with cryptogenic stroke associated PFO. Several studies have shown a higher prevalence of PFO in cryptogenic stroke patients. Increasing evidence suggests that PFO closure can reduce future stroke risk in selected patients. There is no clear evidence in managing patients with PFO and cryptogenic stroke. The consensus now is to provide PFO closure for cryptogenic stroke patients under age 60. In our case series, the younger patient was advised to opt for PFO closure and the older patients had a more conservative management. Clinician should review the risk and benefit of different treatments with the patients to facilitate shared decision making.

CONCLUSION: Investigation of cryptogenic stroke should include cardiac embolism. Personalized management and shared decision making are recommended for PFO in cryptogenic stroke patients.

DELAYED DIAGNOSIS OF VASCULITIS IN A PATIENT WITH CHRONIC MASTOIDITIS

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LEARNING OBJECTIVE #1: Identify vasculitis as a differential diagnosis for chronic mastoiditis

LEARNING OBJECTIVE #2: Recognize that diagnostic momentum can lead to a delay in diagnosis

CASE: A 58-year-old Spanish-speaking woman developed acute left tinnitus followed by left ear pain. She was initially diagnosed with otitis media and placed on multiple courses of antibiotics without improvement. Three months later, she was admitted to an Otolaryngology (ENT) service with acute bilateral facial paralysis, retrobulbar optic neuropathy, and left partial cranial nerve III and VI palsy. MRI of her brain revealed abnormal dural thickening and enhancement surrounding the left temporal bone, worrisome for meningitis complicating otomastoiditis. She underwent bilateral mastoidectomies and left facial nerve decompression, which was complicated by bilateral hearing loss. Cultures and pathology did not reveal an infectious source, but she completed six weeks of antibiotic therapy due to high clinical concern for osteomyelitis. She noted minimal improvement. One month later, she experienced blurred left eye vision and dyspnea prompting readmission to the ENT service. Due to concern for meningitis or malignant otitis externa, she was empirically started on vancomycin and cefepime. CT chest showed scattered ground-glass opacities. Urinalysis had 4-10 red blood cells. Her symptoms again failed to improve with broadened antimicrobial coverage. Given significantly elevated inflammatory markers, lung involvement, and clinical course, alternative etiologies such as granulomatosis with polyangiitis (GPA) were considered and she was transferred to a medicine service. Her C-ANCA titer was 1:2560 and PR3 was >30, which, together with her CT chest and clinical symptoms, were consistent with GPA. She was treated with high dose methylprednisolone with marked clinical improvement.

IMPACT/DISCUSSION: This patient was ultimately diagnosed with GPA after a diagnostic delay of several months in the setting of antibiotic treatment failure for presumed chronic mastoiditis/osteomyelitis. This case fell subject to diagnostic momentum by way of accepting an infectious etiology based on the imaging reports without sufficient skepticism or revisitation of the initial diagnosis. The decision to perform bilateral mastoidectomies for presumed chronic mastoiditis unfortunately led to permanent hearing loss. However, she was able to recover some vision after the initiation of steroids. In reality, it may be difficult to differentiate between infectious versus inflammatory causes of mastoiditis, especially on MRI. Therefore, clinicians should consider GPA in the differential diagnosis of patients with upper and lower airway disease, especially with failure to improve on appropriate antimicrobial coverage for presumed otomastoiditis, such as our patient.

CONCLUSION: Clinicians should consider GPA in a patient with chronic mastoiditis and no objective evidence of microbial growth. Diagnostic momentum can cause delays in diagnosis and ultimately cause harm to patients.

DERMATOMYOSITIS COMPLICATED BY ACUTE RETROPERITONEAL HEMORRHAGE

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LEARNING OBJECTIVE #1: Recognize the presentation and work up of dermatomyositis

LEARNING OBJECTIVE #2: Recognize hemorrhagic myositis as a possible fatal dermatomyositis complication

CASE: Dermatomyositis is an inflammatory myopathy associated with a heliotrope rash, Shawl sign, and Gottron papules. These patients are

susceptible to hemorrhagic myositis, a rare complication with about a 60% mortality rate. A 59-year-old woman with history of anxiety presented to the emergency room (ER) with a worsening erythematous, painless, non-pruritic facial rash, difficulty swallowing, and shoulder weakness for six weeks.

On presentation, she had a temperature of 98.5 °F, heart rate of 112 beats per minute, blood pressure of 151/94 mmHg, and oxygen saturation of 98% on room air. On exam, she had a well-demarcated erythematous rash along her periorbital region (heliotope rash), bilateral cheeks and nasal bridge (malar erythema), lower neck (Shawl sign), and finger joint extensor surfaces (Gottron's papules). Proximal muscle strength were graded at 4/5. She was admitted for further work up.

Pertinent negative laboratory results include double-stranded DNA antibody and C-reactive protein. Pertinent positive results included an elevated antinuclear antibody titer at 1:160, creatine kinase at 1,500 units/liter, and positive anti-nuclear matrix protein antibody. Skin and muscle biopsies confirmed dermatomyositis.

She was started on hydroxychloroquine, intravenous immunoglobulin therapy, and pulse dose intravenous methylprednisolone followed by oral prednisone. She was maintained on deep venous thrombosis prophylaxis with subcutaneous heparin (5,000 units/mL). Despite treatment, her dysphagia persisted, and a percutaneous endoscopic gastrostomy tube was placed.

A week after admission, she suddenly developed left thigh pain, weakness, and numbness. Lumbar spine magnetic resonance imaging without contrast revealed a new left pelvic mass. Abdominal and pelvic CT angiogram noted a retroperitoneal hematoma 9.3 x 4.5 cm transversely and 20.1 cm craniocaudally, compressing the distal left common iliac vein, left psoas muscle, and left iliopsoas muscle without active extravasation. She was hemodynamically stable, but hemoglobin decreased from 15.8 gram/deciliter on admission to 11.5 gram/deciliter. Platelet and coagulation studies were within normal ranges. The hematoma was treated with CT guided drain placement with eventual improvement.

IMPACT/DISCUSSION: While hemorrhagic myositis is not a routinely recognized dermatomyositis complication, it has been seen in patients both on and off anticoagulation. The etiology of our patient's retroperitoneal hemorrhage was likely multifactorial including steroid-induced tissue friability, prophylactic heparin use, and dermatomyositis immune complex deposition weakening intramuscular vasculature.

CONCLUSION: This case highlights the presentation and work up of dermatomyositis. Furthermore, we emphasize recognition the extensive systemic complications of dermatomyositis including a potentially fatal hemorrhagic myositis.

DIAGNOSIS OF WERNIKE'S ENCEPHALOPATHY 15 YEARS GASTRIC BIPASS SURGERY FOLLOWING LIFESTYLE CHANGES DURING COVID-19 ISOLATION

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LEARNING OBJECTIVE #1: Diagnose Wernicke's Encephalopathy in patients with bariatric surgery.

LEARNING OBJECTIVE #2: Recognize potentially deleterious effects of social isolation on health.

CASE: A 44-year-old obese woman with history of gastric bypass 15 years ago was admitted for worsening confusion over 3 weeks. There was no history of fever, seizures, and impaired consciousness. She had bilateral vertical nystagmus, ataxic gait and was disoriented. Laboratory workup was unrevealing, including normal vitamin B12 and thyroid function tests. Magnetic resonance imaging of the brain demonstrated increased signal in the periaqueductal gray matter, periventricular matter along 3rd ventricle, and medial thalamic areas. Diagnosis of Wernicke's encephalopathy (WE) was made on clinical grounds and high dose thiamine repletion was started. History from family revealed that the patient was functional and independently raising her son until a month ago. She had history of alcohol use but had increased consumption over the prior months while working from home and isolating

from friends and family during the COVID-19 pandemic. She stopped eating 1.5 months prior to admission. She noted to be deficient in vitamins A, D and zinc. Though her global confusion mildly improved over her hospital stay, she continues to have difficulties with short and long-term memory, delusions, and confabulation, suggestive of progression to Korsakoff Syndrome.

IMPACT/DISCUSSION: Wernicke's encephalopathy is a neuropsychiatric syndrome caused by thiamine deficiency with a classic triad of nystagmus, confusion, and ataxia. Diagnosis remains difficult, as initial presentation is variable, and the clinical triad is present in as few as 10% of cases. It is classically seen in chronic alcoholics; however, any condition resulting in poor nutritional status places the patient at risk. Nutritional derangements are common following after bariatric surgery due to altered absorption of food from the stomach and small bowel reducing absorption of micronutrients. Hence life-long postoperative compliance with appropriate dietary choices and vitamin supplementation is imperative. Our patient had the triad of nystagmus, ataxia, and confusion. Pre-disposition to dietary deficiency due to prior gastric bypass, increased alcohol consumption from drastic lifestyle change during the COVID-19 pandemic, isolation from her support systems, and poor oral intake likely resulted in exacerbation of underlying nutritional deficiencies and development of WE. This case illustrates the potential for severe, irreversible consequences of thiamine deficiency and need for periodic evaluations and lifelong nutritional support in at risk patients.

CONCLUSION: WE remains underdiagnosed.

Patients with gastric bypass should be supplemented with lifelong fortified vitamin regimen. Patients in prolonged isolation from support systems maybe at risk for psychological or medical problems and may benefit from close monitoring and screening.

DIAGNOSTIC CONSIDERATIONS IN NEWLY DISCOVERED CARDIAC MASS

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LEARNING OBJECTIVE #1: Assess the potentially broad differential for a newly discovered cardiac mass

LEARNING OBJECTIVE #2: Recognize the clinical features of an obstructive cardiac mass Recognize and manage the most common sequela of cardiac myxomas

CASE: An elderly woman presented after syncope. She had been diagnosed with CML 18 months prior, and more recently, with paroxysmal atrial fibrillation, Sjogren's syndrome, and a right breast mass. TTE revealed a left atrial mass 6.9x2cm not seen on a TTE 16 months prior; the mass prolapsed across the mitral valve resulting in obstruction and syncope. Based on its appearance and prior anticoagulation use, cardiac tumor was highest on differential. CT scan confirmed left atrial mass but revealed no adenopathy or signs of other tumor outside the heart. With no other targetable biopsy site, the mass was resected – although prior to resection, case was complicated by embolic infarct resulting in upper extremity weakness. Ultimately, pathology confirmed a benign mass, most compatible with cardiac myxoma.

IMPACT/DISCUSSION: Cardiac tumors are rare. Primary cardiac tumors are especially uncommon, occurring in approximately 0.02% of cases. Comparatively, secondary tumors are much more common. Distinguishing between the two types is important as it determines treatment. In this case, primary tumor was initially thought less likely as are typically slower growing, which led to an emphasis on evaluating for secondary tumor etiologies. Of particular concern was the newly discovered breast lesion as organ carcinomas with the highest propensity for cardiac spread include breasts. While rarer, there are also cases of cardiac metastasis due to lymphoma and leukemia - concerning as patient had history of CML and Sjogren's syndrome (increasing lymphoma risk). Lastly, while she had no history, melanoma has highest propensity to spread to cardiac tissue and should always be considered when assessing for secondary cardiac tumors.

Once determined to be primary in origin, optimal treatment is surgical removal of the tumor. The most common type of primary cardiac tumor is a myxoma, which are often pedunculated and commonly originate in the left atrium. They can also result in systemic symptoms including weight loss and fever. While

traditionally thought to be slow growing, the growth rate is largely variable and there are multiple case reports of rapidly growing myxomas. Of particular importance, myxomas have a high propensity to cause embolic disease and neurologic deficits, emphasizing the importance of timely diagnosis and removal.

CONCLUSION: A broad differential should be considered when a new cardiac mass is discovered, particularly evaluating for metastatic disease and risk factors.

While tending to be slow growing, atrial myxomas have variable growth patterns and can cause symptoms relatively rapidly, including syncope.

Timely diagnosis of myxomas is vital to ensure appropriate treatment and minimize risk of negative sequela, such as embolic disease.

DIFFICULT DIAGNOSIS OF RARE DISEASE: SUBCUTANEOUS PANNICULITIS-LIKE T-CELL LYMPHOMA

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LEARNING OBJECTIVE #1: Recognize the presentation and symptoms of Subcutaneous Panniculitis-like T-cell lymphoma (SPTL).

LEARNING OBJECTIVE #2: Differentiate SPTCL from Lupus Panniculitis in a patient with SLE.

CASE: 39-y.o. AA F w/ h/o focal segmental glomerulosclerosis and granulomatous mastitis presented w/ 6 mo of progressive anorexia, fatigue, night sweats, 30 lbs unintentional wt. loss, hair loss, polyarthralgias, diffuse subcutaneous nodules, progressive lower extremity weakness and numbness. She had diffuse, painless SQ nodules since her early 20's which would spontaneously appear/regress.

Exam revealed patches of alopecia, cervical and axillary adenopathy, diffuse 0.5 to 1 cm subcutaneous masses on the forearms and legs, bilateral non-pitting edema, bilateral lower extremity weakness, numbness of soles, and absent ankle reflexes. Labs showed leukopenia (2.4) with absolute lymphopenia, monocytopenia, neutropenia (700, 130, 1600) with elevated bands (23%), normocytic normochromic anemia (Hb 9.4, MCV 88, MCHC 32.8, RDW 16.6), platelets 308, Ferritin 12,217, ESR >130, + ANA, +Ro ab (SS-A), +APL ab (Anti Beta 2 glycoprotein), + phosphatidylserine >150, + erythrocyte bound C4d. Flow cytometry revealed a 1% clonal B-cell population. CT chest/abdomen/pelvis showed deep subcutaneous fat with patchy ground-glass densities and edema throughout the chest and abdominal walls, which was worse in the pelvis and upper thighs. Bone marrow bx showed mild hypocellularity w/ no atypical aggregates or increase in lymphoid cells. Neurology w/u was consistent with polyneuropathy. She was diagnosed with SLE and treated with hydroxychloroquine and prednisone, which improved wt. loss, hair loss, and weakness; however SQ nodules persisted. Subsequent PET CT revealed innumerable superficial hypermetabolic nodules. Initial skin biopsy of the nodules was nonrevealing. Repeat biopsy of deep tissue revealed a subcutaneous panniculitis-like T-cell lymphoma (SPTCL). Oncology recommended treatment with rituximab.

IMPACT/DISCUSSION: Subcutaneous panniculitis-like T-cell lymphoma (SPTCL) is a rare form of skin lymphoma that is localized primarily to the subcutaneous adipose tissue without the involvement of the lymph nodes. SPTCL accounts for less than 1% of non-Hodgkin lymphomas presenting in late 30s with a female preponderance. SPTCL incidence is higher in patients with Lupus erythematosus panniculitis (LEP). Histologically, SPTCL is composed of cytotoxic alpha-beta T-cells that mimic LEP, however, it can occur in the abdomen and lower extremities. LEP has low Ki-67 proliferation index in the T cells, lack of atypical T cells, and presence of inflammatory cells while SPTL is usually CD3+, CD8+, CD56-, has elevated Ki-67 proliferation and usually has an indolent course.

CONCLUSION: SPTCL can co-occur with Lupus. Consider deep tissue biopsy if previous biopsy results are inconclusive. SPTCL can be successfully treated with systemic corticosteroids or immunosuppressive agents.

DIFFUSE ALVEOLAR HEMORRHAGE ASSOCIATED WITH IDIOPATHIC PULMONARY HEMOSIDEROSIS

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LEARNING OBJECTIVE #1: Recognize the clinical features of idiopathic pulmonary hemosiderosis (IPH)

LEARNING OBJECTIVE #2: Recognize if IPH can cause diffuse alveolar hemorrhage (DAH)

CASE: A 73-year-old woman presenting with fever and dyspnea was transferred to our hospital. One month before admission, she had a fever and consulted another clinic. She denied hemoptysis. She had end-stage renal disease that required hemodialysis, and myelodysplastic syndrome (MDS). Chest computed tomography (CT) showed bilateral infiltration. Community-acquired pneumonia was suspected, and empiric antibiotics were prescribed. Blood and sputum cultures were negative. Her symptoms were not alleviated, and she was transferred to our hospital. On physical examination, her vital signs were normal, and the oxygen saturation was 94% (breathing 3 L/min of oxygen through the nasal cannula). Conjunctival pallor was noted. Chest examination revealed diffuse inspiratory crackles and no heart murmur. Laboratory tests revealed leukocytosis, anemia, and thrombocytopenia. Lactate dehydrogenase, serum ferritin levels, and C-reactive protein levels were elevated. Laboratory test results were negative for antinuclear antibody, antineutrophil cytoplasmic antibody, and anti-glomerular basement membrane antibody. Chest CT revealed patchy areas of nonspecific alveolar infiltrates. The findings of bronchoalveolar lavage were consistent with DAH. To classify the cause, video-assisted thoracoscopic surgery was performed. There was infiltration of hemosiderin-phagocytic macrophages, but no evidence of vasculitis or destruction was noted. These findings supported a bland pulmonary hemorrhage (BPH) pattern. Based on the lack of coagulopathy and autoimmune disorder, IPH was diagnosed. The patient received glucocorticoids, and her symptoms ameliorated. After discharge, she had frequent infections, and her condition became difficult to control. Six months after diagnosis, the patient died of respiratory failure.

IMPACT/DISCUSSION: The underlying causes of DAH are divided into three groups: pulmonary capillaritis, diffuse alveolar damage, and BPH. A case series reported that 14% of DAH cases were idiopathic. IPH is described as a DAH with a pattern of BPH. The exact etiology of IPH is unknown, and common causes include heredity, autoimmunity, allergies, and environmental factors. The clinical manifestations of IPH are hemoptysis, dyspnea, anemia, and fever. Fever was seen in 14% of patients with IPH. There were no specific diagnostic tests. Treatment of IPH has not been established. A case series study reported that systemic glucocorticoids were effective. In general, IPH in adults has a good prognosis. In our patient, requiring hemodialysis and having MDS may have increased susceptibility to infections.

CONCLUSION: We described a patient who experienced fever as the initial manifestation of IPH. Recognizing IPH as a possible cause of DAH is critical for preventing a delay in diagnostic treatment.

DIGGING FOR THE TRUTH: DELAYED DIAGNOSIS OF SKULL BASE OSTEOMYELITIS IN AN ELDERLY WOMAN WITH UNCONTROLLED DIABETES

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LEARNING OBJECTIVE #1: Appreciate the wide differential diagnosis of chronic facial pain and headache in an elderly diabetic patient and identify next steps in management.

LEARNING OBJECTIVE #2: Recognize the importance of prompt intervention and multidisciplinary involvement in the management of skull base osteomyelitis.

CASE: A 64-year-old woman with uncontrolled type 2 diabetes mellitus presented with five months of constant, stabbing left temporal headache and progressive neurologic deficits, including blurred vision, flashing lights, and subacute left-sided hearing loss. On presentation two months prior, she was

diagnosed with giant cell arteritis despite negative bilateral temporal artery biopsy and treated with empiric high-dose steroids without improvement.

On exam, she was afebrile with normal visual acuity with glasses, diminished left-sided hearing, and mild tenderness to palpation of the left temple, ear, and jaw. Labs revealed glycosylated hemoglobin exceeding 14%, ESR of 111 mm/hr, and CRP of 22 mg/L. Computed tomography of the head demonstrated a left retropharyngeal soft tissue lesion with bony erosion of the left lateral clivus and sphenoid sinus opacification. Brain magnetic resonance imaging (MRI) showed an infiltrative enhancing soft tissue lesion centered at the left cranio-cervical junction with bony involvement. The patient underwent left sphenoidotomy with debridement. Intra-operative cultures grew *S. aureus* and *K. pneumoniae*, while histopathology showed chronic sino-nasal mucosal inflammation with fungal balls. The patient was treated with broad-spectrum antibiotics and antifungals for polymicrobial skull base osteomyelitis. Her headache and neurologic symptoms completely resolved after six weeks of treatment.

IMPACT/DISCUSSION: Skull base osteomyelitis is a rare and potentially fatal clinical entity caused by invasive fungal or bacterial infection from a sinus or otologic source. Uncontrolled diabetes, as in this patient, is a leading risk factor due to the associated immunosuppression and microangiopathy. Depending on the affected skull bones, symptoms are often vague and non-specific with cranial neuropathies occurring late in disease. MRI is the preferred imaging modality, but biopsy is typically required for definitive diagnosis and to rule out alternative diagnoses. Even then, identification of the causative microorganism can be complicated by false-negative results, particularly in the clivus bone and preclival soft tissues where chronic inflammation can be low-grade and pathogen burden low. Prolonged antimicrobial treatment is the cornerstone of treatment, often with surgical debridement. Timely intervention is needed to prevent neuro-invasive disease.

CONCLUSION: Skull base osteomyelitis is a rare clinical entity typically seen in elderly diabetic and immunocompromised patients. Its presentation can mimic other non-infectious inflammatory and malignant processes so is often misdiagnosed. Clinicians must maintain a high index of suspicion until a definitive diagnosis is made.

DO YOU SMELL THE DIFFERENCE? OLFACTORY HALLUCINATIONS IN A SCHIZOPHRENIC PATIENT

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LEARNING OBJECTIVE #1: Recognize that symptoms of psychiatric conditions can mask underlying medical conditions.

LEARNING OBJECTIVE #2: Understand that olfactory hallucinations can be a presenting symptom of pituitary pathology.

CASE: A 55 y.o. male with a h/o HTN presented to the ED for worsening delusions and olfactory hallucinations. He had symptoms of a lump on the back of his head/neck, along with smelling chemicals around his house. Collateral history confirmed that his paranoia had worsened over the past 3 months; he had become convinced that his fiancée and other family members were spraying chemicals around the house to harm him. His symptoms became so severe that he left home to sleep in his car for 2 days, prompting him to call a mental health crisis line. He had a h/o delusions, but never this severe. Family history was significant for schizophrenia in his mother and bipolar disorder in his sister.

On exam, he was alert, oriented, and calm. Vital signs: BP = 179/110 mm Hg; P = 85 bpm. A 1.5 in. round, non-inflamed subcutaneous mass was palpated over the left occiput. Neurological exam was notable for bitemporal hemianopsia. His thought content was delusional, stating he still smelled chemicals. Urine drug screen and serum ethanol levels were unremarkable. Head CT to evaluate the left occipital mass showed a lipoma measuring approximately 3.2 x 1.2 cm. However, imaging also revealed a 4.1 x 3.7 x 3.8 cm pituitary macroadenoma. The sella turcica was markedly enlarged with a large mass extending across the floor, partially filling the sphenoid sinus, which extended superiorly into the suprasellar cistern, abutting and effacing the optic chiasm. A follow up MRI confirmed findings. Pituitary labs were unremarkable.

Neurosurgery and psychiatry were consulted. The patient was started on Risperidone for paranoid schizophrenia and underwent transphenoidal resection of pituitary adenoma. His phantosmia resolved within 3 days after surgery. His paranoia also improved. He was discharged home on low dose Risperidone and 2-week course of hydrocortisone, with close follow up with neurosurgery.

IMPACT/DISCUSSION: Olfactory hallucinations can be seen in many psychiatric and neurological conditions, including schizophrenia, Parkinson's, and epilepsy. Although changes in smell can occur with pituitary tumors, it is rare for this to be the presenting symptom. In our patient, the timeline of atypical symptoms raises concerns that this be further evaluated and not simply attributed to his schizophrenia. His paranoid thinking resolved after tumor identification and phantosmia resolved after resection of tumor. This indicates that the patient's former psychiatric symptoms may have been due to the pituitary microadenoma rather than his schizophrenia. There is not an extensive literature on patients with both psychosis and a pituitary tumor.

CONCLUSION: This case highlights that diagnostic overshadowing can occur when a person with a psychiatric condition receives delayed or inadequate evaluation due to misattribution of symptoms.

ENDOGENOUS ENDOPTHALMITIS DUE TO MRSA BACTEREMIA IN A PATIENT WITH COVID-19

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LEARNING OBJECTIVE #1: To recognize the risk of endogenous endophthalmitis in patients with a systemic source of infection and immunosuppression.

LEARNING OBJECTIVE #2: Recognize the signs and symptoms of bacterial endophthalmitis.

CASE: A 34-year-old man with a history of IV drug use presents with back pain and bilateral lower extremity weakness. Blood cultures were positive for MRSA and CT of the spine showed epidural abscess at S5-L1 with intrasosseous extension. Following urgent surgical debridement and treatment with vancomycin, he showed initial improvement. However, the patient developed hypoxemic respiratory failure and was found to be COVID-19 positive. He was started on dexamethasone and remdesivir. On day 3 of treatment, the patient developed left eye vision loss due to endogenous endophthalmitis. Examination of his left eye showed complete vision loss, a hypopyon, and scleral inflammation. Despite antibiotic treatment he had persistent leukocytosis, recurrent fevers, and persistently MRSA-positive blood cultures. Due to increased immunosuppression, dexamethasone was discontinued and antibiotic coverage broadened with ceftaroline and levofloxacin. Following broad antibiotics and surgical interventions (paracentesis, vitrectomy, and intravitreal injections) his fever and leukocytosis abated, while complete vision loss improved to unilateral blurred vision.

IMPACT/DISCUSSION: Endophthalmitis is a rare and severe infection that results from infection of the interior eye by bacteria or fungi. Commonly, these infections are exogenous in nature caused as a complication of ophthalmic procedures and penetrating ocular trauma. The most commonly implicated pathogens are gram-positive coagulase negative organisms, especially *Staphylococcus epidermidis*.¹

In less common cases, endogenous endophthalmitis results from hematogenous seeding of the eye by a bacterial or fungal source. Endogenous endophthalmitis accounts for only 2-8% of all endophthalmitis cases.^{2,3}

We present a case of endogenous endophthalmitis in a patient with MRSA bacteremia who was also found to be infected with COVID-19. A systematic review by Jackson et al indicated mortality of 4% in endogenous endophthalmitis, and Okada et al demonstrated that 78% of patients had a final visual acuity of 20/400 or worse.^{4,5} Thus, bacterial endophthalmitis is a medical emergency and prompt diagnosis and treatment is critical to prevent vision loss. Intravitreal antibiotics is the most important component of treatment and, in severe cases, vitrectomy plays a paramount role.⁶ In cases of endogenous endophthalmitis, systemic antibiotics should also be considered.³

CONCLUSION: Although, endogenous endophthalmitis is much less common than exogenous endophthalmitis, there should be a high clinical suspicion in patients with a systemic source of infection, and those with one or more contributors to immunosuppression (e.g., advanced age, malignancy, diabetes mellitus, corticosteroid use).¹

EOSINOPHILIC ENIGMA: A CASE OF HEPATO-ADRENAL SYNDROME

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LEARNING OBJECTIVE #1: Identify hepato-adrenal syndrome and its presentation in both stable and end-stage cirrhosis

LEARNING OBJECTIVE #2: Recognize adrenal insufficiency as a cause of peripheral eosinophilia

CASE: A 42-year-old male with alcoholic cirrhosis complicated by recurrent hydrothorax and mild ulcerative colitis (not on chronic steroids) presented with acute progressive dyspnea in the setting of alcohol use relapse while on vacation. He was found to be tachycardic, tachypneic, and hypoxemic to 88% on room air, with pitting edema in bilateral lower extremities and decreased breath sounds over the right lung fields. His labs were significant for a white blood cell count of 10.6 k/uL with 1.2k eosinophils and a sodium of 130 mEq/L. Chest radiography demonstrated a large right-sided pleural effusion. The patient was admitted for acute decompensated cirrhosis and suspected hepato- hydrothorax. He underwent diagnostic and therapeutic thoracentesis that revealed a transudative pleural effusion. He also required aggressive diuresis with a continuous bumetanide infusion. Despite symptomatic improvement, he remained tachycardic with a worsening leukocytosis and persistent eosinophilia, and was started on empiric piperacillin/tazobactam. A broad infectious work-up for bacterial, mycobacterial, and fungal organisms was negative. A morning cortisol was checked and found to be < 2 mcg/dL. Serum ACTH was 20 pg/mL, and cortisol after standard-dose corticotropin stimulation testing (CST) was 22.8 mcg/dL, all consistent with a diagnosis of mild central adrenal insufficiency (AI). Antibiotics were discontinued, and the patient was started on cortisol replacement therapy with subsequent improvement of vital sign and laboratory abnormalities prior to discharge.

IMPACT/DISCUSSION: AI is uncommon in the general population and typically presents with non-specific symptoms such as fatigue, weakness, abdominal discomfort, and weight loss, which makes early diagnosis challenging. However, there is a higher reported prevalence of AI in patients with both compensated and decompensated cirrhosis, giving rise to the term hepato-adrenal syndrome, which may be associated with more severe liver disease and increased mortality. Additionally, a peripheral eosinophilia is classically associated with AI and has been reported in observational studies as a potential marker in hospitalized patients. In the workup for AI in this setting, it is further important to emphasize that, while our patient had a profoundly low early morning cortisol, the best diagnostic test is by no means clear (i.e., standard-dose vs. low-dose CST), and expert consultation may be helpful if initial testing is equivocal.

CONCLUSION: In summary, patients with cirrhosis are at increased risk for developing AI. Eosinophilia in such patients should prompt consideration of AI as a primary or concomitant diagnosis, and appropriate testing should be performed in the right clinical context.

EPISTAXIS: A UNIQUE PRESENTATION OF ACTINOMYCOSIS

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LEARNING OBJECTIVE #1: Recognize the clinical features of actinomycosis.

LEARNING OBJECTIVE #2: Manage actinomycosis in immunocompromised individuals.

CASE: 60-year-old male with coronary artery disease status-post stenting on dual-antiplatelet therapy (DAPT) with aspirin and prasugrel, type 2 diabetes mellitus, hypertension, and chronic kidney disease (CKD) stage IV presented with multiple episodes of epistaxis and dizziness resulting in a fall, without loss of consciousness or head trauma. Despite nasal packing, epistaxis continued, therefore the patient underwent flexible nasopharyngolaryngoscopy, which showed no active bleeding with dried blood clots in the left nasal cavity, however, there was decreased sensitivity of the left middle turbinate upon suctioning. The hypoesthesia was concerning for possible invasive process, with magnetic resonance imaging (MRI) face showing acute left maxillary sinusitis with hypoenhancement of the left maxillary sinus, concerning for early changes associated with fungal sinusitis. Computed Tomography (CT) sinuses was done, revealing severe left maxillary sinus disease with superimposed hyperdensity, concerning for fungal infection. Urgent nasal endoscopy and left maxillary antrostomy with tissue biopsy was done, had findings of inflamed nasal mucosa with purulent exudate in the left maxillary sinus. Piperacillin/tazobactam and micafungin were started empirically due to concerns of bacterial and/or fungal infection. Histology from the tissue biopsy was negative on fungal stains, and tissue cultures grew *Actinomyces odontolyticus*, coagulase-negative *Staphylococcus aureus*, and *Propionibacterium granulosum*. Antibiotics were narrowed to cefazolin, which were changed to cefadroxil upon discharge due to low concern for bony wall involvement, with resolution of epistaxis.

IMPACT/DISCUSSION: *Actinomyces* are gram-positive bacteria that are part of the normal flora in the upper and lower aerodigestive tracts. Actinomycosis is a relatively rare chronic, infectious disease caused by *Actinomyces*, and patients with underlying dental caries, diabetes mellitus, and immunosuppression are at a greater risk. The commonly affected areas in actinomycosis are the cervicofacial, pulmonary-thoracic, and abdominopelvic regions, however only a few cases have reported involvement of the nasal cavity and paranasal sinuses. Actinomycosis of the nasal cavity presents with symptoms similar to sinusitis, with purulent drainage, nasal obstruction, and in some cases, facial swelling. Enhanced CT is the best imaging modality, however definitive diagnosis requires the presence of *Actinomyces* on cultured specimens. Management includes a prolonged course of penicillin or cephalosporin antibiotics with or without surgical procedures, including drainage, debridement, and total resection of infected tissue.

CONCLUSION: While actinomycosis is a rare disease, clinicians should include it as part of the differential in cases of unilateral nasal symptoms as delayed diagnosis can lead to progressive necrosis and poor outcomes.

ERYTHEMA MULTIFORME AS A PRODROMAL CUTANEOUS MANIFESTATION OF SARS-COV-2 INFECTION

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LEARNING OBJECTIVE #1: Recognize the unusual presentations of COVID-19

LEARNING OBJECTIVE #2: Close observation of the high-risk patients with skin manifestations

CASE: A 19-year-old male presented to the clinic with a 48-hour history of a sharply demarcated red-raised and itchy rash on his upper and lower extremities, and trunk. The characteristic target lesion was detected. He had no fever or cough at the time of the presentation. He had no known allergies to medications. He did not take any medications in the last three months. The skin rash was visited by a dermatologist and a diagnosis of erythema multiforme was made. However, the reason for this rash was not clear. Corticosteroid and antihistamine therapies were used, and the patient was discharged home. However, after three days, fever (T=38.3C), shortness of breath, and dry cough began. The patient presented to the ED, and a SARS-CoV-2 test returned positive. CXR showed bilateral infiltrates. Due to low

oxygen saturation patient was admitted to the hospital and was started on remdesivir and dexamethasone. After five days the rash started to improve, and after two weeks it completely resolved.

IMPACT/DISCUSSION: Considering the COVID-19 pandemic, early recognition of erythema multiforme as a prodromal sign of infection would lead to prompt testing, diagnosis, and treatment to reduce transmission of COVID-19. Other authors have also identified urticaria, a varicella-like exanthem, a petechial rash, a morbilliform rash, transient livedo reticularis, an eruption similar to symmetrical drug-related intertriginous and flexural exanthema, erythematous-purple pedal papules, vasculitis, and chilblains in association with SARS-CoV-2 infection. It is necessary to closely observe and consider respiratory precaution in patients with new skin eruptions during this pandemic.

CONCLUSION: Cutaneous manifestations of COVID-19 are increasingly being reported. Recently, erythema multiforme has been identified as being associated with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection. During the pandemic, it is important to be aware that not all erythema multiforme represent medication-related or spontaneous erythema multiforme, as this may result in misdiagnosis and delayed testing.

EXTRA-PARENCHYMAL NEURO BEHCET'S DISEASE: A RARE CASE OF CORTICAL VENOUS THROMBOSIS.

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LEARNING OBJECTIVE #1: Atypical presentations of Behcet's syndrome
LEARNING OBJECTIVE #2: Neuro-Behcet's syndrome diagnosis

CASE: A 48-year male presented with complaints of headache, B/L ptosis and diplopia for the last 5 days, unsteady gait, and word-finding difficulty for 2 days. Four months prior to this presentation, he presented with dysphagia and an ulcerative lesion on the right tonsil which was negative for cancer on biopsy. Three months later, he presented with dysphagia and 40-pound weight loss. He was noted to have dysarthria, uvular deviation, and palate depression and was treated with a course of steroids for the post-viral syndrome. One month later, he had another hospitalization with urinary retention and persistent dysphagia. MRI Brain and spine negative for demyelinating lesions. Negative work up included paraneoplastic antibodies, myasthenia/lambert Eaton syndrome antibodies, autoimmune and infectious etiologies. He was treated with steroids and discharged. During this current admission, a review of systems was positive for dysphagia, weight loss, bilateral upper extremity, and back skin lesions. Physical exam showed bilateral ptosis(R>L), up beating nystagmus, and diplopia with no visual field deficits. Multiple red to violaceous macules were noted on bilateral extremities. Family history was significant for Behcet's syndrome in brother. Vital signs normal and lab work showed slight leukocytosis. CTA head showed small left parietal intraparenchymal hemorrhage with decreased opacification of superior sagittal and right transverse sinus concerning cortical venous thrombosis which was confirmed by MRV and no cortical lesions identified. A dilated retinal exam was normal. Skin biopsy showed mild perivascular lymphocytic inflammation with chronic irritation. Differential diagnosis included vasculitic coagulopathy due to cryoglobulinemia, Behcet's, paraneoplastic, APLA, Waldenström's, etc. Labs showed elevated ESR 27 mm/hr, CRP 6.2 mg/dl, negative Hepatitis-C and cryoglobulins, normal rheumatoid factor and anti-CCP antibody, normal protein electrophoresis, negative HLA-B51, normal protein C and S, and negative ANCA. Given the negative workup for other inflammatory diseases, a diagnosis of Neuro-Behcet's was made and the patient was started on methylprednisolone and therapeutic anticoagulation.

IMPACT/DISCUSSION: Neuro-Behcet's (NBD) is seen in 5-30% of patients and is classified into parenchymal and extra-parenchymal manifestations. Parenchymal NBD manifestations include meningoencephalitis, myelitis, headache, cranial nerve palsies, etc. while non-parenchymal manifestations include cerebral venous thrombosis and aseptic meningitis.

CONCLUSION: Classic manifestations of Behcet's were absent in our case and given neurological syndrome which cannot be explained by any other etiology a diagnosis of probable non-parenchymal Neuro-Behcet's was given.

Immunosuppression with steroids and other agents is recommended with the use of biologics for refractory cases.

FAMILY HISTORY AIDS DIAGNOSIS OF ALS IN A YOUNG PATIENT

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(Control ID #3535833)

LEARNING OBJECTIVE #1: Recognize the importance of family history in making a diagnosis.

LEARNING OBJECTIVE #2: Recognize the presenting symptoms and risk factors for ALS.

CASE: A 27 year old male with a history of genital herpes presented to the primary care clinic for left leg weakness which started two months ago after a fall onto his left hip. Since then, he reported difficulty walking up stairs and had multiple falls due to weakness. He denied fever, leg pain, back pain, numbness, tingling, urinary incontinence, and skin rash. Social history was significant for being a nonsmoker, no drug use. Initially reported a vague family history of ALS in his mother who passed away at age 40. He has two healthy siblings. Physical exam was significant for mild left thigh atrophy, 4/5 strength in left hip flexion and extension, 4/5 in left plantarflexion, 5/5 in left knee flexion and extension. Muscle strength of the right lower extremity was 5/5 in hip and knee flexion and extension. Left leg was mildly internally rotated upon ambulation and noted to have difficulty with heel walking. The remaining neuro exam was normal. No spinal tenderness noted. Initial workup included a normal bilateral hip x-ray and lumbar MRI with no evidence of herniated disc or stenosis. Patient was referred to a psychiatrist and started physical therapy. He was referred to neurology due to progressive worsening weakness in proximal muscles and continued frequent falls. Patient then started experiencing twitching and loss of grip strength in his left arm. The neurologist performed further workup including EMG and lumbar puncture. The patient finally revealed to the neurologist an extensive family history of ALS which included his mother, uncle, maternal grandfather, and great grandfather. With this prominent family history and findings on the EMG, he was diagnosed with a genetic variant of ALS.

IMPACT/DISCUSSION: ALS is a progressive neurodegenerative disease usually occurring in ages 40-70s. Majority of cases are sporadic while 5-10% are inherited. Risk factors include age, family history, and cigarette smoking. Initial presentations can be vague and include muscle weakness and fasciculation in any limb, dysarthria, or dysphagia due to loss of upper or lower motor neurons. Regardless of initial symptoms, progressive weakness of all muscles will eventually occur and lead to respiratory compromise. Our patient presented with single limb onset which spread to other muscle groups over a few months. The initial working diagnosis was neuromuscular injury but as his condition progressed and a strong family history was revealed, ALS moved up on the differential and was eventually confirmed. Obtaining an accurate family history can be difficult due to the time constraints or patients' cooperation, but is important to complete as it can help reach a diagnosis more quickly. Without it, we may even miss the diagnosis.

CONCLUSION: •Always obtain a thorough family history.

•Family history can broaden the differential diagnosis to include diseases we may not have thought about.

FATAL PULMONARY CEMENT EMBOLISM AFTER PERCUTANEOUS VERTEBROPLASTY IN A PATIENT WITH MULTIPLE MYELOMA

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LEARNING OBJECTIVE #1: Recognize symptomatic pulmonary cement embolism as a rare, life threatening complication of percutaneous vertebroplasty

LEARNING OBJECTIVE #2: Manage symptomatic pulmonary cement embolism

CASE: An 85 year old female with past medical history of osteoporosis status post multiple kyphoplasties of T10-L4 vertebra and atrial fibrillation on anticoagulation presented with 2 weeks of severe back pain found to have pathologic compression fracture of T8 vertebra on CT imaging. Vertebral and bone marrow biopsies demonstrated multiple myeloma 1 week prior to admission. Percutaneous vertebroplasty (PVP) was performed under local anesthesia, delivering 4mL methyl-methacrylate cement via 11 gauge needle without immediate complications. The next day she reported chest pain and shortness of breath. She was hypotensive, tachypneic and dyspneic with a new oxygen requirement of 2L/min via nasal cannula. She had massive jugular venous distention to the mandible when sitting upright and coarse breath sounds in the upper lung fields bilaterally without S3 gallop or lower extremity edema. ABG was normal and EKG showed atrial fibrillation with rapid ventricular response. Chest x-ray showed diffuse peripheral patchy opacities bilaterally. Transthoracic echocardiogram disclosed EF 55% with enlarged right ventricle and pulmonary artery pressure 55mmHg. Doppler sonography of the legs was unremarkable. Rate control and heparin infusion provided 4 days of symptomatic relief prior to repeat decompensation now requiring 6L/min oxygen. ABG disclosed respiratory acidosis. CT-chest showed diffuse ground glass opacities overlying scattered branching cement emboli in the pulmonary arteries not present on prior studies. The patient enrolled in hospice and expired 7 days after her procedure.

IMPACT/DISCUSSION: Vertebral compression fractures frequently occur in multiple myeloma. PVP is widely accepted as an efficacious minimally invasive treatment. Although complication rates are low, cement leakage most frequently complicates PVP. PCE may occur with cement leakage independent of the volume of cement injected. Rarely, PCE may be fatal in uncontrolled leakage. In a prospective cohort of 106 multiple myeloma patients PCE occurred in 23% of patients after PVP, all of which were asymptomatic without parenchymal changes on follow-up imaging. Asymptomatic PCE does not require treatment. Symptomatic PCE presents with tachycardia, chest pain, dyspnea/tachypnea and cough. Chest radiography in symptomatic patients is warranted with treatment following guidelines for management of thrombotic pulmonary embolisms with 6 months of anticoagulation. In rare cases of central CPE, surgical removal of the thrombus may be considered.

CONCLUSION: Asymptomatic PCE commonly complicates PVP and may present as a central or peripheral embolization. Rarely, it may present with symptoms similar to thrombotic pulmonary embolism without evidence of provocation. Post-procedural chest imaging and anticoagulation should be considered in symptomatic patients following PVP.

FEVER OF UNKNOWN ORIGIN: ADULT ONSET STILL'S DISEASE WITH MACROPHAGE ACTIVATING SYNDROME

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LEARNING OBJECTIVE #1: AOSD can also present as fever of unknown origin (FUO) and may be a common cause of FUO.

LEARNING OBJECTIVE #2: The treatment of FUO is guided by the final diagnosis, but when no cause is found antipyretic drugs can be prescribed. Corticosteroids should be avoided in the absence of a diagnosis, especially at an early stage. The prognosis of FUO is determined by the underlying cause.

CASE: Our patient was a 57 year old female with past medical history of diabetes mellitus and hypertension who presented with fever (off and on for 7 days) and salmon colored rash. Noted to be tachycardia and hypotensive on arrival. Initial work up revealed leukocytosis (27 k/microliter), high ferritin (59,485 ng/ml) and imaging with bilateral mediastinal, hilar, and axillary lymph nodes. Hemophagocytic lymphohistiocytosis was initially high on the differential list but bone marrow biopsy and lymph node core biopsy done were both unremarkable. Given fever, characteristic rash and fulfillment of Yamagishi criteria AOSD with MAS was considered and Solumedrol was started. Patient's fevers, tachycardia and hypotension resolved. Lab values including ferritin and leukocytosis gradually improved. Patient had extensive infectious work-up done which was all negative. After discharge from the

hospital, she followed up with rheumatology, was maintained on prednisone and methotrexate and future plans is to start Anakinra as a steroid sparing agent.

IMPACT/DISCUSSION: More than 50 years after the first definition of fever of unknown origin (FUO), it still remains a diagnostic challenge. Evaluation starts with the identification of potential diagnostic clues (PDC), which should guide further investigations. In the absence of PDCs, a standardized diagnostic protocol should be followed with PET-CT as the imaging technique of first choice. Even with a standardized protocol, in a large proportion of patients from western countries the cause for FUO cannot be identified.

Adult-onset Still's disease (AOSD) is a rare but clinically well-known, polygenic, systemic auto inflammatory disease. Interleukin 1 driven inflammatory pathway plays a pivotal role in pathophysiology of AOSD and MAS and leads the concurrent presentation rarely. The fever of AOSD is usually quotidian (a daily recurring fever) or double-quotidian (two fever spikes per day). Fever often precedes other manifestations. The temperature swings can be dramatic, with changes of 4 degrees C (7.2 degrees F) occurring within four hours. AOSD can also present as fever of unknown origin (FUO) and may be a common cause of FUO in some regions owing to its sporadic appearance in all adult age groups with potentially severe inflammatory onset accompanied by a broad spectrum of disease manifestation and complications.

CONCLUSION: AOSD is an unsolved challenge for clinicians with limited therapeutic options and high clinical suspicion can help providers gear therapeutic plan in the right direction.

FLU OR FUMBLE? A MYSTIFYING MANIFESTATION OF MOLECULAR MIMICRY

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LEARNING OBJECTIVE #1: Recognize an atypical presentation of Guillain-Barré Syndrome with chest pain, taste loss and paresthesia.

LEARNING OBJECTIVE #2: Distinguish psychogenic symptoms from Guillain-Barré Syndrome with a neurological exam.

CASE: A 73-year-old female with hypertension, dyslipidemia, depression, recent two-day hospitalization for atypical chest tightness and paresthesia returned for worsening lower extremity weakness and numbness for four days. She received the influenza vaccine two weeks prior to initial hospital admission.

She was recently hospitalized with midline non-radiating, non-exertional chest pain, new onset headache, loss of taste, and paresthesia in her hands and feet. Blood pressure was 180/100. Labs, EKG, chest x-ray, CTA chest and CT head were unremarkable. MRI brain showed chronic microvascular ischemic changes. The patient was discharged the next day with a diagnosis of atypical chest pain secondary to anxiety.

Upon return to the hospital, mental status, cranial nerve exam and motor tone were normal. She had symmetric decreased temperature sensation below the elbows and knees and absent vibration sensation in the left lower extremity. Bilateral patellar and Achilles reflexes were absent and Babinski sign was down going. MRI brain was unchanged. MRI lumbar and thoracic spine were unrevealing for cord compression but showed degenerative disease.

On admission, symptoms were thought to be from degenerative disc disease and possible conversion. The next day she described sensations in her feet like she was wearing a boot and paresthesia in her hands spread to her elbows. With concern for acute inflammatory demyelinating polyneuropathy, she was started on intravenous immunoglobulin for five days. On day three, she complained of worsening numbness progressing to her abdomen. On day four, she had facial weakness and deteriorating fine motor control of her hands. On day seven, lumbar puncture CSF was positive for protein of 154 and glucose of 76, revealing an albumin-cytologic dissociation. At discharge, she had difficulty ambulating without a walker. Four weeks later, she had improved motor weakness but persistently abnormal gait.

IMPACT/DISCUSSION: Guillain-Barré Syndrome (GBS) is the most common cause of acute flaccid paralysis worldwide. We believe the influenza vaccine two weeks prior was the inciting event. With variability in presentation, atypical GBS patients are often misdiagnosed, labeled psychogenic, and

sent home only to return with symptoms. The increase in GBS risk seen with vaccines against swine and H1N1 influenza also created a challenge to support the benefits of vaccines. Further exploration is justified to assess the relationship between vaccines and immune-related disorders.

CONCLUSION: -Careful neurological exam and close follow-up are warranted to prevent unnecessary testing and reduce misdiagnosis when considering GBS.

-The benefit of vaccines in preventing disease need to be weighed against the risk of GBS.

-Factors that affect susceptibility to develop GBS warrant further investigation.

FORGET ME NOT: ST ELEVATION AND LEFT MAIN CORONARY ARTERY DISEASE IN “FORGOTTEN” LEAD AVR

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LEARNING OBJECTIVE #1: Recognize electrocardiographic findings suggestive of high-risk acute coronary syndrome, including left main coronary artery disease

LEARNING OBJECTIVE #2: Identify electrocardiographic pattern of ST-elevation in aVR with diffuse ST-depressions as perhaps “STEMI-equivalent”

CASE: A 41-year-old woman with no significant past medical history presented after witnessed cardiac arrest while jogging. Cardiopulmonary resuscitation was performed and return of spontaneous circulation was achieved in the field after defibrillation with initial rhythm of ventricular fibrillation. Electrocardiogram (EKG) notable for 2mm ST segment elevation in aVR and diffuse ST segment depressions. Coronary angiogram revealed 95% stenosis of left main coronary artery. An intra-aortic balloon pump was placed given concern for cardiogenic shock with ejection fraction of 15 percent. Before surgical revascularization could be explored, patient experienced cardiac arrest with pulseless electrical activity; return of spontaneous circulation was achieved after epinephrine. The patient subsequently underwent percutaneous coronary intervention with a drug-eluting stent placed in the left main coronary artery. Cardiac function gradually improved and weaned off mechanical support devices. The remainder of hospital course was uncomplicated and the patient was discharged home one week later with a fully recovered ejection fraction.

IMPACT/DISCUSSION: Myocardial infarction (MI), especially non-ST-elevation MI (NSTEMI), is frequently encountered by the general internist. Effective interpretation of the EKG, and knowledge of the urgency with which to consult cardiology, are critical to timely intervention. The EKG pattern of ST elevation in aVR with diffuse ST depressions has been identified as a strong, independent predictor of severe left main coronary artery or triple vessel coronary artery disease (CAD).¹

In the emergency medicine literature, some have suggested that this EKG pattern be considered a “STEMI equivalent,” similarly to a new left bundle branch block or true posterior MI.² In an academic medical center where aVR elevation with diffuse ST depressions was treated as a “STEMI equivalent,” undergoing emergent coronary angiography, only ten percent of patients were found to have angiographic evidence of acute coronary artery occlusion requiring emergent revascularization.³

However there is significant variability in the existing literature, with a similar study finding 73 percent of patients required revascularization during their hospitalization, and 39 percent had left main or triple vessel CAD.⁴

CONCLUSION: For the general internist, recognition of isolated ST elevation in aVR with diffuse ST depressions should trigger prompt cardiology consultation for urgent coronary intervention.

FOR THE HEART, DIAGONAL EARLOBE CREASES (DELCS) MAY BE A SIGN OF THINGS TO COME.

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LEARNING OBJECTIVE #1: Recognize and emphasize the importance of diagonal ear lobe crease (Frank’s sign) and its significant association with increased risks of ischaemic heart disease and myocardial infarctions.

LEARNING OBJECTIVE #2: Highlight the importance of physical examination in identifying at-risk patients for coronary artery disease.

CASE: A 82-year-old man with CAD, MI status post two PCI with multiple stents, HTN, T2DM, and COPD presented with a pressure-like substernal chest pain and exertional dyspnea for a day. He used his asthma rescue inhaler without improvement. He went to his primary medical doctor for an evaluation of his symptoms where an EKG was done and revealed heart rate of 32 with a 2:1 atrioventricular (AV) heart-block. In the emergency department, an examination of a patient’s vitals and physical exam were significant for blood pressure of 172/69, heart rate of 32, and otherwise unremarkable physical exam. Chest X-ray showed hyper-inflated lungs. EKG revealed bradycardia to 31 beats per minute, with a new second-degree type II heart block, no ST segment elevation or depressions, and normal axis. Cardiac enzymes were negative. Patient was admitted to the cardiac intensive care unit (CICU) for monitoring and pending pacemaker placement the next day, which was successful without complications. Subsequent physical examination in the CICU revealed the presence of bilateral DELCs. An echocardiogram revealed a normal left ventricular ejection fraction of greater than 70% without wall motion abnormalities.

IMPACT/DISCUSSION: Tremendous technological advancements continue to redefine the practice of medicine. Consequently, several recent studies have documented the decline in physical examination skills among physicians in the setting of such advancements. Physical signs are useful indicators of underlying diseases. Frank’s sign, which is the diagonal ear lobe crease (DELCS) is equally important. Even though the etiology of DELCS remains unknown, numerous theories have explained the relationship between DELCS and cardiovascular diseases. The most popular theories suggested that the systemic loss of elastin, collagen, and telomeres could be the culprit. Elastin and collagen in the vessel wall determine the passive mechanical properties of the large arteries. These elastic fibers are subject to proteolytic degradation and chemical alterations that affect arterial stiffness and blood pressure leading to cardiovascular diseases. Additionally, a study of Japanese male with DELCS showed shortened telomeres, which correlates with an accelerated cell turnover and premature aging, leading to atherosclerosis.

CONCLUSION: Our patient exhibited bilateral DELCS and had a significant and extensive history of CAD status post multiple coronary artery stents and a pacemaker. It is imperative that more emphasis should be given in training physicians on the recognition of this easily detectable sign, which may facilitate early diagnoses in patients at high risk for CAD.

FRAMING BIAS: HOW ONE WORD CAUSED A DIAGNOSTIC DELAY OF A LIFE THREATENING PROCESS.

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LEARNING OBJECTIVE #1: Recognize the presence of a framing bias and how it distorts a case into a confusing, dangerous conundrum.

LEARNING OBJECTIVE #2: Diagnose a rare cause of acute abdominal pain by taking a diagnostic timeout and re-framing the problem statement.

CASE: A transferring hospital provides this problem statement: “A 54 year old man presented 5 days ago for acute abdominal pain, emesis, and syncope, found to have ascites, colitis, and anemia being transferred for workup of new ascites.” Our admitters then find: the patient was previously healthy, only on losartan for hypertension, and even saw his PCP one week prior with normal exam and blood count. He was at his job as a driver, stood up, and experienced a 9/10 sharp upper abdominal pain. He toughed out the symptoms and returned home where he would later experience a second wave of pain with an episode of syncope. He woke up, vomited clear fluid, and called 911. At the neighboring hospital, he was found to be in moderate distress with diffuse abdominal tenderness and guarding. Labs showed a hemoglobin of 6.5 g/dL and a WBC of 13.0 K/uL. A CT of his abdomen found large bowel colitis and moderate ascites. He was resuscitated and started on broad spectrum antibiotics leading to a stable condition at the time of transfer to our hospital. A paracentesis was

not performed due to lack of a qualified operator. The rest of the history collected by the admitting team was non-contributory.

IMPACT/DISCUSSION: Although “ascites” means fluid in the abdomen, it is almost reflexive to think of the liver, heart, or malignancy as causes, which is what the neighboring hospital did and, once incorporated into their problem statement, led our admitting team to do the same. As the primary team coming on, we took a diagnostic timeout to reframe: “This is a 54 year old previously healthy man who presented with acute abdominal pain, acute anemia, and fluid in the abdomen.” Could this fluid really have been a spontaneous hemorrhage...after five days of conservative management? If so, how did he not bleed out? We decided to get a repeat CT scan, which revealed multiple dissections and aneurysms of the medium sized abdominal vessels with a large hematoma contained within the ascending bowel mesentery. A branch of the superior mesenteric artery ruptured, but miraculously formed a hematoma within the mesentery to self-tamponade. After ruling out rheumatologic and connective tissue diseases, the patient was diagnosed with segmental arterial mediolysis and managed with strict blood pressure control.

CONCLUSION: The problem statement we develop is a powerful tool that organizes our thought process to efficiently present a patient to other members of the care team, but it can also be a dangerous tool. A problem statement that misrepresents a patient’s issues, even if just from a misinterpreted word, can create a framing bias that gets carried from one team to the next until a diagnostic timeout is performed. When a clinical course isn’t fitting together, pause and take it back to the start.

FREQUENT FEVERS AND A FOOD TRUCK: A DIFFERENTIAL DILEMMA IN THE TIME OF COVID-19

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LEARNING OBJECTIVE #1: Recognize the clinical features of typhoid fever

LEARNING OBJECTIVE #2: Avoid anchoring bias during the COVID-19 outbreak

CASE: A 21-year-old male with no medical history presented with over a week of fevers, cough, congestion, and abdominal pain in October that persisted despite outpatient antibiotic treatment for presumed sinusitis. The patient denied high risk behaviors, global or outdoor travel, and any known COVID-19 exposures.

His physical exam was notable for tachycardia to 115 beats/min and mild right upper quadrant abdominal tenderness. Labs were notable for hemoglobin 11.6 g/dL, platelets 101 THO/uL, and liver function test elevations (AST 183 U/L, ALT 224 U/L, alk. phos. 305 U/L). A chest x-ray showed bibasilar opacities and a small left pleural effusion. Abdominal CT scan demonstrated hepatosplenomegaly, small volume ascites, and diffuse intra-abdominal lymphadenopathy. He received ceftriaxone and azithromycin. Blood cultures, viral studies (EBV, CMV, HIV, SARS-COV-2), and tick-borne panels were obtained. For the first three nights the patient continued to spike fevers to 102°F despite antibiotic administration. Repeat SARS-COV-2 testing was negative.

On the fourth day of hospitalization, blood cultures returned positive for Salmonella. On further discussion, the patient reported several days of vomiting and diarrhea 3 weeks prior, following a meal at a halal food truck. Samples further speciated to *S. typhi* with levofloxacin providing only intermediate coverage. Cefpodoxime was prescribed, and the patient’s symptoms abated with treatment.

IMPACT/DISCUSSION: The case demonstrated the importance of a broad differential when diagnosing fevers with elevated transaminases. At the height of the pandemic, COVID-19 loomed large in the diagnostic schema despite several negative tests. Each historical, laboratory and radiographic abnormality could have been explained by COVID-19, so it was critical to broaden and refine the differential. Other etiologies were probed with the patient and his family, reinforcing the importance of a thorough social history. While *S. typhi* infections are not typically seen in the developed world, the patient was presumed to have been exposed by the food truck meal. The three-

week period separating the febrile illness from his initial gastroenteritis points to a phenomenon seen with a lower infectious dose of *S. typhi* whereby a longer incubation time follows exposure; on the other hand, conditions which reduce stomach acidity, intestinal integrity, or microbiome activity cause higher infectivity. The febrile illness of typhoid fever typically occurs between 3 and 21 days after exposure and will last up to 4 weeks without proper treatment. Third generation cephalosporins and fluoroquinolone antibiotics are the mainstay of therapy.

CONCLUSION: Salmonella typhi presents a rare cause of prolonged fevers following an initial gastroenteritis.

During the COVID-19 pandemic, it is vital to maintain a broad differential diagnosis for other causes of fever and elevated liver enzymes.

GASTRIC BALL- NOT AT ALL! ORBERA INDUCED GASTRIC OUTLET OBSTRUCTION

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LEARNING OBJECTIVE #1: To identify gastric outlet obstruction as a complication of intragastric balloon therapy which is a relatively safe bariatric procedure.

LEARNING OBJECTIVE #2: Early diagnosis and immediate endoscopic intervention can prevent catastrophic outcomes such as gastric perforation

CASE: A 49-year-old female presented to our facility with complaints of right-sided abdominal pain since the past 2 weeks, associated with multiple episodes of nausea, non-bloody non-bilious emesis, anorexia, and weight loss. The patient denied any fevers, chills, dyspnea, chest pain, icterus, or urinary symptoms. Also denied any recent travel, sick contacts, changes in diet, or new medications. Past medical history was significant for morbid obesity for which a patient underwent ORBERA intragastric balloon placement surgery in Colombia one year back. The patient was due for a balloon replacement however due to the COVID-19 pandemic travel restriction she could not travel back for the procedure. Vitals stable on admission. Physical examination was notable right upper quadrant tenderness without any guarding or rigidity. Laboratory investigations were within normal limits. She subsequently underwent Computerized Tomography (CT) scan of the abdomen with contrast which revealed a large intragastric balloon in the gastric antrum which had migrated to cause obstruction of the distal portion of the stomach. The gastric fundus and body were moderately distended with an accumulation of ingested fluids and gas. There was no evidence of perforation or bowel obstruction. The patient was managed with nasogastric tube decompression, intravenous fluids, and endoscopic removal of the intragastric balloon. The patient subsequently had complete resolution of symptoms.

IMPACT/DISCUSSION: Intragastric balloon therapy is a relatively safe, minimally invasive procedure for temporarily inducing weight loss. ORBERA is one of the newer generations of intragastric balloons, which has a spherical shape, high volume capacity (500–700 ml) and uses saline for filling. The complicated rate has been reported as 5.5% which includes spontaneous deflation and migration of the balloon, peptic ulcers, gastric outlet obstruction, and gastric perforation. Our patient presented with gastric outlet obstruction which is a rare complication requiring emergent management. Clinically, the presence of a palpable mass in the pylorus and non-bilious vomiting of undigested food suggests gastric outlet obstruction. It is diagnosed by a CT scan and treatment includes endoscopic removal of the balloon.

CONCLUSION: Intragastric balloon therapy is a modern and relatively safe bariatric surgery. Balloon migration can cause rare complications such as gastric outlet obstruction which can lead to life-threatening gastric perforation. Abdominal pain and non-bilious emesis in a patient with an intragastric balloon should prompt urgent imaging and endoscopic removal of the balloon.

GASTRIC PERFORATION AS A RARE, LATE COMPLICATION OF NISSEN FUNDOPLICATION.

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LEARNING OBJECTIVE #1: Recognize late gastric perforation as a cause of increased work of breathing in patients with prior Nissen Fundoplication.

LEARNING OBJECTIVE #2: Recognize possible causes of gastric perforation that follow an erosion-ulceration sequence and the role that malignancy may play in exacerbating this sequence.

CASE: A 59 year-old woman with a history of Nissen fundoplication in 1998, a fundoplication revision in 2012, and metastatic ovarian cancer presented with hypoxemia and sepsis. Workup with Chest CT demonstrated a gastric perforation into the right thorax. Right thoracotomy was done and a right chest tube was placed through to the perforation. Her breathing status improved over one week and she was discharged.

One month later, the patient was re-admitted when her work of breathing increased again and she developed a cough. Her oxygenation was declining and her chest tube output had acutely decreased. Chest CT demonstrated a persistent leak into the right thorax with a displaced chest tube. She was first managed conservatively with chest tube replacement due to metastatic ovarian cancer that had progressed into her abdomen. A surgery consult was obtained with plans for a more durable outcome.

She was scheduled for revisional surgery, which revealed a herniated wrap and a large, sustained perforation draining into the right chest. The perforation was repaired and a Blake drain communicating with the right pleural space placed. A swallow study one week later confirmed no leakage at the perforation site.

IMPACT/DISCUSSION: Gastric perforation is a rare complication of Nissen fundoplication, the most commonly performed procedure to treat gastroesophageal reflux. When it does occur, it is usually intraoperative, making late perforations even rarer. Six late perforations are documented to date. The mechanism of gastric perforation is poorly understood. A proposed sequence of events is erosion of the gastric mucosa or local ischemia leading to ulceration and then perforation. Causes include NSAID use, gastric stasis, or foreign body (stitches/Teflon pledgets). Based on her surgical finding of intrathoracic wrap herniation, it is likely that our patient had compromised blood flow to an area of her gastric mucosa, which resulted in the ulceration-perforation sequence. Our patient also had a history of metastatic ovarian cancer, which may have further accelerated gastric mucosa erosion as malignancy is a chronic inflammatory state.

CONCLUSION: Lessons from our case include prompt identification of herniated fundoplication wraps to lower the risk of local ischemia and a sustained perforation of the gastric mucosa. In addition, early diagnosis and surgical correction should be prioritized for patients with chronic inflammatory states (malignancy, autoimmunity, infection), as these may play a role in exacerbating the ulceration-perforation sequence.

GASTRIC VOLVULUS: A RARE AND FORGOTTEN DIFFERENTIAL IN A SEA OF ABDOMINAL PAIN

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LEARNING OBJECTIVE #1: 2. Consider gastric volvulus as a possible etiology for abdominal pain and Melena.

LEARNING OBJECTIVE #2: 3. Early recognition of acute gastric volvulus signs/symptoms and ordering appropriate imaging

CASE: A 69 year-old gentleman with a past medical history of alcohol use disorder complicated by chronic pancreatitis, type 2 diabetes and COPD presented with syncope and hypotension. He reported intractable vomiting, anorexia, early satiety and diffuse abdominal pain for the past 3 days accompanied by four large episodes of melena. Initial vitals were remarkable for hypotension (BP 80s-90s/50s) and tachycardia. Labs showed hemoglobin of 6.0 and lactate levels of 12.2 prompting a transfer to the ICU. Emergent EGD revealed moderately severe reflux esophagitis, suspected gastric volvulus with angulation at the antrum and dusky appearing duodenal mucosa. Per radiology, CT abdomen confirmed a partial gastric outlet obstruction likely from adherence to the pancreas from chronic pancreatitis but neoplasm could not be excluded.

Due to concerns for pancreatic malignancy and pylorus/duodenal tethering to a mass, CA-19 levels were checked and returned elevated. Plans for EUS guided

biopsy and gastric outlet obstruction stenting were made but the patient's respiratory status worsened. Family at the time chose to approach comfort measures only and he passed shortly afterwards.

IMPACT/DISCUSSION: Gastric Volvulus is defined as an abnormal rotation of the stomach around itself first described in the 1860s in by Berti then subsequently treated by Berg in the same era. Symptoms can range from vague abdominal pain, nausea and anorexia to surgical emergencies such as strangulation, necrosis and perforation depending on the degree of gastric inlet versus outlet obstruction. Advancements in both diagnosis and management have improved mortality outcomes to 15-20% in acute and 0-13% in chronic respectively. Acute gastric volvulus should be considered as a possible differential for abdominal pain and upper or lower GI bleeds despite its rarity and low clinical suspicion.

Although our patient acutely presented with hypotension and syncope, his progressively worsening large volume melena and endoscopy findings highlighted above likely represented a higher degree of gastric outlet obstruction vs. volvulus from the underlying pancreatic malignancy. The elevated lactate and dusky appearing duodenal mucosa were attributed to the tethering of these structures to the pancreatic head. This case highlights a rare phenomenon of primary gastric volvulus first mentioned on endoscopic findings.

CONCLUSION: Gastric volvulus can be a life threatening surgical emergency without early recognition. Mortality rates have decreased but still remain high (15-20%) in an acute setting. In this case, gastric volvulus was first considered during an EGD with a pancreatic mass discovered on follow up imaging. As a result, we propose to have a high clinical suspicion when considering differentials for similar presentations due to its rare but emergent nature.

GASTROINTESTINAL AA AMYLOIDOSIS PRESENTING AS NONSPECIFIC COLITIS ON COLONOSCOPY IN THE SETTING OF END STAGE RENAL DISEASE AND RECURRENT MRSA SEPTIC ARTHRITIS

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LEARNING OBJECTIVE #1: Recognize gastrointestinal AA amyloidosis in a patient with worsening diarrhea with associated chronic inflammatory disease or history of amyloidosis

LEARNING OBJECTIVE #2: Differentiate between the gastrointestinal manifestations of AL and AA Amyloidosis through patient presentation and endoscopic findings

CASE: We present a case of a 33 year old female who presented to the hospital with intractable lower abdominal pain and diarrhea for 1 week. She had been on chronic suppressive antibiotic therapy for recurrent MRSA septic arthritis of the right hip. This was suspected to cause AA amyloidosis induced end stage renal disease last year, which was confirmed on renal biopsy.

Labs showed unremarkable transaminases but were significant for elevated alkaline phosphatase and total bilirubin. CT showed hepatomegaly, wall thickening of multiple segments of proximal bowel, terminal ileum and transverse colon. Patient was started on broad spectrum antibiotics and admitted for sepsis concerning for possible infectious enterocolitis.

Colonoscopy found diffuse areas of moderately erythematous mucosa from cecum to rectum. C. difficile and CMV PCR returned negative. The appearance of nonspecific colitis was concerning for inflammatory bowel disease.

Colon biopsies later returned with confluent deposition of amorphous hyaline material in the lamina propria, with preference for capillary walls. These findings were consistent with AA amyloidosis and was confirmed with Congo Red stain showing apple-green birefringence. Patient improved with supportive therapy and resumed chronic suppressive antibiotic therapy on discharge.

IMPACT/DISCUSSION: Amyloidosis arises from extracellular deposition of serum protein fibrils. The most common forms include AL amyloid from plasma cell dyscrasia, and AA amyloid from recurrent inflammation from chronic disease. Amyloid most commonly deposits in the kidneys, heart, and liver. Biopsy proven gastrointestinal amyloidosis is rare but

needs to be considered in patients with a history of amyloid and GI symptoms.

AL amyloid may deposit in the deeper submucosal or muscular layer of the GI tract, which may be appreciated as polypoid protrusion, thickened folds or ulcerations on endoscopy. In contrast, AA amyloid may deposit in the more superficial layer of the lamina propria, resulting in fine granular appearance, friability, and erosions on endoscopy. Subsequently, gastrointestinal AL amyloidosis may present as constipation or obstruction, while gastrointestinal AA amyloidosis may present as diarrhea and malabsorption.

Management is mostly supportive, and treatment of the underlying disorder may be associated with regression of gastrointestinal amyloidosis.

CONCLUSION: The clinical presentation and endoscopic findings of gastrointestinal amyloidosis presents differently in AA or AL Amyloidosis. A patient's history of chronic inflammatory disease as well as signs of other organ involvement, such as end stage renal disease, are critical when approaching the diagnosis of gastrointestinal AA amyloidosis.

GOING DEEPER: DIAGNOSING A CASE OF ACUTE GI BLEED WITH CAPSULE ENDOSCOPY

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LEARNING OBJECTIVE #1: Recognize the importance of capsule endoscopy in diagnosis for acute GI bleeding.

LEARNING OBJECTIVE #2: Recognize lymphoma as a cause of GI bleeding.

CASE: A 71 yo male presented to his primary care physician with 3 weeks of increased dyspnea on exertion, fatigue, and bloody stool for 1-2 days. He had a history of indolent, stage III follicular lymphoma for which he was not receiving active treatment. His hematocrit showed a drop from 35.5 to 22.2 in three weeks.

Colonoscopy and EGD were performed which did not reveal the cause of GI bleed. Due to the negative colonoscopy and EGD, capsule endoscopy was performed which showed a possible polypoid lesion in the mid to distal ileum. Further evaluation with double-balloon enteroscopy revealed a large 5cm, firm, ulcerated mass in the distal ileum highly likely to be the source of bleeding and anemia. A biopsy showed diffuse large B-cell lymphoma.

IMPACT/DISCUSSION: Follicular lymphoma accounts for 20% of all non-Hodgkin lymphoma diagnosis. Common presentations involve painless, slowly progressive adenopathy and systemic symptoms such as fever and weight loss. Patients are typically diagnosed at stage III or higher with an indolent disease course that is not curable with existing treatment options. Watchful waiting is the standard of care with a median survival rate of 8-15 years. The risk of transformation to an aggressive disease course is 30% over 10 years with increased risk associated with higher prognostic index scores (FLIPI: age > 60, nodal sites > 4, LDH > 280 U/L, \geq Stage 3, Hgb <12.0 g/dL) and expectant management without treatment. Follicular lymphoma primarily and secondarily involves extranodal sites such as the GI tract, skin, ocular, adnexa, and testis. In patients with GI involvement, lesions in the jejunum and ileum are common.

In this case, the patient's follicular lymphoma underwent a transformation to diffuse large B-cell lymphoma, which forebodes a poor prognosis. The patient's lymphoma in this case was localized in his terminal ileum and was detected by capsule endoscopy after a negative colonoscopy and EGD.

Capsule endoscopy is a non-invasive procedure used to record internal images of the GI tract using an ingested capsule camera. The images are wirelessly transmitted to a receiver and the total recording time of the procedure is 8 hours. As the endoscopy report can take days to weeks to complete, it is critical for clinicians to follow up on results as they become available.

CONCLUSION: Capsule endoscopy is used to visualize the entire small intestine, particularly the jejunum and ileum, which are not accessible on EGD or colonoscopy. Had the capsule endoscopy not been ordered in this case, the source of bleeding from the lymphoma in the terminal ileum would not have been found. Particularly in cases of GI bleeding in the context of lymphomas with common GI involvement, visualization of the entire small bowel via capsule endoscopy is essential for an accurate diagnosis.

GNOCOCAL ARTHRITIS: HIDING IN PLAIN SITE

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LEARNING OBJECTIVE #1: - Understand the limitations of synovial cultures in the diagnosis of Gonococcal Arthritis

LEARNING OBJECTIVE #2: - Recognizing the manifestations of Disseminated Gonorrhea

CASE: 21 year-old male presented for a day of right knee pain. It was associated with fever and diaphoresis. He had no recent trauma or sick contact. He did have dysuria in the setting of recent, unprotected sex. He denied a history of STD's, HIV, travel, or illicit drug use. He immigrated from Mexico 3 years ago. On exam, he was diaphoretic. His right knee was severely edematous and warm to the touch. He was unable to perform any range of motion or weight bearing. Diffuse, erythematous lesions with excoriations were noted on bilateral lower extremities.

Work-up consisted of laboratory testing, MRI imaging, and synovial studies. Notable results included negative blood cultures, ANA, HIV, and AFB testing. MRI showed a large effusion with synovitis. Synovial studies showed a WBC of 39,000 but cultures (aerobic, anaerobic, and chocolate agar) were negative. Urine G&C was positive for chlamydia only.

He was diagnosed with gonococcal arthritis as a result of chlamydial co-infection. He was treated empirically for chlamydia and was started on IV ceftriaxone. After wash-out and initiation of antibiotic therapy, he reported resolution of pain and was slowly regaining mobility of his knee. He was discharged on a prolonged 21 day course of Ceftriaxone since no organisms could be isolated for susceptibilities.

IMPACT/DISCUSSION: He was admitted for inflammatory arthritis characterized by the high number of WBC's in the synovial fluid. Working diagnosis was gonococcal arthritis given his young age, history of unprotected sex, and his almost classic presentation of DGI (arthritis, dermatitis, lacking only tenosynovitis). He underwent joint washout; cultures from the washout and arthrocentesis were negative. Although this case may present as a "classic gonococcal arthritis" with a patient of the expected demographic and clinical presentation, the evaluation proved to be a diagnostic challenge. Data shows that cultures for Gonorrhea are positive in less than 50% of cases and less likely in patients presenting with DGI. A key aspect of this case is how diagnostic reasoning, sensitivity/specificity of laboratory testing, and an epidemiologic approach overlap to reach a conclusion. Negative cultures for gonorrhea cannot be used to rule out gonococcal arthritis when the clinical index of suspicion is high. Even though a reactive arthritis from a primary chlamydial infection is possible, there is a more likely alternative diagnosis. This case also highlights a unique presentation of migratory polyarthralgia from disseminated gonorrhea.

CONCLUSION: - Negative cultures cannot be used to rule out gonococcal arthritis when the clinical index of suspicion is high

- Gonorrhea is the second most common communicable disease; it is imperative that clinicians are able to recognize all components of localized and disseminated infection

GOUT CRYSTALS? GOUT PRESENTING AS OLECRANON BURSTITIS

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LEARNING OBJECTIVE #1: Recognize olecranon bursitis as a presenting symptom of gout

LEARNING OBJECTIVE #2: Identify the utility of diagnostic aspiration in the management of acute olecranon bursitis

CASE: A 76-year-old man with history of hypertension, hyperlipidemia, knee osteoarthritis, and benign prostatic hyperplasia presented to general internal medicine clinic with a four-day history of swelling on the right elbow. He reported no prior trauma but described increasing redness, fluid accumulation, pain, and warmth over the elbow in the past two days. Range of motion remained full. He reported no other constitutional symptoms including fever or fatigue. Medications included atorvastatin and lisinopril. Social history was remarkable for four alcoholic drinks and two servings of red meat per week. He also reported recent strenuous yard work. His heart rate was 86 and

temperature 97.6 degrees. Physical examination demonstrated a 3x2 inch erythematous and warm fluid filled bursa on the posterior right elbow. The patient was diagnosed with olecranon bursitis. Due to concern for septic olecranon bursitis, diagnostic aspiration was performed and sent for cell count and differential, culture and gram stain, and crystal analysis. He was placed on prophylactic antibiotics to await the results of the aspirated fluid. The returning cell count was not consistent with infection and no organisms were seen on culture. However, crystal analysis demonstrated monosodium urate crystals consistent with gout. He was treated successfully with colchicine and advised on prevention of future gout flares by avoiding purine rich foods and decreasing alcohol consumption.

IMPACT/DISCUSSION: Acute gout most commonly presents in the first metatarsophalangeal joint. Other less frequent but also common locations include the forefoot, ankle, knee, wrist, and fingers. The olecranon bursa is an infrequent location for the presentation of acute gout and thus may be missed. The diagnosis of gout may also be evasive as patients that present with olecranon bursitis often can recall prolonged pressure on the elbow or previous strenuous activity which may increase suspicion of inflammation from overuse and infection over crystal disease. In this case, the patient's age, presentation, and medical history was more consistent with inflammation from overuse and/or infection. The physical exam was concerning enough for septic bursitis that aspiration was performed immediately, and the patient was placed on prophylactic antibiotics. Despite lower clinical suspicion for crystal disease, the fluid studies confirmed the diagnosis of gout and the patient was treated appropriately. Without performing the diagnostic aspiration, the patient would have not received effective treatment.

CONCLUSION: -Olecranon bursitis can be the presenting symptom of gout in patients with minimal risk factors and advanced age

-A diagnostic aspiration, while not always necessary, can help guide treatment in cases of undifferentiated olecranon bursitis, especially if there is concern for infection or gout

GROUP B STREPTOCOCCUS INFECTIVE ENDOCARDITIS IN A NON-PREGNANT MIDDLE AGE WOMAN WITH SEVERE UTERINE FIBROID DISEASE

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LEARNING OBJECTIVE #1: Identify and recognize Group B Streptococcus as potential pathogen in non-pregnant adults

LEARNING OBJECTIVE #2: Recognize uterine fibroids as a potential associated condition to Group B Streptococcus bacteremia

CASE: A 51-year-old female with a history of heart failure, hypertension, and uterine fibroids was admitted with positive blood cultures for Group B Streptococcus (GBS), fatigue, and fever. She had a longstanding history of morbid obesity and uterine fibroids and stated that her vaginal bleeding had been worse in the past two weeks. She denied any tobacco, alcohol, or IV drug use. Labs showed a moderate microcytic anemia (9.4 g/dL). A transthoracic echocardiogram showed an ejection fraction of 40% and focal calcifications on the posterior mitral leaflet but no vegetation. Transesophageal echocardiogram revealed a 12 x 6 mm mobile vegetation on the posterior mitral leaflet associated with perforation and severe regurgitation. Abdominal MRI was performed and revealed splenomegaly and a very enlarged uterus (29x12x20 cm) with innumerable myometrial masses. The biggest mass measured nearly 14 cm. She underwent bioprosthetic mitral valve replacement. Surgical pathology was consistent with endocarditis. The patient had an uneventful recovery and cleared her bacteremia after receiving 6 weeks of ceftriaxone.

IMPACT/DISCUSSION: GBS is a rare cause of infective endocarditis (IE). Systemic infections due to GBS are not common in non-pregnant adults and typically involve older adults and patients with chronic conditions such as diabetes. The most common presentation of invasive GBS is skin/soft tissue infection or bacteremia without a source. The source of infection is not easily identifiable in GBS endocarditis. GBS colonizes the gastrointestinal and genitourinary tract. The patient presented in this case report did not exhibit a skin/soft tissue, dental, or urinary tract infection, nor had she used drugs or had a prior surgery. She

did have severe uterine fibroids associated with increased vaginal bleeding at the time of presentation. There is literature that correlates GBS endocarditis in patients with prior gynecological manipulations, such as vaginal delivery or abortion in the absence of other identifiable sources. Given her extensive fibroid disease and structural pelvic abnormalities, we concluded that bacterial translocation from a gynecologic source was likely in her case. Her valvular infection required operative intervention. Left-sided cardiac valves are more commonly affected in cases of GBS endocarditis with involvement of the mitral valve being the most frequent.

CONCLUSION: Recognition of the potential severity of disease with GBS in non-pregnant adults is important. In patients with GBS bacteremia and endocarditis, a gynecologic source should be considered when identification of infection from more typical anatomic sites is lacking.

HEADACHES: TO IMAGE OR NOT TO IMAGE

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LEARNING OBJECTIVE #1: Review criteria for appropriate use of imaging in the evaluation of headache in the primary care setting

LEARNING OBJECTIVE #2: Discuss gastrointestinal stromal tumor (GIST) and potential for metastasis

CASE: A 60-year-old man presents with new-onset right sided headache. Headaches are 7 out of 10 in intensity, originate in the occipital region, radiate to the crown. They are associated with ear pain and decreased hearing, have occurred daily for 3 weeks and are made worse by laying down. He has noticed a collection of thick mucus on the right side of his mouth that occurs when he brushes his teeth as well as right eye watering, blurry vision and occasional floaters. He denies weakness/numbness in his extremities, slurred speech, and unsteadiness in his gait. Past medical history is notable for hypertension and gastrointestinal stromal tumor (GIST) Stage IV complicated by liver metastasis on Sunitinib.

On exam, he is alert and oriented with no gait abnormalities or focal deficits in strength and sensation of his extremities. Neurological exam reveals tongue deviation to the right.

He was prescribed a trial of ergotamine for cluster headaches. Given his history of malignancy, an MRI brain with and without contrast was obtained. MRI showed a lobulated enhancing mass centered on the right hypoglossal canal with contiguous involvement of the adjacent occipital condyle, most consistent with osseous metastasis. He was referred to Neurosurgery and Radiation Oncology.

IMPACT/DISCUSSION: Headaches (HAs) are one of the most common complaints seen in ambulatory settings with the majority of cases being benign. History and physical exam are key to determining the need for imaging in the diagnostic workup. The ACR (American College of Radiology) Appropriateness Criteria provides guidance on the use of radiologic imaging for patients with HAs. Criteria include HA severity, chronicity, location, presence of neurologic deficits, if there are characteristics typical of migraine or tension-type HA, and presence of known or suspected immunocompromised state.

Gastrointestinal stromal tumors (GISTs) are cancers that arise from cells of Cajal (ICC), the nerve cells in the wall of the bowel that regulate the muscular contraction. In the US, there is a higher rate of GIST in Black patients. While it was initially thought that some cases of GIST were benign, it is now known that all GISTs have metastatic potential. GISTs typically metastasize to the liver and peritoneum. Less commonly, cases of metastasis to lung, bone, brain, pleura, and lymph nodes have been reported. GISTs rarely metastasize to the brain. In an analysis of metastatic pattern and prognosis of GISTs, only 1/4224 patients (0.02%) were found to have metastasis to the brain.

CONCLUSION: In this case, the new headache with neurologic deficit and known history of malignancy prompted imaging which led to the diagnosis. This case illustrates the need to consider serious causes of headache even in patients with malignancies that rarely metastasize to the brain.

HEART FAILURE; THE UNUSUAL SUSPECT

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LEARNING OBJECTIVE #1: Recognize the effects of hypothyroidism on the cardiovascular system

LEARNING OBJECTIVE #2: Manage cardiovascular disease related to thyroid hormone dysfunction

CASE: 55 year old female presents with one month of worsening dyspnea on exertion, anasarca edema and 27 lb weight gain. She drinks 3-4 L of fluid a day with reduced urine output. Review of systems positive for orthopnea and paroxysmal nocturnal dyspnea. Past medical history includes uncontrolled type 2 diabetes mellitus and hypothyroidism, chronic kidney disease 3b, dyslipidemia, hypertension and congestive heart failure (CHF). 8 months ago, left ventricular ejection fraction (LVEF) was 60%. Family history of hypothyroidism and CHF in mother. She has a history of poor compliance with home medications (due to cost) which include atorvastatin 40mg, Carvedilol 12.5mg bid, Furosemide 120mg bid, regular insulin bid, levothyroxine 200 mcg, Lisinopril 10mg, potassium chloride 10meq. PE: HR 78 BP 157/96 BMI 34.4 kg/m². Periorbital edema. Normal heart rate and regular rhythm. 1+ brachial and 3+ pedal edema. Chest X-ray: pulmonary edema and R>L pleural effusions. Echocardiogram showed LVEF 20-25% with severe global hypokinesis. NT-ProBNP 1,807 pg/mL. TSH 578 mIU/mL, T4 0.167 ng/dL, TPO Ab Negative. Albumin 3.3 g/dL. 24Hr Urine protein creatinine ratio 3.7mg/g. Serum and urine immunofixation detected no monoclonal component. Kidney biopsy showed diabetic glomerulosclerosis. Levothyroxine therapy was restarted. Case complicated by major retroperitoneal bleeding after renal biopsy causing hemorrhagic shock and emergent renal artery embolization. Repeat echocardiogram two weeks after hospital discharge revealed no change in LV systolic function.

IMPACT/DISCUSSION: Overt hypothyroidism can present with signs and symptoms that resemble congestive heart failure; including exertional dyspnea, edema and pleural effusions. Hypothyroidism impairs cardiac output and contractility that is reversible with thyroid hormone replacement. Cardiac dysfunction as a result of low triiodothyronine presents with poor left ventricular performance from impaired diastolic relaxation, compliance and cardiac filling. Simultaneous increases in peripheral vascular resistance and afterload are also a result of inadequate thyroid function. In addition, there is a blunted catecholamine response due to reduced beta adrenergic receptor expression. Modifiable risk factors exacerbated by hypothyroidism such as elevated cholesterol, triglycerides and LDL can be appropriately managed with an HMG-CoA inhibitor "a statin". Coronary artery disease (CAD) should be appropriately investigated and treated, if present. Thyroid hormone replacement should be restarted at a low dose to prevent worsening angina and inducing arrhythmia.

CONCLUSION: Hypothyroidism can impair cardiac output and contractility and present as congestive heart failure. Cardiac dysfunction is reversible with thyroid hormone replacement.

HEARTS AFLAME MYOPERICARDITIS WITH CARDIAC TAMPONADE A RARE INITIAL PRESENTATION OF SYSTEMIC LUPUS ERYTHEMATOSUS

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LEARNING OBJECTIVE #1: Recognize cardiac involvement as an initial manifestation of Systemic Lupus Erythematosus (SLE)

LEARNING OBJECTIVE #2: Treat SLE-induced myopericarditis with cardiac tamponade

CASE: A 54 year-old African American woman with history of hypertension and tobacco use presented with two weeks of dyspnea, which first developed on exertion and progressed to dyspnea at rest. She had no orthopnea or lower extremity edema. She endorsed pleuritic chest pain. Vitals were notable for blood pressure of 210/110 mm Hg. Physical exam revealed muffled heart sounds, JVP elevation, and a hypopigmented patch of alopecia above the left ear.

Laboratory testing revealed hemoglobin 7.6 g/dL, creatinine 1.3 mg/dL, CRP 11.0 mg/L (<5mg/L), ESR 110 mm/hr (<30mm/hr), ANA titer 1:640 (<40), C3 54 mg/dL (83-193mg/dL), C4 9 mg/dL (15-57mg/dL), anti-Smith Ab 165 u (<20 units), BNP 140 pg/mL (<100pg/mL). Negative/normal labs: troponin x3, blood cultures, COVID-19, HIV, TSH and TB testing.

Chest X-ray revealed an enlarged cardiac silhouette. Transthoracic echocardiogram (TTE) demonstrated a large pericardial effusion with evidence of cardiac tamponade.

She underwent emergent pericardiocentesis draining 1.4L of fluid. Repeat TTE showed resolution of tamponade. Cardiac MRI revealed a diffuse inflammatory process suggestive of myopericarditis. Given concern for new diagnosis of SLE, methylprednisolone 1gm daily was started.

IMPACT/DISCUSSION: SLE is an autoimmune disorder whose pathophysiology is mediated by antibody formation and immune-complex deposition resulting in an inflammatory cascade. It can affect nearly any internal organ, resulting in heterogeneous disease presentation. Using the Systemic Lupus International Collaborating Clinics criteria, our patient met 5 out of 17 points: nonscarring alopecia, pericarditis, low C3/C4, high titer ANA, and elevated anti-Smith Ab. Myopericarditis was also confirmed on cardiac MRI. Infection was ruled out as blood cultures, HIV, COVID-19, CMV, EBV and TB tests were negative. Pericardial fluid cytology was negative for malignancy.

Cardiac involvement in SLE can include cardiomyopathy, arrhythmias, valvular disease and heart failure. Pericarditis is the most common cardiac manifestation, with up to 40% of patients having concurrent pericardial effusion. Yet myocardial involvement and cardiac tamponade in SLE are rare, especially as the initial presentation.

First-line treatment of SLE myocarditis includes systemic steroids often with cyclophosphamide and hydroxychloroquine; azathioprine and IVIG have also been used. Our patient had substantial improvement after starting pulse dose steroids. She was transitioned to prolonged oral prednisone taper with hydroxychloroquine on discharge.

CONCLUSION: Clinical presentation, laboratory workup and imaging conferred a diagnosis of myopericarditis with tamponade secondary to newly diagnosed SLE. Prompt recognition is essential given high complication rates if left untreated. Pericardiocentesis followed by steroids and immunomodulators are the treatment of choice.

HEPATOSPLENIC T-CELL LYMPHOMA MASQUERADING AS ALCOHOLIC HEPATITIS: REMOVING THE MASK OF CLINICAL BIASAidan Dmitriev¹; Emily min²; Svetlana Yatsenko²; Grant C. Bullock²; Aimee N. Pickering²¹University of Pittsburgh School of Medicine, Pittsburgh, PA²University of Pittsburgh Medical Center, Pittsburgh, PA. (Control ID #3540046)

LEARNING OBJECTIVE #1: Recognize discordant data when assessing a common patient presentation to avoid framing, availability, and premature closure biases

LEARNING OBJECTIVE #2: Identify the risk factors for and classic presentation of hepatosplenic T-cell lymphoma (HSTCL), a rare but important disease first encountered by the internist

CASE: A 38-year-old man with history of Crohn's disease controlled by mercaptopurine (6-MP) for 15 years presented with 8 weeks of worsening jaundice and malaise. Social history was notable for drinking 1 pint of vodka per day for 5 years. On exam, the patient had marked jaundice and scleral icterus. Labs were notable for pancytopenia (WBC 3.6, Hgb 11.7, PLT 83), direct hyperbilirubinemia (Total 30.8, Direct 27.1), and cholestatic liver injury (ALT 93, AST 106, ALP 175). Workup for autoimmune/infectious hepatitis etiologies, hemochromatosis, and Wilson's disease was negative. Abdominal MRI demonstrated mild hepatomegaly without nodularity and marked splenomegaly. This initial workup supported a diagnosis of hepatitis secondary to chronic alcohol and 6-MP use. However, the degree of pancytopenia and splenomegaly without radiologic evidence of cirrhosis prompted a bone marrow biopsy, which demonstrated a marked clonal expansion of neoplastic sinusoidal $\gamma\delta$ T- cells that were also detected in the liver sinusoids. The

morphologic, immunophenotypic, molecular and cytogenetic studies confirmed a diagnosis of HSTCL on a background of chronic alcohol use.

IMPACT/DISCUSSION: In the setting of this patient's alcohol use history, his initial presentation and workup were suggestive of alcoholic hepatitis, which became our working diagnosis. Given his long-standing use of 6-MP, which is known to cause noncirrhotic portal hypertension, we also considered drug toxicity as a contributing factor. These diagnoses were reasonable as they accounted for common diseases that could explain findings in the context of the patient's history. However, the true diagnosis of HSTCL was only identified after considering the discordant findings of pancytopenia and splenomegaly and performing a bone marrow biopsy. Although rare, HSTCL is an important entity that should be considered when suspicious of alcoholic hepatitis because of vast differences in treatment and prognosis. Both diseases can have overlapping illness scripts, and our patient's demographics and medical history did place him at higher risk of HSTCL. It is evident that without considering discordant data and rare diseases when building a differential diagnosis, the internist is susceptible to premature closure bias. Diagnoses initially higher on the differential may turn out to be the result of availability and framing biases.

CONCLUSION: • Attention to discordant data in a case can prompt appropriate further workup, help avoid clinical biases, and lead to the correct diagnosis.

• Alcoholic hepatitis and HSTCL can have overlapping illness scripts but differ vastly in incidence, prognosis, and treatment.

HICCUP IN THE CORONARIES

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LEARNING OBJECTIVE #1: Distinguish when hiccups can be pathological and needs to be further worked up.

LEARNING OBJECTIVE #2: Recognize hiccups as a symptom of myocardial ischemia.

CASE: A 62-year-old African American gentleman with past medical history significant for hypertension, hyperlipidemia and stroke presented to the ED with hiccups for one week. He also reported dyspnea and epigastric pain. Denied any chest pain, palpitations, diaphoresis, dizziness, orthopnea, nausea, or vomiting. Due to persistent hiccups, he decided to seek medical care. Vitals on admission were temperature 98.1F, heart rate 79 bpm, blood pressure 174/104mmHg, respiratory rate 12/min, SpO₂ 96% on room air. Physical examination was unremarkable. Troponin was 2436 ng/L. BNP was 109pg/ml. Electrocardiogram showed normal sinus rhythm with non-specific T wave inversions. The diagnosis of non-ST elevation myocardial ischemia was established. He underwent cardiac catheterization, which showed severe triple vessel obstructive coronary disease. Patient underwent CABG surgery and had an uneventful post-operative period. Following his surgery, his hiccups resolved which initially did not respond to Baclofen.

IMPACT/DISCUSSION: Hiccups are self-limiting but if persist can be an indicator of myocardial ischemia. Although poorly understood, it is likely related to ischemic insult to the inferior wall of the myocardium leading to irritation of the phrenic nerve. The other probable reason is irritation of Vagus nerve supplying the pericardium. There are very few cases that reports association of hiccups and myocardial ischemia often among elderly men with risk factors for coronary artery disease. To our knowledge this is the first case in which hiccup was part of the primary symptom associated with severe triple vessel coronary disease requiring CABG. Our case stresses the importance to have high index of suspicion especially in high risk and elderly patients.

CONCLUSION: - Hiccups are generally considered benign and self-limiting. High risk patients with intractable hiccups need further work up.

- It is important to recognize hiccups as the presenting symptom of myocardial ischemia especially among elderly men with pertinent risk factors.

HIDING IN PLAIN SIGHT: THE MECKEL SPECIAL

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LEARNING OBJECTIVE #1: Pre-operative diagnosis of Meckel's diverticulum can be challenging in the adult population with a high false negative technetium-99m pertechnetate scan.

LEARNING OBJECTIVE #2: Double-balloon enteroscopy may provide a higher diagnostic yield for Meckel's diverticulum.

CASE: A 33-year old male with past medical history of seizures and irritable bowel syndrome presented with painless hematochezia and was found to have acute anemia. Both colonoscopy and EGD showed no evidence of active bleed except for isolated sigmoid diverticula, small hemorrhoids, and mild gastritis. Capsule endoscopy was also performed which showed one small AVM with no active bleed in the distal small bowel. Due to persistent anemia requiring multiple blood transfusions, a Meckel technetium-99m pertechnetate scan was completed which showed normal distribution of the radiotracer. The hematochezia ceased spontaneously, however etiology was unknown. Two years later, patient returned with right lower quadrant abdominal pain. CT abdomen showed diffuse wall thickening with adjacent inflammatory stranding in the terminal ileum, concerning for Crohn's disease. He was given IV antibiotics and steroids. Surgery was consulted due to high suspicion for appendicitis for diagnostic laparoscopy which showed a non-perforated inflamed appendix and an incidental finding of inflamed Meckel's diverticulum that was located in the terminal ileum.

IMPACT/DISCUSSION: This case illustrates the inherent challenges of preoperative diagnosis of MD in adults. Few studies have shown that the sensitivity and specificity of Pertechnetate studies in adult population are significantly lower than pediatric population. As a result, symptomatic Meckel's is only diagnosed pre-operatively in 40-68% of the patients. Our patient had multiple risk factors (age < 50 years, male, and diverticulum size > 2cm) which justified our suspicion for Meckel's scan. Some reasons that caused false negative results include insufficient or absent gastric mucosa, impaired blood supply, hemorrhage and dilution. Even though the MD complications are rare, it occurs mostly in adults and can cause serious consequences. Thus, recent studies suggested that double-balloon enteroscopy may have a higher diagnostic yield (85%) compared to capsule endoscopy (21.4%) for MD. Three case reports found a new technique of push and pull enteroscopy that provided a precise diagnosis of MD. Our specific case increases the awareness of the low sensitivity of the Tc-99m scintigraphy in the adult population. Therefore, it may be worthwhile to pursue balloon-assisted enteroscopy in patients with high suspicion of MD.

CONCLUSION: Radionuclide localization of ectopic gastric mucosa within a Meckel's diverticulum has a lower sensitivity in the adult population. Adults patients with higher risk for MD might benefit from double-balloon enteroscopy as an initial diagnostic test. Further prospective studies are required to compare double balloon push enteroscopy with other diagnostic modalities in order to evaluate its efficacy.

HYPONATREMIA IN ANTI-CASPR2 ASSOCIATED ENCEPHALITIS

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LEARNING OBJECTIVE #1: Recognize hyponatremia as a presenting symptom of anti-Caspr2 associated encephalitis

LEARNING OBJECTIVE #2: Identify CASPR-2 as a cause of limbic encephalitis

CASE: A 59-year-old female presented with 2 days of nausea, emesis, headaches, and generalized weakness. Her history includes hypertension and autoimmune thyroiditis. Her medications were hydrochlorothiazide and levothyroxine. She reported smoking marijuana weekly but denied tobacco

or alcohol use. Her vitals were normal with temperature 36.6 celsius, heart rate 61 bpm, and blood pressure 123/68 mmHg. Physical examinations, including the abdomen were unremarkable.

Laboratory findings were remarkable for serum sodium of 119 mmol/L, serum osmolality of 251 mosm/kg, TSH of 9.06 mU/L and free T4 of 1.39 ng/dL. Intravenous normal saline improved her serum sodium level to 130 mmol/L. She was discharged. The patient returned with a generalized tonic clonic seizure. Her vital signs and examination findings were within normal limits. Her serum sodium remained 130 mmol/L. The patient began to exhibit personality changes and paranoid delusions. Examination of the cerebrospinal fluid (CSF) revealed WBC 1, RBC 0, protein 43, mg/dL and glucose 87 mg/dL. Gram stain of the CSF was negative. Serum thyroid peroxidase antibody was greater than 1000 IU/mL. MRI of the brain showed multiple focal areas of cortical edema involving the right parietal lobe, bilateral internal frontal lobes, lateral aspect of the bilateral temporal lobes and bilateral insula consistent with autoimmune encephalitis. Her personality and mood changes improved after receiving intravenous methylprednisolone. Autoimmune encephalitis antibody panel detected serum anti-Caspr 2 antibodies and negative CSF antibodies.

IMPACT/DISCUSSION: Anti-Caspr2 associated encephalitis is a rare form of autoimmune encephalitis that manifests predominantly as peripheral nerve hyperexcitability. It mainly affects men with a median age of 65. Literature review shows a few cases linking Hashimoto's encephalopathy with certain autoimmune encephalitis. Nagano et al described a case of Hashimoto's encephalopathy presenting as 'smoldering' limbic encephalitis in a patient that tested positive for anti-anti-NH2 terminal of α -enolase (NAE) antibody. While working up suspected autoimmune encephalitis, it is important to test both serum and CSF for antibodies to maximize diagnostic yield. Anti-caspr2 is not commonly associated with malignancy, though a few cases of carcinomas have been reported. Thymomas followed by myasthenia gravis are the most common associations in anti-caspr2. Treatment of choice in non-tumor anti-caspr2 encephalitis is early initiation of immunotherapy with steroids, plasma exchange or IVIg for improved clinical results.

CONCLUSION: For acute confusion, if initial work-up for infections, metabolic, vascular or structural causes are negative, autoimmune encephalitis should be suspected.

Early treatment of non-tumor anti-caspr2 encephalitis with immunotherapy is associated with better outcomes.

INCIDENTALLY DISCOVERED LIVER CIRRHOSIS SECONDARY TO HEPATIC SARCOIDOSIS

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LEARNING OBJECTIVE #1: Sarcoidosis is systemic granulomatous disease which can be pulmonary or extrapulmonary in nature. Clinically recognizable gastrointestinal involvement of sarcoidosis is <1%, however hepatic involvement is seen in almost 50% of cases

LEARNING OBJECTIVE #2: Hepatic sarcoidosis maybe managed with steroids. Steroids have been shown to reduced the liver size and granuloma. No treatment is required in asymptomatic patients.

CASE: A 65-year-old African American gentleman presented with evidence of recurrent ascites causing dyspnea requiring repeat paracentesis. He presented a month prior with similar symptoms and was diagnosed with liver cirrhosis. Patient has a history of Sarcoidosis which was deemed the cause his cirrhosis. Other causes of Liver cirrhosis were excluded via blood work including negative hepatitis panel, congenital disorders, AFP, mitochondrial IgG, ANA, RF, and other immunological workup. He did not abuse alcohol or other toxins and did not taken hepatotoxic medications. He had normal mentation, INR of 1.1, and only his ALP was elevated at the time of admission. His peritoneal fluid analysis showed evidence of Spontaneous bacterial peritonitis with negative culture/gram stain. Antibiotics were started and symptoms were relived with paracentesis. With evidence of cirrhosis on imaging, evidence of portal hypertension, and reoccurring symptomatic ascites, he was discharged with referral to a liver transplant center.

IMPACT/DISCUSSION: It is known that although more common in African Americans, more severe disease is also seen in this population. Our patient did

have CT and Ultrasound evidence of cirrhotic changes involving his liver. In studies patients with systemic sarcoidosis, only 10-30% had elevated liver enzymes. This case did show consistently elevated ALP. Approximately 0.012% of these patients develop end stage liver disease. Hepatic Sarcoidosis usually affects younger age groups (20-40 years). Our patient was 65 when he started to develop recurrent ascites which led to the diagnosis of exclusion, hepatic sarcoidosis causing cirrhosis. Our case was asymptomatic and presented with Cirrhosis, ascites with SBP and evidence of portal hypertension. Alternate drugs that can be used in hepatic sarcoidosis include Azathioprine, Infliximab, methotrexate, along with other anti-rheumatic medications, but more studies are required on this topic, specifically in relation to advanced hepatic sarcoidosis.

CONCLUSION: This case was a good example of systemic sarcoidosis used as a differential in cryptogenic cirrhosis. It was a diagnosis of exclusion in this particular patient, but should bring cognizance of the rare complications involved with hepatic sarcoidosis.

INDETERMINATE THYROID NODULES: A PALPABLE CONCERN AND NEW APPROACH

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LEARNING OBJECTIVE #1: Recognize the risk of malignancy in cytologically indeterminate thyroid nodules

LEARNING OBJECTIVE #2: Manage cytologically indeterminate thyroid nodules, incorporating the use of molecular genomic testing

CASE: A 55-year-old woman presented to her primary care physician for routine physical examination. Her concerns included fatigue and occasional sharp chest pain. Past medical history included hypertension, prediabetes and depression. Medications included amlodipine, lisinopril and HCTZ. She had no allergies. Family history was significant for goiter (mother). She smoked tobacco daily and occasionally drank alcohol. Review of systems was noncontributory.

On exam she appeared well. Vitals: 138/78-89-16-98.8. The thyroid was enlarged (right lobe >left) and non-tender. There was no cervical adenopathy. Complete physical examination was otherwise normal.

TSH was 0.5. Ultrasound showed three solid, isoechoic nodules (superior right lobe 2.7 x 2.1x 2.2 cm, inferior right lobe 2.6 x 2.2 x 2.0 cm and inferior left lobe 3.2 x 1.8 x 1.8 cm). Fine needle aspiration (FNA) of the left lower nodule was benign and suggestive of multinodular goiter. The right lower nodule revealed atypia of undetermined significance. Repeat FNA of the right lower lobe nodule with ThyroSeq molecular genomic evaluation was recommended and revealed benign follicular cells and NRAS pQ61R positivity. Right hemithyroidectomy was recommended.

IMPACT/DISCUSSION: FNA is frequently used to evaluate thyroid nodules for malignancy. For approximately 20% of thyroid nodules, cytology shows an atypical or follicular lesion of undetermined significance or follicular neoplasm, which are all considered indeterminate for malignancy. Historically, when repeat FNA confirmed an indeterminate nodule, lobectomy was advised as the reported rate of cancer in these nodules varies from 10-40%.

In an effort to decrease the number of lobectomies performed for benign disease, molecular testing can be used to risk-stratify cytologically indeterminate thyroid nodules. Nodules with indeterminate cytology and a benign molecular pattern may be followed without surgery. Those with a suspicious molecular pattern require lobectomy or total thyroidectomy.

RAS are the most common mutations found in cytologically indeterminate thyroid nodules. 70-90% of patients with these mutations have a low-risk cancer or Noninvasive Follicular Thyroid Neoplasm with Papillary-like Nuclear Features (NIFTP). NIFTP is a premalignant tumor that is biologically similar to a follicular adenoma and current guidelines recommend surgical excision.

CONCLUSION: Molecular testing of cells obtained by FNA offers guidance for clinical decision making when thyroid nodules are indeterminate.

Because of the risk of malignancy, surgical resection is recommended for patients with indeterminate nodules found to have RAS mutations.

INFECTIVE ENDOCARDITIS DUE TO STREPTOCOCCUS SALIVARIUS PRESENTING AS SEPTIC ARTHRITIS

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LEARNING OBJECTIVE #1: Recognize atypical presentations of Infective Endocarditis (IE)

LEARNING OBJECTIVE #2: Identifying potential other sources of infection in patients presenting with septic arthritis.

CASE: A 72yr old male with history of AICD placement 8yrs ago after cardiopulmonary arrest and left knee arthroplasty 18yrs ago presented due to increased pain and swelling of left knee. He denied recent trauma or surgeries to the knee and there was no history of IV drug use. X Ray left knee showed total knee arthroplasty with osseous densities superior to patella and suprapatellar soft tissue swelling. He was started on vancomycin and ceftriaxone after joint aspiration. Irrigation and Debridement of joint with removal of the hardware was performed.

However, he continued to spike fevers, so antibiotics were switched to clindamycin and cefepime. He then underwent revision arthroplasty due to retained implant, with extensive debridement and antibiotic spacer placement. His leukocytosis trended down, however he continued to spike fevers. Trans-thoracic Echocardiogram showed no vegetations. Blood and wound cultures from surgical site grew *S. salivarius*. Synovial fluid cultures grew *S. equinus* which could possibly be *S. salivarius* since viridans group bacteria are often misidentified as Group D Streptococci (GDS).

Transesophageal Echocardiogram was done due to this unusual bacterial growth with history of AICD.

It showed a 1.2 x 1.5 cm mass attached to the right ventricular lead just before the tricuspid valve. Electrophysiology was consulted who recommended laser lead extraction for which he was transferred to a tertiary facility.

IMPACT/DISCUSSION: Septic arthritis is usually known to be caused by Staphylococcus and Streptococcus. Viridans streptococci are commensal bacteria of oral cavity and upper respiratory tract that rarely cause septic arthritis. *S. salivarius* is a viridans group streptococci known to be associated with dental caries and IE. Presence of this unusual bacteria in cultures and persistent fever prompted us to look for another source. Our patient did have poor dental hygiene but no recent oral surgeries. We still aren't completely sure as to what happened first but due to the known association of this bacteria with endocarditis, one can postulate that bacteremia due to endocarditis led to hematogenous seeding to the prosthetic joint. However, timely recognition changed the management and led to removal of potential sources of infection. Since some GDS are associated with colon carcinoma, colonoscopy was also recommended.

CONCLUSION: Viridans group streptococci are rarely the causative agents of septic arthritis. They are in fact a part of commensal flora found in oral cavity and are known to be associated with dental caries and infective endocarditis. The presence of this bacteria in blood in patients presenting with septic arthritis should prompt physicians to look for other sources of bacteremia.

INSPECTION OF CORONARY ARTERY ANOMALIES THROUGH MULTIMODAL IMAGING ANALYSIS

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LEARNING OBJECTIVE #1: Recognize the indicators of coronary artery anomalies through coronary angiography and the need for multimodal imaging analysis for full characterization.

LEARNING OBJECTIVE #2: Assess the causative relationship between coronary artery anomaly and heart failure.

CASE: A 60-year-old Caucasian male presented with long-standing shortness of breath. Medical history revealed anxiety, hypertension, hypothyroidism, type 1 diabetes, alcoholic cirrhosis, and liver transplant. A social history of alcohol abuse and a pack of cigarettes a day habit for the past 10 years was also noted. Physical exam was suggestive of pulmonary edema, ascites, and bilateral lower limb edema, indicating fluid overload due to either alcoholic cirrhosis or heart failure.

Liver ultrasound and lab results confirmed normal anatomy and functioning, eliminating the diagnosis of liver cirrhosis. Chest X-ray and CT revealed the presence of right-sided pulmonary edema/effusion. An echocardiogram assessed heart function, revealing an ejection fraction of 45% indicative of left ventricular dysfunction, but further testing was needed to determine etiology. Workup for potential etiologies for the heart failure included a coronary angiogram which revealed non-obstructive atherosclerosis of the left anterior descending artery (LAD), but more importantly the presence of a very rare coronary artery anomaly (CAA). Characterization of the CAA found that two ostia originated from the right coronary cusp of the aorta, but no ostium was present in the left coronary cusp. The first ostium gave rise to the LAD and right coronary artery, while the second ostium gave rise to the circumflex artery.

Treatment included starting the patient on aggressive diuretic management and heart failure medications. Further treatment planning requires 3-dimensional imaging analysis to fully characterize the pathway of the anomalous coronary arteries—namely if the LAD is inter-arterial and therefore being intermittently compressed between the aorta and pulmonary artery.

IMPACT/DISCUSSION: CAAs are congenital disorders that hold the potential to cause life-threatening complications for the patient. While they hold such potential, many patients' CAAs go undiagnosed. Given the discussed case, the patient's CAA may have been causing slow chronic ischemia and repeated injury to the myocardium which has culminated in significant loss of ventricular function. Furthermore, if future imaging finds the patient's LAD is inter-arterial and therefore being intermittently occluded, it could provide further evidence for heart failure as a result of chronic ischemia.

Also, given the current lack of literature dealing directly with CAAs, it is our hope that this case will help further practitioners' understandings of CAAs and the steps that can possibly be taken in diagnosis.

CONCLUSION: Proper usage of multimodal imaging analysis provides full characterization of CAAs.

Determination of the etiology of heart failure is crucial for targeted treatment planning.

INTRAMUSCULAR HEMATOMA AS A MANIFESTATION OF ACQUIRED HEMOPHILIA A: A CASE REPORT

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LEARNING OBJECTIVE #1: Recognize the clinical presentation of Acquired Hemophilia A (AHA) and how it differs from classic hemophilia.

LEARNING OBJECTIVE #2: Intervene early in cases suspicious for AHA given high levels of morbidity and mortality.

CASE: A 74-year-old woman with a past medical history significant for hypothyroidism, esophagitis and recent rectus sheath hematoma, presented from acute rehab for worsening atraumatic hematomas, fatigue and lightheadedness.

Three months prior to admission, the patient experienced recurrent admissions for acute blood loss anemia secondary to gastrointestinal bleeding and rectus sheath hematoma. She had no personal or family history of easy bruising or bleeding. Vitals on admission showed sinus tachycardia. Exam was notable for pallor, diaphoresis, numerous ecchymoses and hematomas with a palpable mass over her abdomen, consistent with a known rectus sheath hematoma. There was no melena on exam and despite significant bruising, patient denied any recent trauma or abuse.

Laboratory work up revealed a hemoglobin of 5.7g/dl. Coagulation studies showed a normal INR and PT but an elevated activated partial thromboplastin

time (aPTT) of 88.1 seconds. This did not fully correct with a mixing study. A reduced factor VIII activity (<1%) and a high titer of factor VIII inhibitor (180.8 Bethesda Units) were noted. Given her recent onset of bleeding diathesis with the above lab results on admission, she was diagnosed with AHA. She was initially treated with recombinant factor VIIa and high dose steroids. Unfortunately, despite aggressive treatment she developed hemorrhagic shock due to uncontrolled AHA, which was not amenable to surgical or interventional radiology intervention. Given her worsening clinical condition she was also treated with porcine factor VIII, tranexamic acid, IVIG and rituximab. After discussion regarding poor prognosis of CPR in the setting of her continued coagulopathy, she was made DNR in accordance with her wishes. She died from uncontrolled blood loss on hospital day seven.

IMPACT/DISCUSSION: AHA is a rare bleeding disorder caused by acquired production of autoantibodies against endogenous coagulation factors, most often factor VIII. Due to its low prevalence, this diagnosis is often delayed or missed. However, this case emphasizes AHA should remain on the differential for new coagulopathy, particularly in a patient with intramuscular, non-traumatic, hematomas. This is opposed to the classic presentation of hemophilia which includes hemarthrosis. In addition to this history, an isolated prolongation of aPTT, that does not fully correct with a mixing study, should prompt the general internist to consider urgent evaluation of factor VIII activity, inhibitor level and hematology consult.

CONCLUSION: AHA is a hematological emergency that requires a high degree of clinical suspicion, early recognition and prompt subspecialist involvement to help limit the effect of autoantibodies targeting coagulation factors.

INVASIVE KLEBSIELLA PNEUMONIAE LIVER ABSCESS SYNDROME PRESENTING AS RIGHT CALF SKIN ABSCESS

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LEARNING OBJECTIVE #1: Recognize that *Klebsiella pneumoniae* in skin abscess is uncommon and should be considered for primary infection source control

LEARNING OBJECTIVE #2: Diagnose sepsis by SIRS criteria in suspected afebrile patient

CASE: A 36-year-old Filipino man with past history of diabetes presented with acute right calf pain. Pain was non-radiating, worsened on palpation, and relieved with rest. He denied having fever or recent exposure to freshwater, seawater, recent travel, or injury. He is a former-smoker and alcohol drinker. On review of systems, he denied dyspnea, abdominal pain, or dysuria. Initial vital signs were remarkable for tachycardia. Physical exam was pertinent for right calf tenderness with fluctuation and erythematous area. Needle aspiration was done and a small amount of purulent fluid was obtained and sent for gram stain and culture. CT lower extremities showed a 4cm-sized muscular abscess. CBC showed leukocytosis. Fulfilling the SIRS criteria from tachycardia and leukocytosis, he was admitted for sepsis with calf abscess. Vancomycin and ceftriaxone were started as empirical antibiotics. Gram stain showed gram-negative rods, later identified *Klebsiella pneumoniae*. ID specialist recommended further tests for primary infection source. LFTs were remarkable for elevated ALP, UA was positive for leukocyte esterase and pyuria. CT abdomen/pelvis showed a 7-cm multi-loculated liver abscess and prostatic abscesses. He underwent catheter-guided liver abscess aspiration and drainage and TURP for prostatic abscesses. Both abscess cultures grew *Klebsiella pneumoniae* and all specimens were sensitive to ceftriaxone. Later on, he was given ceftriaxone and metronidazole. CXR, and CT Chest showed loculated pleural effusion. Thoracentesis drained yellow cloudy pleural fluid. Pleural study was correlated with parapneumonic effusion and culture did not grow any organisms. He was diagnosed as **Sepsis secondary to Invasive *Klebsiella pneumoniae* liver abscess syndrome with right parapneumonic effusion.** His symptoms improved with antibiotics and abscess drainages. After drain removals, he was discharged from the hospital and

continued on ceftriaxone and metronidazole as outpatient medications in a total of 6 weeks.

IMPACT/DISCUSSION: *Klebsiella pneumoniae* is found as a bacteria that causes pneumonia. It rarely causes skin infection that may be disseminated from other organs. Further evaluation can reveal other organ involvement to prevent recurrence and complications.

CONCLUSION: This case illustrates a patient with multiple organ disseminated infectious disease could present with local skin infection. Most of the other infected organs were found by early recognition that it is rare for *Klebsiella pneumoniae* to grow on skin abscess. Knowing that it does not typically cause local skin infection, disseminated infection from other sources should be suspected. SIRS criteria used for sepsis diagnosis in this patient helped to assess the severity of his condition and ensured that the sources of infection were discovered and managed.

IRON OVERLOAD IN NON-TRANSFUSION-DEPENDENT ALPHA THALASSEMIA

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LEARNING OBJECTIVE #1: Identify non-transfusion-dependent thalassemia (NTDT) as a risk factor for iron overload.

LEARNING OBJECTIVE #2: Describe appropriate surveillance for iron overload in patients with NTDT.

CASE: A 46-year-old man immigrated from Vietnam and established care in a community health center.

His vital signs and physical examination were unremarkable. His weight was normal, and he had no jaundice or hepatosplenomegaly. Liver function tests were normal, and testing for viral hepatitis was negative. A complete blood count showed anemia (Hgb 10.7 g/dL) with severe microcytosis (MCV 64 fL). Hemoglobin H was detected on hemoglobin electrophoresis, confirming a diagnosis of alpha thalassemia. Iron studies revealed elevated ferritin (582 ug/L) and high-normal transferrin saturation (38%), so a workup for iron overload was pursued. HFE genetic testing was normal. An MRI showed liver iron concentration at the upper limit of normal (~2g Fe/kg dry weight).

He was seen annually in the clinic. In the five years following his first visit, he had developed diabetes (A1c 7.0%) and bilateral knee pain. His hemoglobin remained stable, ranging 9-11 g/dL, and he never required a transfusion. LFTs remained normal, but ferritin had risen to 982 ug/L. F2 fibrosis was found on Fibroscan. He underwent a liver biopsy, which revealed hemosiderosis.

The patient was referred to Hematology clinic, where he was started on iron chelation therapy with deferasirox and a folic acid supplement. TSH and testosterone levels were normal.

IMPACT/DISCUSSION: Iron overload causes significant morbidity in patients with non-transfusion-dependent thalassemia (NTDT), despite the absence of frequent transfusions. In these patients, excess dietary iron is absorbed in response to impaired erythropoiesis and ongoing hemolysis. Heavily affected organs include the liver and endocrine organs, while cardiac toxicity is less prevalent.

Iron-mediated damage may not be evident until the third or fourth decade, so surveillance should begin at age 15. MRI is recommended every 1-2 years to quantify liver iron concentration (LIC) in addition to serum ferritin measurement every 3 months. Ferritin level may underestimate the severity of iron overload in NTDT, but is a cost-effective alternative if MRI is unavailable. Clinicians should screen annually for hypogonadism, hypothyroidism, and diabetes mellitus.

Chelation therapy is indicated when serum ferritin is ≥ 800 ng/mL and/or LIC is ≥ 5 mg Fe/g dry weight, as these levels correlate with increased morbidity. Deferasirox is the only FDA-approved chelation agent for NTDT.

This case illustrates a classic presentation of insidious iron overload in a patient with NTDT resulting in end-organ damage in adulthood. Alongside his hepatic fibrosis, this patient's diabetes and knee arthralgias may have been a result of iron overload.

CONCLUSION: Iron overload is an under-recognized cause of morbidity in patients with NTD. Close surveillance with serum ferritin, liver MRI, and endocrine markers is recommended starting at age 15.

ISCHEMIC COLITIS IN AN ADULT WITH SICKLE CELL DISEASE

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LEARNING OBJECTIVE #1: Recognize ischemic colitis as a gastrointestinal manifestation of vaso-occlusive crisis in Sickle Cell Disease (SCD)

LEARNING OBJECTIVE #2: Recognize the complications of red blood cell exchange that could lead to ischemic colitis

CASE: A 26 year old African American gentleman with SCD (HbSS) complicated by stroke and Moyamoya disease on chronic red blood cell (RBC) exchange transfusion presented to the ED with abdominal pain and bright red blood per rectum. On the morning of admission, he underwent RBC exchange transfusion following which he noticed bright red blood per rectum which prompted him to go to the ER. He has history of catheter related upper extremity DVT for which he was on Apixaban and was also on iron chelation therapy (Deferasirox) for transfusion related iron overload. His vitals and physical examination were significant for temperature 98.1 F, heart rate-127/min, BP- 124/71 mm Hg, peri-umbilical tenderness, digital rectal examination which revealed brown stool mixed with bright red blood.

Laboratory features: Hemoglobin (Hb) - 11.9g/dL, hematocrit- 34.9%, leucocytes- 13, 700 per mm³, platelets- 74, 000 per mm³, automated reticulocyte percentage- 4.27%, PT- 13.4 sec, INR- 1.22, PTT-31, fibrinogen- 161mg/dL, and d-dimer- 1.11mg/L FEU, lactic acid 0.7mmol/L. His platelet count prior to RBC exchange was within normal limits. His Hb electrophoresis at the time of admission revealed HbA1- 85%, HbA2- 2.1%, HbS- 12.9%. His CT angiogram of abdomen and pelvis revealed circumferential mucosal thickening of descending and sigmoid colon, and rectum suggestive of colitis with patent mesenteric vasculature.

He was clinically diagnosed to have ischemic colitis. His anticoagulation and Deferasirox were held, intravenous fluid hydration and analgesia with intravenous opioids were initiated. He was empirically started on Piperacillin-Tazobactam and was given bowel rest for two days following which his diet was slowly advanced. His coagulation parameters and platelets improved over the next few days. He did not have any further bleeding episodes following hospitalization and his abdominal pain improved as well. He was discharged after five days of hospital stay and planned to undergo colonoscopy in three months.

IMPACT/DISCUSSION: Very few cases of ischemic colitis in SCD have been reported. Apart from standard treatment, red cell exchange has also been used successfully for treating these patients. In our case, we thought that this is unlikely to be a gastrointestinal vaso-occlusive crisis since HbS levels were low after his RBC exchange. Instead, this episode of ischemic colitis could be related to hypovolemia, and iatrogenic coagulopathy and thrombocytopenia due to RBC exchange which involves removal of whole blood while replacing only packed RBCs.

CONCLUSION: - Ischemic colitis should be recognized as a manifestation of gastrointestinal vaso-occlusive crisis in SCD.

- SCD patients can also develop complications related to RBC exchange presenting as ischemic colitis.

ISOLATED CNS POST-TRANSPLANT LYMPHOPROLIFERATIVE DISORDER

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LEARNING OBJECTIVE #1: Recognize risk factors of post-transplant lymphoproliferative disorder

LEARNING OBJECTIVE #2: Diagnose post-transplant lymphoproliferative disorder

CASE: 68 year old female presented with 3 weeks of nausea, headaches, and forgetfulness. Her past medical history included non-alcoholic steatohepatitis cirrhosis leading to orthotopic liver transplant approximately 4 years prior. Her immunosuppressive regimen included tacrolimus and mycophenolate mofetil. She presented after an initial outpatient brain MRI showed multifocal intracranial lesions with 3mm midline shift. On exam she was alert and oriented to name only with notable dysarthria, but otherwise there were no focal neurological deficits on detailed examination. Staging CT of the abdomen, pelvis, and chest did not show evidence of abscesses or metastatic disease. A brain MRI demonstrated 4 peripheral ring enhancing intracranial lesions with surrounding vasogenic edema. Work up for opportunistic infections and embolic sources were all negative. Serum EBV serology was negative. Lumbar puncture showed atypical lymphocytosis on cytology. CSF EBV DNA PCR was detected at 231,000 copies/mL. Flow cytometry showed monoclonal B, kappa restricted cells. The diagnosis of CNS post-transplant lymphoproliferative disorder was made. She was urgently initiated on systemic and intrathecal therapy. She tolerated therapy and was discharged home successfully. On clinic follow up approximately 7 weeks after initial presentation, the patient's neurological exam was stable compared to prior without new focal abnormalities.

IMPACT/DISCUSSION: The majority of PTLD cases are associated with EBV. Though, up to 48% of PTLD cases have been reported to be EBV negative. In the case above, the serum EBV was negative; however, CSF EBV titer was elevated, demonstrating isolated CNS involvement of PTLD. To our knowledge, only a handful of cases have been reported to demonstrate a discrepancy in peripheral blood and CSF EBV viral load where it was found to be negative in PB but positive in the CSF. Although EBV serology may be a useful tool in diagnosing PTLD, negative serology test should not preclude the diagnosis of CNS PTLD. Gold standard of diagnosis is still a biopsy. Risk factors for PTLD: Following solid organ transplantation, there is a higher incidence of PTLD in EBV-seronegative recipients than for EBV-seropositive recipients where the seronegative recipient acquires EBV from the seropositive donor. The solid organ transplantations with highest risk of developing PTLD are heart, lung, intestinal, and multiorgan transplants (up to 20% in some studies). Renal, liver, and pancreas transplantation carry lower risks (1-5%). Certain T cell dampening agents such as anti-CD3 ab, anti-thymocyte globulin, tacrolimus, and cyclosporine have been associated with increased risk of PTLD.

CONCLUSION: Risk factors of PTLD include EBV seronegative status of the recipient; heart, lung, and intestinal transplants and certain T cell suppressive agents. Gold standard for diagnosis is biopsy

IT'S STRONGYLOIDES BUT WHAT ELSE COULD IT BE?

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LEARNING OBJECTIVE #1: Recognize screening indications for parasitic infection in immigrant patients based on epidemiology

LEARNING OBJECTIVE #2: Recognize the importance of treating asymptomatic Strongyloides and treatment options

CASE: A 68 year old man with coronary artery disease presented to our clinic for a follow-up visit. The patient was born in an internal farming region in Liberia and emigrated to the U.S. in the 1970s. He continues to travel to Liberia biannually. Chart review revealed persistent, asymptomatic eosinophilia since establishing care in 2017 with the highest level of 1634 cell/microL. Given his epidemiological exposures, our clinical concern was a chronic infection with Strongyloides stercoralis. Strongyloides IgG returned positive and peripheral blood smear was normal except for mild eosinophilia. We did not treat with Ivermectin immediately given the risk of precipitating ocular or cerebral edema if he had a concomitant Loa loa infection. He was referred to an infectious disease clinic for further guidance. A thick smear to evaluate for Loa loa and serial stool exams for Schistosoma mansoni and haematobium were recommended before initiating treatment for Strongyloidiasis.

IMPACT/DISCUSSION: This case highlights the importance of incorporating epidemiologic exposures in evaluation of incidental laboratory abnormalities. Although patients may remain asymptomatic, the potential long-term health consequences can be severe.

The rate of *S. stercoralis* infection can be as high as 46% in the immigrant population. *S. stercoralis*, a helminth, can live its entire life cycle completely in a human host and can persist for decades through autoinfection. Despite varied presentation, it is often asymptomatic. The most common clinical finding is an elevated eosinophil count. Hyperinfection syndrome due to disseminated strongyloidiasis, a complication that can occur decades after infection, is associated with immunosuppression and high-dose steroids. It has a mortality rate of over 50%. The first step in screening patients is by serology. Examination of stool has low sensitivity in uncomplicated infections. The first line treatment for *Strongyloides* infection is Ivermectin. A relative contraindication to Ivermectin is a concomitant infection with *L. loa* which is co-endemic in Central and West Africa. Immigrants from these areas should be screened for *L. loa* infection prior to initiating treatment due to the risk of fatal encephalopathy with Ivermectin. *L. loa* is not detectable on stool examination and is diagnosed by presence and quantification of microfilariae on thin and thick blood smear. If positive, Albendazole for 7 days is the treatment alternative.

CONCLUSION: Though often overlooked, persistent eosinophilia, especially in immigrants or travelers from endemic countries should prompt further evaluation of parasitic infection. Understanding the epidemiology of the African region our patient was from was pertinent for clinical reasoning and guided further diagnosis and treatment for a potentially fatal disease.

KETOSIS-PRONE DIABETES: A MISLEADING CAUSE OF DKA

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LEARNING OBJECTIVE #1: Diagnose Ketosis-Prone Diabetes (KPD)

LEARNING OBJECTIVE #2: Recognize the clinical features of KPD and how it differs from Type 1 Diabetes Mellitus (T1DM) and Type 2 Diabetes Mellitus (T2DM)

CASE: A 29 year-old male with no significant medical history presented with two weeks of progressive fatigue, polyuria, polydipsia, and weight loss. Blood glucose was 610 mg/dL, anion gap 19, bicarbonate 13 mmol/L, Hemoglobin A1c 12.8%, beta-hydroxybutyrate 3.4 mmol/L, and urinalysis showed glucose >500 mg/dL and >80 mg/dL ketones. He denied a personal history of diabetes mellitus (DM). An insulin drip and intravenous fluid resuscitation were started for Diabetic Ketoacidosis (DKA). Based on the patient's age and body habitus (BMI 24.5 kg/m²) he was presumed to have DKA secondary to new-onset T1DM. He was initiated on insulin therapy and discharged. Outpatient endocrine evaluation included Islet Antigen 2 (IA-2) and Glutamic Acid Decarboxylase (GAD-65) antibodies which were both negative. C-Peptide level was normal at 2.37 ng/mL, though C-Peptide to blood glucose ratio was reduced, indicating inadequate beta-cell function. A diagnosis of KPD was made. He continues to be monitored for return of adequate beta-cell function and possible discontinuation of insulin therapy.

IMPACT/DISCUSSION: Historically, DM has been subclassified into two major categories: T1DM and T2DM. KPD, often referred to as "Atypical Diabetes," "Type 1b Diabetes," or "Flatbush Diabetes," is an increasingly-recognized syndrome that does not align with this subclassification of DM. KPD is characterized by patients with no DM history who present with DKA but do not meet phenotypical presentation of T1DM. The pathophysiology of KPD is underlying beta-cell dysfunction, leading to inadequate insulin production. KPD is further subclassified into four categories based on presence (+) or absence (-) of autoantibodies (A) and residual beta-cell function (B), determined by C-Peptide levels. The four subgroups are: A+B-, A-B-, A+B+, A-B+.

Much like T1DM, KPD patients will initially require insulin therapy. However, depending on the subclassification, KPD patients have the potential to be transitioned off insulin therapy. Patients lacking adequate residual beta function (B-) typically resemble T1DM and require lifelong insulin therapy. Those who display residual beta function (B+), such as this patient, have potential for reversible beta-cell dysfunction. C-Peptide and blood glucose levels are

monitored over time to assess adequate beta-cell function. If detected, patients are weaned from insulin and transitioned to oral agents.

CONCLUSION: KPD is an increasingly-recognized cause of DM that does not align with typical subclassification of T1DM and T2DM. Due to the initial presentation of DKA, KPD can be easily misdiagnosed as T1DM. Proper identification of KPD is key, as these patients have the potential to be transitioned off long-term insulin therapy.

KETOSIS-PRONE DIABETES MELLITUS IN A JAPANESE WOMAN: "FLATBUSH DIABETES" CAN APPEAR ANYWHERE

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LEARNING OBJECTIVE #1: Recognize ketosis-prone diabetes mellitus as an important entity among diabetic patients presenting with ketosis in multiple ethnic groups

LEARNING OBJECTIVE #2: Classify ketosis-prone diabetes mellitus to offer proper management

CASE: A previously healthy 46-year-old Japanese woman presented with fatigue and unintentional 9-kg weight loss over 3 months. She reported palpitations, polydipsia, and polyuria. She had no history of smoking or family history of thyroid disease, diabetes, or cancer. Her height and weight were 155 cm and 39 kg (body mass index=16.2 kg/m²). Her vital signs were within normal limits, except for heart rate (112 beats/min). Physical examination revealed no findings in the neck, chest, abdomen, or extremities. Blood laboratory tests revealed a blood glucose level of 492 mg/dL, HbA1c of 17.1%, and anti-GAD antibody level of >2000 U/mL (cut-off <5 U/mL). The serum ketone body level was 438 μmol/L (normal range <130 μmol/L), but urine ketone bodies were not detected. Complete blood count, C-reactive protein, liver and kidney function, electrolytes, and thyroid function were within normal limits. Venous blood gas analysis revealed a pH of 7.359, bicarbonate level of 28.2 mmol/L, venous pO₂ level of 19.3 mmHg, pCO₂ level of 51.4 mmHg, and anion gap of 10.8 mEq/L. We first diagnosed her with new-onset type 1 diabetes and administered 14 units of rapid-acting insulin and 10 units of long-acting insulin; subsequently, her symptoms promptly improved. Her HbA1c level was 6.0% after 6 months of treatment. β-cell function was assessed. Her fasting C-peptide level was 1.03 ng/mL, and C-peptide level 5 min and 10 min after 1 mg glucagon stimulation were 1.73 and 1.60, respectively. These results indicate preserved β-cell function. We finally diagnosed her with autoantibodies and β-cell function present (A+β+) ketosis-prone diabetes mellitus. Her blood glucose level was well-controlled even after the insulin dose was decreased to 6 units of rapid-acting insulin and 8 units of long-acting insulin. Thus, we will switch to basal-supported oral therapy.

IMPACT/DISCUSSION: Ketosis-prone diabetes mellitus (KPD) is a heterogeneous condition characterized by presentation with ketosis, despite lacking the typical phenotype of type 1 diabetes. KPD was originally described as "Flatbush diabetes" in African Americans, but it has recently been seen in multiple ethnic groups, such as Hispanic, Asian, and Indian. KPD has four subgroups (A+β+, A+β-, A-β+, A-β-) based on the presence or absence of autoantibodies (A+/-) and β-cell function (β+/-). The patient met the criteria for A+β+ KPD. While insulin is often discontinued in A+β+ and A-β+ KPD, A+β- and A-β- KPD usually require lifelong insulin. Therefore, it is important to be aware of KPD and its classification because it can change management.

CONCLUSION: KPD is an important entity among patients with diabetes presenting with ketosis in multiple ethnic groups. We need to be aware of KPD and its classification to offer proper management.

KEYTRUDA-INDUCED THYROID DYSFUNCTION

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LEARNING OBJECTIVE #1: Diagnose immune-related thyroid function due to Pembrolizumab (Keytruda)

LEARNING OBJECTIVE #2: Assess patients treated with pembrolizumab routinely to monitor for immune-mediated side effects

CASE: A 48-year-old female presented to the hospital with multiple non-specific complaints, including generalized weakness, myalgias, nausea, and vomiting for a few days. Her past medical history was significant for hypertension, diabetes mellitus type II, and stage IV colon adenocarcinoma on treatment with Pembrolizumab and was recently switched to FOLFOX (Folinic acid, Fluorouracil, Oxaliplatin) due to cancer progression. Physical examination was unremarkable. Laboratory investigations revealed elevated creatinine of 1.4 mg/dl and creatinine kinase of 3000U/L. The patient was started on intravenous fluids for management of rhabdomyolysis and acute kidney injury. Given that the patient had worsening myalgias, additional testing, including thyroid function tests (TFTs), myositis panel, were performed. TFTs revealed elevated thyroid-stimulating hormone (TSH) of 113uIU/mL (last noted TSH 0.91uIU/mL 6 weeks ago), thyroxine (T4) < 0.25 ng/dL, and thyroid peroxidase antibodies of 412 IU/L. The patient's abnormalities were attributed to Pembrolizumab induced hypothyroidism, and she was initiated on thyroid hormone replacement therapy. Repeat TSH 6 weeks later trended down to 6.99 uIU/mL with complete resolution of symptoms.

IMPACT/DISCUSSION: Pembrolizumab is one of the anti-Programmed Death-1 (PD-1) monoclonal antibodies, the class of medications widely used in clinical practice for various cancers. The most commonly reported side effects are fatigue, nausea, and pruritis. However, endocrinological immune-mediated side-effects such as hypophysitis, thyroiditis, and adrenalitis are also reported in the literature. Drug-induced thyroiditis secondary to Pembrolizumab manifests commonly either as hypothyroidism secondary to destructive thyroiditis or hyperthyroidism presenting as Graves' disease, and in some cases such as ours, it can present with non-specific symptoms. A high degree of clinical suspicion amongst non-oncological physicians can result in early diagnosis and treatment. Diagnosis is predominantly clinical. Treatment varies depending on the severity of clinical presentation, with asymptomatic patients requiring no treatment and others requiring thyroid hormone supplementation, beta-blockers, or steroids. Severe cases even require hospitalization to prevent and treat catastrophic complications. Routine monitoring of TFTs is indicated in all the patients initiated with pembrolizumab.

CONCLUSION: It is important for clinicians to measure baseline thyroid function tests prior to starting therapy with immune checkpoint inhibitors, as well as routine thyroid function test monitoring should be considered.

KIKUCHI-FUJIMOTO DISEASE: THE GREAT MASQUERADER

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LEARNING OBJECTIVE #1: Recognize the clinical features of Kikuchi-Fujimoto disease.

LEARNING OBJECTIVE #2: Discuss the management of Kikuchi-Fujimoto disease.

CASE: A healthy 28-year-old African American male presented to the hospital with a 1-month history of left-sided neck pain, daily fevers, fatigue, and night sweats. He was prescribed clindamycin and ibuprofen on an outpatient basis without improvement. He has a cat at home who frequently scratches him. He denied recent travel or sick contacts. Physical exam was remarkable for a temperature of 103F and two prominent, fixed, rubbery, nontender left posterior cervical nodes. Labs showed elevated inflammatory markers (CRP 3.2) and negative infectious workup (EBV IgM, HIV, hepatitis panel, toxoplasma and bartonella antibodies). Peripheral smear showed lymphopenia. CXR showed no acute process. CT soft tissue neck demonstrated prominent bilateral cervical lymph nodes. Otolaryngology was consulted and an excisional lymph node biopsy was performed. Pathology showed granulomatous lymphadenitis and benign lymphoid hyperplasia favoring lupus vs Kikuchi disease. Autoimmune workup was negative (ANA, rheumatoid factor, complement levels,

Sjogren antibodies). Given that the negative autoimmune work-up excluded lupus, a final diagnosis of Kikuchi disease was made. He followed up in rheumatology clinic and was prescribed prednisone (10mg with 2.5mg taper per week) with improvement in symptoms.

IMPACT/DISCUSSION: Kikuchi-Fujimoto disease, also known as histiocytic necrotizing lymphadenitis, is a rare self-limited syndrome characterized by lymphadenopathy and fever. Kikuchi can mimic a variety of diseases including infectious mononucleosis, extrapulmonary tuberculosis and lymphoma. Kikuchi disease commonly presents in young females of Asian descent, however has been reported across all ages, ethnicities, and in men. The pathogenesis is unclear but thought to be an immune response to an infectious agent mediated by T cells and histiocytes. Labs often show elevated inflammatory markers, lymphopenia and negative autoimmune workup. A negative ANA is particularly useful in the exclusion of lupus. Diagnosis is made by lymph node biopsy, ideally excisional, and will show paracortical necrosis and infiltration of histiocytes. Treatment is supportive as symptoms typically resolve within one to four months. Glucocorticoids are often employed to alleviate severe or persistent symptoms.

CONCLUSION: • Kikuchi-Fujimoto disease is a rare self-limited syndrome characterized by lymphadenopathy, fever, and negative autoimmune workup. • Treatment is supportive as symptoms typically resolve within one to four months.

LACRIMAL GLAND ENLARGEMENT AS AN EXTRAINTestinal MANIFESTATION OF CROHN'S DISEASE: A CASE REPORT AND LITERATURE REVIEW

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LEARNING OBJECTIVE #1: Recognize that Crohn's disease sometimes presents with extraintestinal manifestations

LEARNING OBJECTIVE #2: Identify patients in whom lacrimal gland swelling is secondary to Crohn's disease

CASE: A healthy 29-year-old woman was referred for a 5-month history of recurrent fever, abdominal pain, and diarrhea. Abdominal computed tomography (CT) revealed diffuse intestinal wall thickening involving the transverse colon and terminal ileum. Although her symptoms spontaneously resolved within 10 days, she also noticed bilateral upper eyelid edema, an S-shaped contour to the upper eyelid. Ultrasonography and CT revealed enlarged lacrimal glands. At the same time, enteroscopy detected noncaseating granulomas in the small intestine, consistent with Crohn's disease. Lacrimal gland enlargement improved spontaneously after 1 month. Bilateral lacrimal gland enlargement associated with Crohn's disease was presumed.

IMPACT/DISCUSSION: I learned two important facts in this case.

Crohn's disease can present with extraintestinal manifestations including lacrimal gland. Differential diagnosis of lacrimal gland tumors includes pseudotumor due to Crohn's disease.

Crohn's disease is a chronic inflammatory disease characterized by a generalized granulomatous inflammation of the gastrointestinal tract, but it is associated with a variety of lesions in organs other than the intestinal tract, including joints and bones, spine, skin and mucous membranes, eyes, hepatobiliary tracts, and blood vessels. Ocular symptoms include uveitis, iritis and scleritis, and in rare cases, lacrimal gland swelling due to granulomatous inflammation. About half of the patients get better spontaneously, but there are reports that steroids are effective. It is important to identify patients in whom lacrimal gland swelling is secondary to Crohn's disease.

CONCLUSION: Crohn's disease sometimes presents with lacrimal gland swelling.

LATE VASCULAR COMPLICATIONS SECONDARY TO SARS-COV-2

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LEARNING OBJECTIVE #1: Need for long term anticoagulation in patients diagnosed with COVID-19 infection to prevent thrombotic events.

LEARNING OBJECTIVE #2: Importance of close followup in Covid-19 patients.

CASE: A 38-year-old male with a past medical history of diabetes mellitus, hypercholesterolemia and a recent history of COVID-19 infection (4 weeks ago) presented to the Emergency Department with complaints of sudden onset of constant right lower extremity pain which worsens with ambulation and is associated numbness.

Physical examination was remarkable for diminished right dorsalis pedal pulse and right foot was cold to touch. Computed tomography angiogram and arterial duplex ultrasound of the right foot revealed filling defects within the distal superficial femoral artery and popliteal artery suggestive of thrombus. Labs revealed normal Platelet counts and coagulation panel. Repeat COVID-19 PCR test was negative, COVID-19 IgG antibodies were positive. Hypercoagulability work up was positive for anti-cardiolipin IgM antibodies. He was started on heparin drip, Vascular surgery performed emergent thrombectomy with intra-arterial tPA. At discharge, the patient was bridged to coumadin. Hematology recommended repeat testing for anti-cardiolipin IgM in 6 weeks.

IMPACT/DISCUSSION: Regardless of cause, acute limb ischemia (ALI) is a vascular emergency. In patients with normal vasculature, the most common causes of ALI include hypercoagulability, trauma, and thrombosis. Patients with SARS-CoV-2 infection are at significant risk of developing arterial and deep venous thrombosis which can develop in almost any location.

Literature* has shown that coagulopathy in these patients is due to Covid-19 mediated inflammatory responses. These responses affect the vessel walls, causing diffuse endothelial inflammation and microvascular damage, which results in widespread thrombosis.

Antiphospholipid (aPL) antibodies were detected in 52% of patients with COVID-19 and are potentially pathogenic.

Diagnosis for ALI is by duplex ultrasound, CT angiography or MR angiography. Treatment includes early initiation of systemic anticoagulation followed by thrombolysis or surgical revascularization based on severity of acute ischemia. Duration of anticoagulation in COVID-19 induced hypercoagulability is usually six to twelve months and hypercoagulability work-up should be repeated in 6-12 weeks.

*Juan Esteban Gómez-Mesa, Stephania Galindo-Coral, Maria Claudia Montes, Andrés J. Muñoz Martín, Thrombosis and Coagulopathy in COVID-19, Current Problems in Cardiology, 2020, 100742, ISSN 0146-2806

CONCLUSION: This case reflects a rare presentation of delayed acute limb ischemia (ALI) in a patient recovering from COVID-19. ALI is a potentially catastrophic complication of Covid-19 induced hypercoagulability. Irrespective of disease severity, we should consider treating all covid-19 positive patients with therapeutic anticoagulation. Close follow up is needed to monitor antiphospholipid antibodies levels.

LEFT ANTERIOR DESCENDING ARTERY FISTULA PRESENTING AS ATYPICAL CHEST PAIN

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LEARNING OBJECTIVE #1: Recognize the clinical features and management approach for minimally symptomatic coronary artery fistulae.

LEARNING OBJECTIVE #2: Recognize the importance of coronary computed tomography angiography for patients with low to intermediate pretest probability of coronary artery disease who present with chest pain.

CASE: A 51-year-old female presented with atypical substernal chest pain described as pressure-like which began 1 hour prior and lasted 30 minutes. She had never experienced similar symptoms. Family history was significant for myocardial infarction in both of her brothers before age 40. Troponins and

electrocardiogram were unremarkable. Coronary computed tomography angiography (CCTA) with calcium scoring showed a tortuous fistula arising from the proximal left anterior descending artery communicating with the pulmonary artery. It was suspected her chest pain was due to steal mediated coronary ischemia. However, radionuclide myocardial perfusion imaging with Regadenoson did not show perfusion abnormalities. Transthoracic echocardiogram (TTE) was also unremarkable. There were no subsequent chest pain episodes while admitted. Therefore, a conservative approach was taken, and surgical closure was deferred. She was started on metoprolol tartrate upon discharge and advised to maintain close follow-up with her cardiologist as she may need closure in the future.

IMPACT/DISCUSSION: This case highlights the importance of CCTA for the diagnosis and risk assessment of patients with a low-intermediate pretest probability of coronary artery disease (CAD). Although our patient was found not to have CAD, CCTA was imperative in demonstrating her coronary artery fistula (CAF). CAFs are connections (typically congenital) between coronary vessels and other cardiac structures. They are present in about 0.002% of the population. CAF typically present with dyspnea, palpitations, or chest pain. However, 50% of cases are asymptomatic. The most common complications from CAF are high-output cardiac failure, steal mediated myocardial ischemia, atrial arrhythmias, and endocarditis. The guidelines from the ACC/AHA do not recommend CAF closure for asymptomatic patients with small or moderate CAF, however, follow-up with echocardiography every 3 to 5 years is recommended. In conservatively treated patients, beta-blockers have shown to be effective. The conservative approach was taken in our patient since she presented with one distinct episode of chest pain which was not reproducible with pharmacological stress.

CONCLUSION: CAF is a rare cardiac anomaly that typically presents as chest pain. Identification with imaging such as CCTA is critical because of the risk for complications such as high-output cardiac failure and steal mediated ischemia. In the past elective closure of CAF was recommended regardless of symptomatology. However, recently in asymptomatic patients, this recommendation has fallen out of favor as there has been a high incidence of spontaneous closure of CAF with conservative management.

LEPTOMENINGEAL CARCINOMATOSIS SECONDARY TO SIGNET RING CELL ADENOCARCINOMA OF THE COLON

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LEARNING OBJECTIVE #1: Identify differential diagnoses in an oncology patient presenting with neurological symptoms.

LEARNING OBJECTIVE #2: Diagnose leptomeningeal carcinomatosis early by clinical features and appropriate diagnostic workup.

CASE: This is a 37-year-old male diagnosed with stage 4 adenocarcinoma of the colon with signet ring cells 18 months ago who presented with neck pain and headache. On initial presentation, the neurological exam was unremarkable. He underwent extensive workup including imaging of the brain, spine, and neck that were negative of metastatic lesions or meningeal enhancement. Symptoms continued to progress within days and he developed diplopia, bilateral horizontal nystagmus, and sensorineural hearing loss. The intracranial exam showed peripapillary disk hemorrhaging along with papilledema. Repeat MRI (Magnetic Resonance Imaging) revealed abnormal signal enhancement within sulci of the right temporal lobe consistent with leptomeningeal inflammation. Subsequently, a lumbar puncture was performed, opening pressure was elevated at 55 cmH₂O, and cytology was positive for malignant cells. After the diagnosis of Leptomeningeal carcinomatosis (LMC), He was started on weekly intrathecal methotrexate, high dose steroids, palliative brain radiation. Despite multiple therapeutic spinal taps, he continued to have elevated intracranial pressure. Unfortunately, the patient was not deemed to be a candidate for a ventriculoperitoneal shunt due to peritoneal metastasis. Despite multiple chemotherapy regimens, the patient died due to the progression of the disease after three months.

IMPACT/DISCUSSION: LMC is a well-recognized phenomenon in hematological malignancies but is often a rare manifestation of solid tumors

including colorectal cancer (CRC). This can involve cranial nerves, spinal cord, and cerebral hemispheres, leading to a wide variety of neurological features and therefore may be misdiagnosed as toxicities of chemotherapeutic agents, infectious meningitis, and parenchymal metastases. As a result of the new therapeutic agents prolonging the survival of cancer patients, rare complications of common malignancies are increasingly being identified. Signet ring cell carcinoma is an aggressive variant with a propensity for extensive carcinomatosis. Although this type has the highest propensity for LMC in gastric cancer, the incidence of LMC in CRC has not been clearly established and is limited to case reports.

CONCLUSION: Given the increasing incidence of CRC in the young population, the internists who are the first providers to encounter a patient with new symptoms should be aware of this uncommon type of spread as prompt diagnosis and treatment can provide significant relief of symptoms although the survival benefit is limited. Early detection and treatment are critical to halt the progression of neurological manifestations. We cannot completely rely on MRI in ruling out LMC as its sensitivity in detecting leptomeningeal enhancement during early stages is quite low.

LESS LIKELY THAN BEING SHOCKED BY LIGHTNING, NASOPHARYNGEAL CLEAR CELL CARCINOMA PRESENTING WITH ZAPS ALL OVER

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LEARNING OBJECTIVE #1: Recognize an atypical presentation of nasopharyngeal clear cell carcinoma

LEARNING OBJECTIVE #2: Identify delays of care in uninsured patients

CASE: A healthy 39-year-old man with recently identified nasopharyngeal mass presented with strange “zap-like” pains and leukocytosis. He had electric painful sensations throughout the body for 2 months. 1 month ago, on presentation to an ED for neck and jaw pain, a head CT identified a 2.7 cm by 2.3 cm mass in the fossa of Rosenmüller and was discharged with ENT follow-up. Unfortunately, he had recently lost health insurance resulting in difficulty following-up for care. He presented with 2 days of cough, hemoptysis, dyspnea, and lower extremity edema. He had no fever, epistaxis, or orthopedic. No family history of blood clots or malignancy. On exam, his heart rate was 125 bpm; there were bilateral crackles with right sided resonance to percussion and left sided dullness to percussion.

Initial laboratory studies were notable for WBC of 18.2 K/uL, Hgb of 20.7 g/dL, and D-dimer of 7.6 mg/L. Imaging showed multiple bilateral pulmonary emboli (PE) without right heart strain. Intravenous heparin was then started. The hospitalization was complicated by several adverse events that delayed the nasopharyngeal mass biopsy. First, he developed heparin induced thrombocytopenia (HIT), requiring transition to argatroban. Days after, he developed a large, left loculated pleural effusion and a pneumothorax. He underwent video-assisted thoracoscopic surgery with decortication and pleurodesis and nasopharyngeal mass biopsy. The biopsy showed carcinoma with clear cell features. Given his lack of insurance, he filed for bankruptcy and ultimately underwent surgical removal of his cancer 4 months after initial presentation.

IMPACT/DISCUSSION: Nasopharyngeal clear cell carcinoma of the minor salivary gland is extremely rare. It can be easily misdiagnosed as squamous cell carcinoma or nasopharyngeal carcinoma. The work-up with EWSR1-ATF1 t(12;22)(q13;q12) fusion product confirm this diagnosis.

We report an uninsured, young patient with no significant risk factors who had multiple PEs, a pleural effusion, and HIT, all before receiving his cancer diagnosis. A typical unprovoked PE workup may have missed his mass as CT scans are often limited to the chest, abdomen, and pelvis. By chance, he recently had head imaging showing his mass that helped identify his malignancy. Given his lack of insurance in a state that did not expand Medicaid and offers little protection for patients in similar circumstances, his cancer had more time to progress. He now has tumor invasion into his carotid artery.

CONCLUSION: Nasopharyngeal clear cell carcinoma of the minor salivary gland can precipitate PEs in otherwise healthy young patients and present with strange shock like pains. Work-up for unprovoked PEs should include

head/neck imaging if traditional testing is not remarkable. The traditional healthcare system fails uninsured patients through care delays that may result in unnecessary malignancy progression.

LESSONS FROM A CHANDELIER AND CUTANEOUS MUCORMYCOSIS

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LEARNING OBJECTIVE #1: Recognize early symptoms and risk factors for mucormycosis and emphasize the importance of early diagnosis for best prognosis.

LEARNING OBJECTIVE #2: Recognize the role of primary care in screening, management, and prevention of chronic disease.

CASE: A 48-year-old male with no known medical history presented for evaluation of right (R) eye pain, decreasing vision, and swelling after running into a chandelier 3 days prior. Symptoms included subjective increased breathing frequency and fluid intake. On exam, he was tachypneic, tachycardic, and hypertensive, with diffuse swelling of the periorbital region of the R eye. Labs revealed hyperglycemia with glucose of 320, anion gap of >25, Hgb A1c 14.9, and VBG consistent with anion gap metabolic acidosis. Diabetic ketoacidosis (DKA) treatment was initiated with an insulin gt in addition to antibiotics. Despite resolution of DKA, his R eye subsequently became edematous with a necrotic eschar involving the medial half of the eye. Punch biopsy confirmed angio-invasive mucormycosis. MRI brain revealed changes consistent with fungal cerebritis and angioinvasive disease. Otolaryngology and neurosurgery were consulted. His case was deemed to be inoperable with recommendation of medical management. IV amphotericin was initiated. He was subsequently transitioned to oral posaconazole and discharged home.

IMPACT/DISCUSSION: Mucormycetes are ubiquitous in the environment, found in soil and decaying vegetation. Due to a ketone reductase enzyme, they proliferate in acidic conditions. Thus, it thrives in the setting of DKA. Mucor first gains access via the nasopharynx. Healthy patients clear it via cilia or the gastrointestinal tract. Otherwise, it is not removed and causes aggressive rhino-orbital-cerebral or pulmonary disease which is often angioinvasive. It also thrives in iron-overloaded states. DKA leads to elevation of serum free iron levels. Rhino-orbital-cerebral mucormycosis, the most common form of the infection, first presents with acute sinusitis symptoms with the telltale sign of necrosis of the palate and vascular invasion resulting in eschars. Cutaneous mucor (usually a result of trauma) begins as a cellulitis that progresses into an ethyma-like reaction. Our patient's fungal cerebritis is an uncommon presentation of cutaneous mucor as it involves deeper structures.

Diagnosis is based on biopsy and clinical correlation. Eschars often present late in the infectious course, thus a high level of suspicion for disease is necessary for better outcomes. Treatment strategy involves both surgical debridement and antifungals. The first line antifungal is IV amphotericin. Step down therapy includes oral posaconazole or isavuconazole. It is critical to treat the underlying condition which predisposed the patient (e.g. diabetes). Unfortunately, the prognosis for mucormycosis is extremely poor and often fatal.

CONCLUSION: This case illustrates the importance of primary care, including regular screening to diagnose chronic health conditions early before complications arise.

LEVOTHYROXINE (L-T4) ADJUSTMENTS AS PART OF A WEIGHT LOSS REGIMEN IN A HYPOTHYROID PATIENT

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LEARNING OBJECTIVE #1: Discuss utility of levothyroxine (L-T4) dose adjustments to manage weight loss in patients with hypothyroidism and normal TSH

LEARNING OBJECTIVE #2: Explain appropriateness of requested medication changes to achieve patient-centered goals

CASE: A 48-year-old female with hypothyroidism, obesity (BMI 35), and type II diabetes presented to establish care and discuss a 30 lb weight gain in the past 2 years. She underwent gastric bypass 14 years ago and achieved her goal weight of 170 lbs, but now weighed 230. She tried multiple diets without success. Her food journal showed two main meals with fruit and vegetables, limited snacking, and 2000 calories daily. She walked 30 mins daily. Current medications included levothyroxine, metformin and furosemide. She felt she had “done everything to lose weight” and attributed limited success to her hypothyroidism as she noted dry skin, hair loss, and vision problems. Physical exam revealed an overweight female with goiter and dry skin, but otherwise unremarkable. Pertinent labs included TSH 3.96 and A1c 6.7%. She was started on exenatide, asked to increase exercise, and referred to nutrition for very low calorie diet teaching. She returned 1 month later with 3 lb weight loss but no resolution of presenting symptoms. She had not scheduled with nutrition, instead asking to focus on thyroid management. Given her concern and symptoms, we adjusted her goal TSH to the low normal range. We agreed to focus on nutrition and bariatric clinic if symptoms did not improve. At 1-month follow-up she said, “I feel like me again”. She had lost 23 lbs and noted resolved symptoms.

Repeat TSH was 1.21. Her weight loss continued over subsequent months without other medication changes and at most recent visit had lost a total of 34 lbs.

IMPACT/DISCUSSION: Multiple studies indicate that L-T4 does not have a significant impact on weight loss in hypothyroid patients. Many report that adjustment in L-T4 does not achieve effects on body expenditure or composition and that there is no clinically significant improvement in quality of life, mood or executive function in asymptomatic patients. Most patients, however, preferred L-T4 dosing that they perceived to be higher. Similar results were noted in subclinical hypothyroidism studies. This case highlights the impact of the patient-physician relationship and a dose adjustment that provided patient validation and contributed greatly to her weight loss success despite the known limited therapeutic effect. Due to this case, I will be more intentional in addressing patient medication adjustments/requests as part of a multifaceted weight loss plan and will actively discuss thyroid management early with suitable patients.

CONCLUSION: -Adjusting L-T4 dosing does not contribute significantly to weight loss in the literature.

-Patient perception of improved health on higher levels of levothyroxine and the patient-physician relationship are contributing factors to lifestyle modification success.

LIVING WITH A DOUBLE WHAMMY BLOOD: A RARE CASE OF COMBINED HEREDITARY THROMBOPHILIA

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LEARNING OBJECTIVE #1: Order thrombophilia panel 4-12 weeks after completion of anticoagulation therapy in suspected hereditary thrombophilia.

LEARNING OBJECTIVE #2: Strongly recommend life-long anticoagulation for individuals with prothrombotic mutations.

CASE: A 65-year-old male presented with bilateral leg swelling for two days. His past medical history was significant for an episode of unprovoked bilateral lower limb deep vein thrombosis (DVT), treated with warfarin for 6 months, bilateral cerebral infarcts with no residual deficits, and asbestos-related lung disease. His home medications included atorvastatin and aspirin. Workup for etiology of stroke was negative. He was a non-smoker and denied any sick contacts, COVID-19 infection, recent travel, surgery, trauma, or immobilization. Venous duplex ultrasound demonstrated bilateral new acute DVT. He was started on IV heparin infusion. The CT chest revealed opacity concerning malignancy given the history of asbestos exposure, but lung biopsy was negative. Given the recurrent episodes of unprovoked venous and arterial thrombus in the absence of malignancy and other risk factors, a thrombophilia workup was ordered, to be done 12 weeks after completion of anticoagulation. He tested positive for a homozygous mutation in the C677T Methylenetetrahydrofolate Reductase (MTHFR) gene with elevated homocysteine levels and heterozygous mutation in the Factor V Leiden (FVL) gene. Workup for secondary causes of elevated homocysteine levels like vitamin B12, folate,

TSH, medication-induced were all negative. It was concluded that his recurrent thrombotic episodes were likely the result of the combination of prothrombotic mutations and was started on anticoagulation, B6, B12, and folate supplements.

IMPACT/DISCUSSION: FVL mutation is the most common type of hereditary thrombophilia and its presence increases the risk of thrombosis 2-4 folds. On the other hand, the role of MTHFR, a folate-dependent enzyme involved in homocysteine metabolism has long been debatable. Over the past two decades, conflicting evidence linked the homozygosity of c.665C>T, previously known as C677T mutation with myocardial infarction, stroke, and venous thrombosis. It has been suggested that treating elevated homocysteine levels may not decrease the possibility of future thrombotic events. However, recent evidence supports the theory that the homozygous mutation in the thermolabile variant of the MTHFR gene (C677T), increasing the plasma homocysteine levels predisposes to thrombosis especially when combined with another genetic mutation such as FVL mutation as seen in our patient. Such patients are at a higher risk of thrombosis and require early identification and lifelong anticoagulation along with avoiding high-risk behaviors known to predispose to clot formation.

CONCLUSION: Order thrombophilia panel 4-12 weeks after completion of anticoagulation therapy in suspected thrombophilia and recommend life-long anticoagulation for individuals with prothrombotic mutations. Avoid testing during acute thrombotic events.

LOSING YOUR NERVE OVER WEIGHT LOSS: AN INTERESTING CASE OF BARIATRIC BERIBERI

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LEARNING OBJECTIVE #1: To identify beriberi as a complication of bariatric surgery especially in the postoperative period of 1-3 months.

LEARNING OBJECTIVE #2: Early diagnosis and therapy with parenteral thiamine can prevent catastrophic neurological outcomes.

CASE: A 27-year-old female presented to our facility with weakness, numbness and tingling. The patient reported that her symptoms initially started in her legs and progressively worsened to involve her hands. This was associated with episodes of nausea, vomiting and weight loss. She denied any fevers, myalgias, arthralgias, recent travel, tick bites or skin rash. Her past medical history was significant for obesity for which she underwent gastric banding surgery two months back. On presentation, physical examination was notable for numbness in a typical glove and stocking pattern involving bilateral upper and lower extremities and positive rhomberg's sign. Laboratory investigations were significant for an elevated erythrocyte sedimentation rate (ESR) level of 80 mm/hour. Extensive work up with brain imaging of the neuronal axis and Cerebrospinal fluid (CSF) analysis was unremarkable. She subsequently underwent an Electromyogram (EMG)/Nerve Conduction Study (NCS) which revealed mixed motor/sensory axonal and demyelinating polyneuropathy. This prompted work up for autoimmune disorders, vasculitis, infections and malignancy which were all negative. All things considered, there was a high concern for nutritional deficiency. Further investigations revealed a thiamine (Vitamin B1) level of <6 ug/L. A diagnosis of dry beriberi was made and treatment with parenteral thiamine was initiated. The patient subsequently had complete resolution of symptoms.

IMPACT/DISCUSSION: Dry beriberi is a manifestation of severe thiamine deficiency. It can be seen as a nutritional complication of bariatric surgery within the first three months postoperatively. The majority of the patients present with symptoms of peripheral neuritis, ataxia, and paraplegia, indicating an advanced stage of the disease.

The symptoms typically start in the lower extremities and progressively involve the upper extremities. The diagnosis can be challenging due to its overlap with conditions such as Guillain-Barré Syndrome and vasculitis especially in the setting of an elevated ESR. In patients with high suspicion of beriberi, treatment with thiamine even before laboratory confirmation has shown positive outcomes. Delay in diagnosis and treatment can cause irreversible neurological injury and coma.

CONCLUSION: Progressive polyneuropathy in a high risk patient should prompt evaluation of thiamine deficiency. Immediate replacement of thiamine can prevent irreversible fatal outcomes.

LOW CD4 IS NOT ALWAYS HIV

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LEARNING OBJECTIVE #1: To recognize chronic fatigue as a sole manifestation of immunodeficiency in adults.

LEARNING OBJECTIVE #2: To evaluate a patient with isolated CD4 lymphopenia, and to diagnose and treat Idiopathic CD4 Lymphopenia (ICL).

CASE: A 44-year-old white female was evaluated in the clinic for chronic fatigue. Past medical history is notable for allergic rhinitis and a few episodes of sinus infections during childhood. A thorough evaluation for fatigue did not reveal any etiology except for a marked lymphopenia. HIV test was negative. Flow cytometry showed low CD4 T-cell lymphocyte count and she was referred to Allergy and Immunology clinic for further evaluation.

The patient was not exposed to immunosuppressant medications or steroids in the past. Laboratory testing confirmed a low absolute CD4 count of 85 cells/mm and negative HIV. Work up for autoimmune conditions, viral infections like parvo B19, HSV-6, EBV and mycobacterial infections were negative. No evidence of hematological malignancy was found. Testing for other immunodeficiencies including B-lymphocyte disorders, complement levels and functioning were normal. Repeat testing after 4 months showed persistent CD4 T-cell lymphocytopenia (100 cells/cubic millimeter) with a negative HIV.

A diagnosis of ICL was made after excluding all other causes of CD4 lymphopenia. Antibiotic prophylaxis with TMP-SMX for Pneumocystis jirovecii pneumonia was recommended, but the patient was reluctant to use it as she had a significant skin rash with TMP-SMX before. Alternative antibiotics were also refused. The patient was closely followed-up for opportunistic infections for more than 4 years and has not developed any so far despite very low CD4 counts.

IMPACT/DISCUSSION: ICL is a rare condition defined by persistent lymphocytopenia in the absence of HIV infection or other causes of immunodeficiency. CD4 counts should be less than 300 cells/mm³ or less than 20% of total lymphocytes on separate occasions, usually two to three months apart. Its pathogenesis remains unknown and all cases of ICL described in the literature were diagnosed when patients presented with life-threatening opportunistic infections triggering work-up for an underlying immunodeficiency. Interestingly, our patient had no opportunistic infections at the time of presentation and was diagnosed during the evaluation of chronic fatigue.

ICL is a diagnosis of exclusion. HIV infection, viral infections, autoimmune conditions, hematological malignancies, and other immunodeficiency conditions have to be ruled out for diagnosing ICL. Management is focused on prevention of opportunistic infections and treatment of infection if they occur. Some studies say that the same prophylaxis guidelines for HIV can be followed for ICL.

CONCLUSION: Chronic fatigue is a commonly encountered symptom by internists.

Chronic fatigue could be a sole presenting symptom of an underlying immunodeficiency like ICL. ICL should be suspected when there is low CD4 count in the absence of HIV.

LUNG GRANULOMA AS AN UNUSUAL PRESENTATION OF INFLAMMATORY BOWEL DISEASE

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LEARNING OBJECTIVE #1: Recognize the unusual extra-intestinal manifestations of IBD

LEARNING OBJECTIVE #2: Differentiating between sarcoidosis and IBD in lung granuloma

CASE: A 21 year old with a medical history of refractory seizures presented with a 6-week history of diarrhea, cough for 2 months and 30 lbs weight loss. The patient denied any fevers or night sweats. She was seen at an OSH for abdominal pain and vomiting. She was discovered with a pulmonary nodule on her abdominal CT and was transferred to our hospital.

Her physical examination was significant for diffuse abdominal pain. Serum electrolytes showed hypokalemia with normal BUN and creatinine. Hb was 10.9, WBC 6.2 with diff of N63L26M8E1B0 and platelet 358. Iron studies showed ferritin 1220, Fe 76, TIBC <17. FOBT was negative. CXR demonstrated patchy areas of alveolar opacification. CT scan showed multiple areas of cavitation, ground glass opacities and nodular areas of consolidation with the largest being 2.8 x 1.6 cm.

Further workup included a rapid HIV, Quant TB and serial blood cultures were negative. TTE revealed no signs of vegetation. She also underwent bronchoscopy with BAL, with specimens sent for bacterial and fungal cultures, acid fast bacilli stain and culture, as well as viral cultures and cytology, all of which were negative. A rheumatologic workup also was pursued including ANCA, ACE, ANA and anti- dsDNA antibodies, all of which were negative. ACE level was normal at 22.

The lung biopsy showed noncaseating granulomas and chronic non specific inflammation. Special stains for fungi, periodic acid Schiff were negative, as were stains for acid-fast bacilli. Because of the lung biopsy showing granulomas, Sarcoid was considered as a possible etiology but the ACE levels were low. Colonoscopy showed ulcers throughout the GI tract. The biopsy confirmed the diagnosis of Ulcerative colitis with ulcers with crypt abscesses involving the cecum, colon with rectal sparing. She was started on sulfasalazine and had significant improvement in her GI symptoms with weight gain. There was also an improvement in her lung findings with size reduction and resolution of the lung nodules.

IMPACT/DISCUSSION: Ulcerative colitis is an inflammatory disorder typified by ulcerative lesions throughout the gastrointestinal tract. Although extra intestinal manifestations occur in 21- 36% of patients and can affect almost any organ, pulmonary manifestations are extremely rare, occurring in fewer than 1% of patients. It is challenging to distinguish between atypical presentations of ulcerative colitis and other granulomatous diseases such as sarcoidosis.

CONCLUSION: The similarity between IBD and sarcoidosis has been well determined as both diseases can have noncaseating granulomas affecting multiple organ systems. The sarcoidosis can present as GI granulomas and the IBD can present as lung granulomas, making diagnosis a challenge. The differentiation can be made with the ACE levels, which will be elevated in sarcoidosis. It is important to make the diagnosis to provide a definitive treatment.

MACROPHAGE ACTIVATION SYNDROME WITH RHABDOMYOLYSIS

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LEARNING OBJECTIVE #1: Diagnose HLH and MAS and recognize the HLH-94 protocol as a treatment for MAS in acute settings

LEARNING OBJECTIVE #2: Identify rhabdomyolysis as a complication for HLH/MAS

CASE: A 30-year-old woman presented with dyspnea, fatigue, and lower extremity edema for several weeks. The patient's medical history was significant for autoimmune hepatitis and undifferentiated systemic rheumatic disease with positive rheumatoid factor, ANA titer >1280 with speckled pattern, and

elevated dsDNA antibody. Additional history included a kidney biopsy positive for p-ANCA with concern for rapidly progressive glomerulonephritis. Physical examination was notable for fever, lethargy, confusion, and sinus tachycardia. Upon admission, laboratory workup was significant for a creatinine of 8.52 mg/dL (up from a baseline of 5.1), hemoglobin of 5.8 g/dL, platelet count of $66 \times 10^9/L$, and a normal WBC count. Further laboratory tests showed elevated transaminases and anion-gap metabolic acidosis with acute renal failure. Patient also had hyperkalemia requiring urgent hemodialysis. Due to concern of acute vasculitis, the patient was started on methylprednisolone. Later, she became leukopenic, and further laboratory tests showed an elevated ferritin of 33,945 ng/mL, soluble interleukin-2 receptor of 5879 dg/mL (Ref range: <1033 dg/mL), a low fibrinogen level, elevated triglycerides, creatine phosphokinase of 190,000 IU/L, and elevated anti-U1-RNP antibody. Given these findings, there was concern for hemophagocytic lymphohistiocytosis (HLH). Bone marrow biopsy showed hemophagocytosis. She was diagnosed with macrophage activation syndrome (MAS) and was given etoposide and dexamethasone. She subsequently showed significant improvement in symptoms and inflammatory markers.

IMPACT/DISCUSSION: MAS is a term that describes HLH in the setting of a rheumatological condition. The criteria for diagnosing HLH, based on the HLH-2004 clinical trial, include fever, splenomegaly, bicytopenia, hypertriglyceridemia or hypofibrinogenemia, hemophagocytosis, ferritin >500 mcg/L, low/absent NK cell activity, and elevated sIL-2r. Patients who meet 5 out of 8 criteria are diagnosed with HLH. Management of MAS in stable patients focuses on immunosuppression with intravenous steroids or other immunosuppressive agents. However, the management of MAS in acute settings is not well established, but the approach can be the same as treatment of acute HLH. The HLH-94 protocol includes treatment with etoposide and intravenous dexamethasone for 8 weeks.

Interestingly, our patient was found to have rhabdomyolysis in the absence of any identifiable trigger. The patient's elevated creatine phosphokinase was thought to be due to HLH/MAS, a complication that has rarely been reported in literature in the absence of infection or malignancy.

CONCLUSION: MAS is the term that describes HLH in the setting of a rheumatological condition. In acute settings, treatment of MAS is similar to treatment of acute HLH. Rhabdomyolysis may be a complication of HLH/MAS.

MAKING THE DIAGNOSIS: SPINAL EPIDURAL ABSCESS

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LEARNING OBJECTIVE #1: Recognize how anchoring and confirmation biases can lead to delayed diagnosis

LEARNING OBJECTIVE #2: Demonstrate what symptoms and tests have the highest sensitivity in the diagnosis of spinal epidural abscess

CASE: A 61 YO ambulatory woman developed sudden onset, right-sided low back pain, radiating down her right leg. The following day, at urgent care, she was diagnosed with sciatica and received an unknown "shot" in her lower back. Five days later, her pain progressed, leading to an antalgic gait, thus she presented to the ED. Lumbar x-ray was performed without concerning findings. She was again diagnosed with sciatica and given IM ketorolac. Four days later, at a rehab medicine visit, she reported 10/10 stabbing pain, significant sleep interference, and an inability to stand unassisted which newly confined her to a wheelchair. She denied saddle anesthesia, bowel/bladder incontinence, weight loss, or fevers, but had new midline spinal tenderness on exam. She then received lumbar paraspinous trigger point injections and PO methylprednisolone.

Ten days later, because of persistent pain and weakness, rehab medicine ordered an MRI Lumbar spine. After it revealed C3-C5, L2-L5 osteomyelitis, a large dorsal epidural abscess from T11 to L2, multiple ventral epidural abscesses from L2 to S1, and multiple bilateral iliopsoas abscesses, the patient was immediately sent to the ED. Labs were notable for WBC 18.9 (85% neutrophils), ESR >130, CRP 46, and MSSA bacteremia. A sample obtained

from the iliopsoas abscess drain also grew MSSA. She received an 8-week course of IV oxacillin.

IMPACT/DISCUSSION: This case has notable features of both anchoring and confirmation bias. Even when "red flag" symptoms were elicited, including 10/10 pain that woke the patient from sleep and new onset weakness that confined her to a wheelchair, the diagnosis, reinforced by a normal lumbar x-ray, anchored still on sciatica. The patient received repeated paraspinous injections with analgesic drugs and corticosteroids, which is known to put patients at risk for parameningeal inoculation of bacteria resulting in paraspinous, spinal and epidural abscesses, all of which she suffered from.

The incidence of spinal epidural abscess (SEA) has doubled in the past two decades. However, rates of missed diagnosis at initial presentation range from 11 to 75% and patients often present to the ED multiple times before a correct diagnosis is made. Back pain is seen in over 90% of patients but fever and weakness are present only half the time. While increased WBC count is a poor predictor of SEA, elevated ESR is seen in over 98% of patients.

CONCLUSION: 1. Consider spinal infection in a patient presenting with debilitating back pain in the setting of multiple paraspinous injections.

2. Recognize that the classic triad of fever, back pain, and neurologic weakness is seen in less than half of patients with SEA, and that ESR, with almost 100% sensitivity, can help risk stratify patients, ultimately leading to earlier diagnosis and treatment.

MANAGEMENT OF DIGITAL AUTO-AMPUTATION IN TRICUSPID VALVE ENDOCARDITIS IN A NON-SURGICAL CANDIDATE

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LEARNING OBJECTIVE #1: Identify infective endocarditis (IE) patients at risk of microvascular ischemia and review optimal management to maximize distal perfusion.

LEARNING OBJECTIVE #2: Recognize barriers to care for patients with drug use disorders.

CASE: A 41-year-old male with longstanding opioid use disorder complicated by recent relapse and prior tricuspid valve endocarditis requiring valve replacement and permanent pacemaker placement presented with chest pain, fevers, and hemoptysis. He was admitted to the intensive care unit with septic shock in the setting of methicillin-resistant *Staphylococcus aureus* prosthetic valve endocarditis and disseminated intravascular coagulation. His case was complicated by a right-to-left atrial shunt allowing seeding of septic emboli to the lungs, spleen, and parietal lobes. He stabilized with fluids, norepinephrine, and vancomycin. After a prolonged ICU course with persistent bacteremia and digital ischemia, he was transferred to the medicine floor for continued treatment. Cardiothoracic surgery (with second and third opinions from outside academic institutions) declined to offer tricuspid valve and pacemaker replacement due to recent intravenous drug use and prohibitive surgical risk. Infectious disease trialed ceftaroline, daptomycin, and rifampin to target foreign body infection but this regimen did not alter his clinical course in absence of source control. His acral ischemia in bilateral upper and lower extremities progressed with worsening pain, ulceration, and necrosis. Anticoagulation was contraindicated given ongoing hemoptysis and concern for hemorrhagic transformation of intracranial infarcts. The patient displayed accelerated progression to dry gangrene with auto-amputation of his nose and portions of his digits within just two weeks. Vascular, plastic, and orthopedic surgery similarly declined intervention due to surgical risk. After extensive discussion, he decided to transition to hospice care.

IMPACT/DISCUSSION: Effective management of septic emboli in IE relies on prolonged antibiotic therapy and surgical intervention when appropriate. In patients with increased risk of tissue injury due to treatment with vasopressor support, early discontinuation and treatment with the lowest possible vasopressor dose as well as initiation of low-dose heparin may prevent ischemic progression, although risks of bleeding must be weighed. Patients may also benefit from experimental therapies such as plasma exchange, sympathetic blockade, and vasodilators. For patients who develop IE in the setting of opiate use disorder, timely linkage to addiction medicine services and initiation of opiate agonist treatment is essential to reduce risk of recurrent IE.

CONCLUSION: Patients with severe IE are at increased risk for micro-vessel ischemia due to vascular occlusion from septic emboli and distal vasoconstriction from vasopressor treatment.

After acute stabilization, it is important to facilitate outpatient treatment of opiate use disorders to effectively prevent recurrent IE.

MARY-ED TO ANCHORING BIAS, DELAYED DIAGNOSIS OF A SISTER MARY JOSEPH'S NODULE

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LEARNING OBJECTIVE #1: Recognize the Clinical Features of Sister Mary Joseph's Nodule

LEARNING OBJECTIVE #2: Identify Cognitive Biases Leading to Delayed Diagnosis of Malignancy

CASE: A 76 year-old male with history of thyroid and prostate cancer was found to have an asymptomatic erythematous umbilical nodule in clinic. He was initially given bacitracin ointment. Over several follow-up visits, he was prescribed doxycycline, clotrimazole/betamethasone, and several silver nitrate and hydrogen peroxide formulations for cellulitis, fungal infection, and warts respectively. The skin lesion did not improve. Review of systems was positive for abdominal fullness, malaise, and anorexia with 30-lbs weight loss during this period.

4 months after the initial encounter, he was hospitalized for syncope in the setting of severe nausea and vomiting. On exam a Sister Mary Joseph's Nodule was identified. Imaging demonstrated ascites, peritoneal carcinomatosis with a metastatic umbilical nodule. The diagnosis of end-stage pancreatic adenocarcinoma was made on biopsy. The patient would develop a malignancy-related gastric outlet obstruction requiring gastro-jejunal tube placement. He was discharged from the hospital and underwent 1 session of chemotherapy before ultimately passing away from gastrostomy-related complications, approximately 1 month after his cancer diagnosis.

IMPACT/DISCUSSION: Cancer misdiagnosis is among the most frequent diagnostic errors in primary care based on studies of malpractice claims, and has a tremendous impact in terms of disability and cost. Failure to obtain appropriate diagnostic studies is a frequently cited preventable factor. On the patient's initial presentation, imaging was reasonably deferred for a presumed mild skin infection. However, the lack of clinical response to antibiotics was ignored and other clinical etiologies were not pursued. The re-trialing of various topical antiseptics without pursuing other diagnostic studies represents Type 1 Clinical Reasoning Failure with anchoring to the diagnosis of an uncomplicated skin lesion. Given the rarity of Sister Mary Joseph's Nodule in all intra-abdominal or pelvic malignancies and in outpatient encounters, availability bias was also likely contributory. It is possible that incomplete history-taking further led to diagnostic delay given the patient's concurrent abdominal complaints, anorexia, and weight loss, which could raise suspicion for an underlying systemic process.

CONCLUSION: - Errors in cancer diagnosis often result from breakdowns in the diagnostic process, which may be secondary to physicians' cognitive biases.

- Sister Mary Joseph's Nodule is a rare but important physical finding which portends advanced malignancy and generally poor prognosis.

MAST CELL MADNESS

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LEARNING OBJECTIVE #1: Recognize the clinical presentation of mast cell disorders

LEARNING OBJECTIVE #2: Differentiate Systemic Mast Cell Activation Syndrome from Systemic Mastocytosis

CASE: 50 year old male with no PMH presented to hospital with a 6 week history of urticarial rash, diarrhea, low grade fever, weight loss, fatigue and abdominal distension. Symptoms started one week after being started on fluoxetine for depression. He does not smoke or consume excess alcohol.

Family history is significant for ulcerative colitis in father and cholangiocarcinoma in mother. CT abdomen showed hepatosplenomegaly, enlarged porta hepatis node, ascites and bilateral pleural effusions.

Labs revealed platelets 93K, Hb 11, and WBC 6K. Vit B12 levels were undetectable. Stool was negative for enteric pathogens. Rheumatic workup showed positive ANA (titer < 1: 80) and Scl 70 Ab IgG. Anti-parietal cell antibody was negative. Ascitic fluid was transudative. A colonoscopy with biopsy later revealed normal pathology. The patient was discharged with a steroid taper to treat possible SSRI induced microscopic colitis.

He returned in 4 days with worsening symptoms. CT lung showed worsening pleural effusions and enlarged right hilar lymph node. Labs revealed worsening thrombocytopenia and anemia and markedly elevated inflammatory markers, ferritin 5588 ng/mL /LDH 885 U/L.

EGD revealed chronic duodenitis with marked mast cell infiltration of the lamina propria (> 50 /hpf). Serum Tryptase level was > 2000. Liver biopsy showed mild steatosis with increased mast cell infiltration. Immunostains were negative for CD2 and CD25 on mast cells. Bone marrow showed hypercellularity with diffuse 70% involvement with mast cells. KIT D816V mutation was not detected. NGS testing for MDS was negative as well.

With supportive care (H1, H2 blockers, Cromolyn, steroids), his symptoms, anemia, thrombocytopenia, LDH and ferritin improved during 1 month follow up.

IMPACT/DISCUSSION: Mast cell activation syndrome improve with therapies that target mast cells and their mediators. It differs from systemic mastocytosis in that there are no C KIT mutations, abnormal (spindle shaped or bilobed) mast cells or surface marker abnormalities such as the presence of CD 25.

Differentiating between mast cell activation syndrome and systemic mastocytosis is crucial as the latter is treated with chemotherapy and possibly BM transplant as it usually associated with AML or MDS. In our patient, the evidence points towards mast cell activation syndrome triggered by SSRI considering the fact that patient's liver/bone marrow aspiration did not show atypical mast cells, the C KIT mutation was negative and most importantly, his symptoms, LDH, ferritin all improved with supportive care.

CONCLUSION: SSRIs can cause mast cell activation syndrome. It presents similarly to systemic mastocytosis. The favorable response to supportive management with antihistamines and steroids favors the former. Differentiating these two conditions which present similarly but have different prognostic implications is critical.

MILIARY TUBERCULOSIS IN AN IMMUNOCOMPETENT MALE WITH CNS INVOLVEMENT

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LEARNING OBJECTIVE #1: Diagnose miliary tuberculosis using CT imaging findings to allow prompt initiation of treatment

LEARNING OBJECTIVE #2: Recognize meningeal tuberculosis and low CD4 count as possible complications of miliary tuberculosis

CASE: A 51-year-old male with no known significant past medical history presents with several weeks of intermittent fevers, chills, night sweats, headaches and 20-pound weight loss. He denies any recent travel, sick contacts, prison or military history, homelessness or drug use. He immigrated from Mexico 30 years ago.

He initially presented to an outside hospital and was found to have a positive QuantiFERON Gold test. Sputum acid-fast bacilli (AFB) cultures remained negative after 1 week. The patient was then transferred to our hospital. A CT chest revealed a dominant left upper lobe cavitary nodule, along with innumerable sub-centimeter nodules throughout all 5 lobes. A CT brain revealed multiple punctate and ring-enhancing lesions in the supratentorial brain parenchyma. CSF studies showed pleocytosis, low glucose, and elevated protein. Repeat AFB sputum smear and culture and MTB PCR were collected. His

CD4 count was also noted to be low at 135, but HIV antigen/antibody were negative. A bronchoscopy was performed, with bronchial lavage sent for culture.

Following initiation of the above workup, the patient was started on RIPE therapy due to concern for miliary tuberculosis (TB) given imaging findings, along with prednisone given the concern for tubercular meningitis.

The patient remained afebrile and headaches resolved following initiation of treatment. At the time of discharge, all of his AFB cultures and MTB PCR results remained negative.

IMPACT/DISCUSSION: This case illustrates the nonspecific presentation of miliary TB which can often delay diagnosis and treatment. It also highlights the importance of recognizing CNS involvement, which is critical given the need for steroid use when treating TB meningitis. CT findings play a key diagnostic role in this illness and help in its prompt identification. Waiting for culture and PCR results can severely delay initiation of treatment and often remain negative. Imaging findings are therefore crucial in aiding with the diagnosis, with classical miliary pattern well defined on CT scan, even when a plain chest radiograph may appear normal. Finally, while HIV and miliary TB coinfections have been widely reported, this case suggests that miliary TB itself can lead to subnormal CD4 levels. A CD4 count of 135 would have suggested a long-standing HIV infection, yet the HIV serologies were negative. The etiology of his CD4 lymphocytopenia is likely to be the TB infection itself.

CONCLUSION: - Prompt recognition of miliary TB is crucial in order to initiate treatment without delay

- Diagnosis is aided by imaging findings on CT scan, and should not await sputum or BAL cultures or PCR results

- Assessing for CNS involvement is crucial in order to guide therapeutic treatment

- Miliary TB can lead to low CD4 counts in HIV-negative patients

MILLER FISHER SYNDROME: STUMBLING UPON AN UNUSUAL CAUSE OF ATAXIA

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LEARNING OBJECTIVE #1: Diagnose Miller-Fisher syndrome (MFS) which is a rare variant of Guillain Barré syndrome (GBS)

LEARNING OBJECTIVE #2: Recognize that MFS can occur in the absence of a known stimulating factor.

CASE: A 50-year-old Caucasian male with a past medical history of hypertension presented with progressively worsening bilateral upper and lower extremity weakness associated with gait instability and worsening diplopia. The patient reported that he was in his usual state of health when he felt numbness in his extremities which progressed to unsteadiness in his gait and decreased hand grip strength in the next three days. He denied any headache, dysphagia, dysarthria, bowel and bladder incontinence, any recent viral illness, travel history, exposure to sick contacts or recent vaccinations. Neurological examination demonstrated right gaze paralysis, decreased strength in the bilateral upper and lower extremities, and absence of deep tendon reflexes (DTR) in biceps, triceps, knees and ankles. Laboratory investigations including inflammatory marker levels were unremarkable. Imaging studies of the brain and spinal cord excluded cerebrovascular accident and any acute demyelinating process. The patient subsequently underwent an extensive work up with lumbar puncture and cerebrospinal fluid (CSF) analysis, nerve conduction studies (NCS) and electromyography (EMG) that did not reveal any abnormalities. IgG and IgM antibodies for Lyme disease, anti-acetylcholine receptor and anti muscle specific kinase (MUSK) antibodies for myasthenia gravis were negative as well. Ultimately anti-GQ1B IgG antibodies, which are highly specific for Miller-Fisher syndrome (MFS) especially in the given clinical scenario, were positive to 1:400. Subsequently the patient was treated with intravenous immunoglobulin (IVIg) therapy and physical therapy with gradual improvement in his symptoms.

IMPACT/DISCUSSION: MFS is a rare subtype of Guillain Barré syndrome (GBS) which comprises of a triad of ophthalmoparesis, ataxia and areflexia. It is an acute autoimmune demyelinating polyneuropathy as a result of molecular mimicry between peripheral nerve and bacterial or viral antigens. Antibodies against ganglioside GQ1B, which are in dense concentration on the neuromuscular junction between the cranial nerves and ocular muscles have a 90% specificity in the diagnosis of MFS. Albuminocytologic dissociation on CSF analysis is also seen in 90% of the cases at peak disease. In rare cases MFS can progress to involve the respiratory muscles like GBS. Main treatment modalities which hasten recovery include IVIg or plasmapheresis along with supportive care.

CONCLUSION: Our case highlights that even in the absence of an identifiable cause which could have triggered MFS, and negative initial work up including absence of albuminocytologic dissociation on CSF analysis, normal NCS and EMG, a high index of suspicion is crucial for diagnosis and treatment of MFS.

MORBID OBESITY - AS A PREDISPOSING FACTOR IN SUPRATHERAPEUTIC VANCOMYCIN LEVEL

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LEARNING OBJECTIVE #1: Recognize that Morbid Obesity is a predisposing risk factor for Supratherapeutic Levels of Vancomycin.

LEARNING OBJECTIVE #2: Recognize that Vancomycin and Piperacillin/Tazobactam have a synergistic effect in the development of Acute Kidney Injury.

CASE: A 41 years old female with a past medical history of hypertension, diabetes mellitus, and morbid obesity with a total body weight of 161 kg presented to the emergency department with a complaint of anterior abdominal wall pain and redness. On presentation, her vitals were significant for Temp of 101.2 F, Heart rate of 120/min. On Physical Exam she had diffuse lower abdominal wall redness with induration. Initial labs showed WBC of 13.8 k/ul and normal renal functions with a creatinine of 0.6 mg/dl. She was admitted with a diagnosis of Panniculitis. Blood Cultures were drawn and she was started on Vancomycin and Piperacillin/Tazobactam.

Vancomycin was dosed using total body weight by the pharmacy at a loading dose of 2 g followed by a maintenance dose of 1.75 g every 8 hours. She received two dosages of vancomycin and her vancomycin trough levels were 82.7 mcg/ml. Serum creatinine also raised to 1.6 mg/dl. After the development of acute kidney injury patient was started on Intravenous fluids, imaging studies including renal ultrasound were negative, urinary electrolytes, and urinalysis was also unremarkable. Vancomycin was stopped while Piperacillin/Tazobactam dose was adjusted and later on stopped after negative cultures. Vancomycin levels and creatinine were monitored. Serum creatinine initially worsens over the course of 72-96 hours peaking at 4.8 g/dl, and then started improving after that. Patient vancomycin levels remained more than 20 mcg/ml for six days and gradually decreased afterward. Patient antibiotics were transitioned to doxycycline and was discharged home with a creatinine level of 2.4 g/dl.

IMPACT/DISCUSSION: Morbidly Obese patients have altered pharmacokinetics of drugs. The increased volume of distribution, altered protein binding, and clearance effects the serum vancomycin levels. Total Body Weight is utilized to calculate the vancomycin dosing but it can lead to disproportionately high dosage calculation. In one study utilization of total body weight for calculation of vancomycin dose resulted in a five times greater likelihood of supratherapeutic vancomycin levels. According to one study, Vancomycin and Piperacillin/Tazobactam dual therapy have more than two folds increased the risk of developing Acute Kidney Injury. Morbid Obesity and Infection were other predisposing factors in the development of Acute Kidney Injury. Development of Acute Kidney Injury further decreased the clearance of vancomycin that enhanced the nephrotoxic effect of vancomycin further worsening the Kidney injury.

CONCLUSION: In Morbid Obese patients alternate vancomycin dosing strategies are needed and patients will benefit from individualized dosing. Vancomycin and Piperacillin/Tazobactam should be used together with caution due to increased nephrotoxicity.

MSSA BACTEREMIA PRESENTING AS POLYARTICULAR ARTHRALGIAS

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LEARNING OBJECTIVE #1: Assess patients with polyarticular arthralgias
LEARNING OBJECTIVE #2: Manage patients with MSSA bacteremia

CASE: A 62-year-old male with history of depression and HLD presented with polyarticular arthralgias, neck stiffness, weight loss, fatigue, and night sweats. The patient had a left elbow epicondylar debridement three weeks prior to developing symptoms. He saw his orthopedic surgeon where he was given a 4mg Medrol dose pack. Given lack of improvement, the patient went to a rheumatologist and underwent a broad rheumatologic work-up that was unremarkable. He was started on prednisone 10mg TID for unspecified inflammatory arthritis.

His symptoms progressed, so he was admitted. The patient was afebrile with stable vitals. He had swelling, warmth, and pain with passive movement of the left wrist and ankle. Labs with leukocytosis and elevated CRP and ESR. Blood cultures grew MSSA. Initial left wrist aspiration had negatively birefringent crystals. However, fluid from second aspiration of left wrist and ankle joints grew MSSA. He was started on antibiotics and the steroids were discontinued. Given neck stiffness and back pain, imaging showed multiple locations in the spine with discitis/osteomyelitis, phlegmon, small abscesses, and an additional right psoas muscle abscess. An echocardiogram did not show vegetations. He completed 6 weeks of antibiotics with improvement in his symptoms.

IMPACT/DISCUSSION: Polyarthralgia is a common complaint encountered by internal medicine physicians. Although he was afebrile and his leukocytosis could have been attributed to steroid use, it is important to include infection in the differential. Septic arthritis commonly presents in a single joint, but can be seen in multiple joints in some cases. Delayed management of septic arthritis can cause permanent joint damage. Our patient had surgery three weeks prior to the initiation of symptoms, which was most likely the source of bacteremia. This case demonstrates the importance of having a broad differential when assessing a patient with polyarthralgia.

Once the diagnosis of MSSA bacteremia is made, a complete work-up for disseminated disease is warranted. This patient did not have any valvular vegetations. However, the back pain and neck stiffness correlated to osteomyelitis found on imaging. Additionally, the septic joints demonstrated MSSA. Given the disseminated bacteremia and prior use of steroids, the immunosuppressive effects of the steroids likely caused further progression of the bacteremia. Prior to initiation of glucocorticoids for polyarthralgia, it is important to rule out infection.

CONCLUSION: Polyarthralgia can be the presenting symptom in MSSA bacteremia

Ensure complete work-up for disseminated disease in MSSA bacteremia
 Consider ruling out infectious causes prior to initiating steroids for polyarthralgia

MTS MORE THAN YOUR SIMPLE DVT

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LEARNING OBJECTIVE #1: Recognize the clinical features of May Thurner Syndrome.

LEARNING OBJECTIVE #2: Manage a patient with DVT from May Thurner Syndrome.

CASE: A 32-year-old female with history of panhypopituitarism (on hydrocortisone, levothyroxine, and oral contraceptive) presented with two days of left lower extremity swelling and pain. Interview revealed a family history of

blood clots. On presentation, she was afebrile, but tachycardic. Workup revealed a leukocytosis of 17.2, potassium of 5.7, and elevated creatinine of 1.46 (unknown baseline). An ultrasound of her left lower extremity showed extensive occlusive thrombus from the external iliac vein to the popliteal vein. CT abdomen and pelvis showed the clot, as well as, compression of the left common iliac vein by the right common iliac artery, suggestive of May Thurner syndrome (MTS). Heparin infusion was started. Vascular surgery was consulted and performed a venogram, which demonstrated large clot burden extending proximally to the distal cava. TPA administration and mechanical thrombectomy were performed. Repeat venogram showed tight stenosis of the iliac vein consistent with MTS. Angioplasty with stent placement in the left common iliac was performed; completion venogram showed patent flow. The patient tolerated the procedure well and was transitioned to apixaban on discharge. Of note, a hypercoagulability work-up revealed Anti-thrombin III deficiency.

IMPACT/DISCUSSION: May-Thurner Syndrome, described by May and Thurner in the 1950s, is the compression of the left common iliac vein by the right common iliac artery. While the prevalence may be as high as 22 - 24% of the general population, symptoms can vary from asymptomatic to severe venous insufficiency. Symptomatic patients may present with lower extremity pain, claudication, chronic edema, venostatic changes, chronic infection, single or recurrent DVT, and in more severe cases limb threatening ischemia and phlegmasia cerulea dolens. MTS occurs more commonly in women and symptoms appear most commonly in the 20's and 30's. While the development of DVT is thought to be secondary to mechanical factors, generally development of DVT occurs in the presence of additional prothrombotic risk factors. Initial therapy is anticoagulation, but the definitive therapy is correction of the anatomic anomaly with vascular stent placement.

The case presented provides a good classical example of DVT in the setting of MTS. The patient presented with very typical symptoms of left lower extremity edema and pain. The presence of extensive thrombus prompted for the workup which revealed the anatomical variant of MTS. The patient had a number of risk factors including age, sex, oral contraceptive use, and anti-thrombin III deficiency.

CONCLUSION: Physicians should consider the diagnosis of MTS in the setting of extensive or recurrent left lower extremity DVT, since definitive treatment goes beyond the mainstay of anticoagulation to include vascular repair of the anatomic variant.

MULTIFACTORIAL COLITIS IN AN IMMUNOCOMPROMISED ADOLESCENT WITH A COMPLEX MEDICAL HISTORY

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LEARNING OBJECTIVE #1: Identify how chronic immunosuppression modifies the differential diagnosis for colitis.

LEARNING OBJECTIVE #2: Describe the appropriate identification and management of MMF-induced colitis.

CASE: OE is a 22-year-old male with a history of factor H deficiency complicated by atypical hemolytic-uremic syndrome status-post simultaneous liver and kidney transplants 17 years ago, on chronic immunosuppression (mycophenolate mofetil [MMF] 250mg BID, prednisone 1mg daily, tacrolimus 2mg daily); eosinophilic esophagitis; and Clostridium difficile infection six months prior, treated with oral vancomycin; who presented with severe abdominal pain, nausea and vomiting for four days and diarrhea for three months. Upon presentation, vital signs were within normal limits (wnl). Physical exam was significant for non-tender, non-distended abdomen with active bowel sounds. Labs included ALT 73 (H), AST 212 (H), Hgb 9.3 (L), EBV PCR negative, HAV IgM negative, HBV negative, HCV PCR negative, eosinophils 1.7 (wnl), tacrolimus level 7.1 (wnl), anti-tissue transglutaminase antibody negative and PETH negative. Abdominal ultrasound exhibited patent hepatic and renal vasculature. Colonoscopy showed diffuse inflammation with edema, erythema, friability, and loss of vascularity throughout the entire colon. Colonic biopsy pathology was negative for cytomegalovirus (CMV) immunohistochemical stain; the histologic features were compatible with treatment effects (e.g. MMF-induced colitis) vs inflammatory bowel disease (IBD). The

patient's MMF was subsequently tapered and monitoring for response is ongoing.

IMPACT/DISCUSSION: A broad differential diagnosis for colitis must be considered in patients with a history of solid organ transplant, particularly those on chronic immunosuppression and with an autoimmune history. Possible causes include infectious etiologies, notably CMV, EBV, cryptosporidium, recurrent *Clostridium difficile*; IBD; celiac disease; eosinophilic enteritis; and drug-induced colitis. Mycophenolic acid-induced colitis is a rare but important side effect of MMF (approximately 4% prevalence). It is a diagnosis of exclusion based on immunohistochemical analysis ruling out CMV. Treatment consists of cessation of MMF, provided an acceptable alternative immunosuppressive regimen is offered. Diarrhea typically resolves within 20 days of discontinuation.

CONCLUSION: The typical differential diagnosis for colitis must be broadened in patients on chronic immunosuppression to include atypical infections, such as CMV, and medication-induced colitis. In patients with a history of solid organ transplant, the decision to stop or switch immunosuppressive agents is individualized. For this patient, next steps include a kidney biopsy to evaluate if dual immunosuppression with prednisone and tacrolimus, without MMF, is appropriate.

MY FACE IT'S ITCHING!

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LEARNING OBJECTIVE #1: Consider sarcoidosis in patients presenting with neurological symptoms unexplained by other pathologies

LEARNING OBJECTIVE #2: Recognize the manifestations of Neurosarcoidosis

CASE: A 50-year-old African-American woman with history of hypothyroidism presented to the hospital with 1 week of sharp right orbital headaches, numbness, and itching, with numbness from the eye to the mouth, pruritus, and dysphagia. Physical exam was positive for diminished pin prick and temperature sensation in the V1-V3 distribution on the right and in the T6-T10 dermatomes, and bilateral cervical lymphadenopathy. Laboratory workup revealed elevated transaminases, LDH 304, WBC 3.2, eosinophils of 7.2%. Antinuclear, antimitochondrial, IgE, double-stranded DNA, myeloperoxidase, and proteinase-3 antibodies were all negative. CT chest revealed hilar and right mediastinal adenopathy, lung nodules, and bilateral breast masses. MRI brain was notable for mass-like soft tissue enhancement in Meckel's cave. Breast biopsy was negative for malignancy. Further workup showed elevated ACE enzyme. FNA lymph node biopsy showed clusters of epithelioid histiocytes mixed with lymphocytes suggestive of a granulomatous process. Patient was diagnosed with neurosarcoidosis, treated with prednisone and cefceft. Follow up outpatient revealed improved symptoms after starting therapy.

IMPACT/DISCUSSION: Sarcoidosis is a multisystem inflammatory disease historically defined by the presence of noncaseating granulomas in various organ systems that can present with a wide constellation of symptoms. Etiology and pathogenesis of this disease are still largely unknown though it is suspected that genetic predisposition and environmental exposures likely play an important role. Though rare, neurosarcoidosis (NS) is an important manifestation of the disease that occurs in 3-10% of patients with sarcoidosis. Neurologic features are rarely present within 2 years of diagnosis.

Though any part of the nervous system can be affected, the most common presentations of NS include cranial neuropathies (50-75%), psychiatric manifestations (20%), peripheral nerve/muscle disease (15%), meningitis (3-26%[7]), and CNS mass lesions (5-10%). Given the rarity of this disease, few randomized controlled trials for treatment/management of NS are available. Standard of care almost invariably involves use of systemic glucocorticoids. Patients often respond well to this treatment but suffer from relapse with steroid dose reduction. Given the adverse effects with chronic use, clinicians are continuing to explore other steroid-sparing treatments for patients.

CONCLUSION: Sarcoidosis is a well-known disease that affects primarily women with a higher incidence in African Americans. Neurological symptoms are present in 3-10% of patients with sarcoidosis; however, they are uncommonly the primary manifestation of the disease, making this case one of few

cases in the literature that presents Neurosarcoidosis as the primary manifestation of this systemic disease.

NAFCILLIN AND METHADONE: A NOVEL DRUG-DRUG INTERACTION

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LEARNING OBJECTIVE #1: 1) Analyze the metabolism of methadone and anticipate potential drug-drug interactions

LEARNING OBJECTIVE #2: 2) Apply a patient-centered approach to methadone dosing

CASE: A 26 year old woman with a past medical history of opioid use disorder on methadone maintenance therapy presented with shortness of breath and peripheral edema. She was diagnosed with endocarditis and started on cefazolin. Methadone was started at 30 mg daily, but she continued to have withdrawal. On day 4 of her hospitalization her dose was increased to her home regimen of 65 mg per day after the dose was finally confirmed. Symptoms of withdrawal improved. On day 9 of her hospitalization, she was diagnosed with septic emboli to the brain and was switched to nafcillin 2 grams every 4 hours for better CNS penetration. She began to have symptoms of withdrawal the next day. The team determined that because nafcillin is a CYP3A4 inducer, it could lower the dose of methadone. Methadone was increased the following day, but lagged the induction effect of nafcillin. The patient's withdrawal symptoms continued. Nafcillin was discontinued on hospital day 22 and we anticipated decreasing her methadone dose. However, she continued to experience withdrawal after nafcillin was stopped. Methadone was increased until reaching 140 mg daily on hospital day 24.

IMPACT/DISCUSSION: Methadone is one of the most complex medications to dose, due to its variable half-life, many drug-drug interactions, and stigma and misconceptions around its clinical use. Methadone is primarily metabolized by the CYP3A4 enzyme. Nafcillin is a known CYP3A4 inducer, but its clinical effect on methadone treatment has not been previously published. CYP3A4 induction typically lasts weeks as enzymes are permanently induced, and new enzymes must be produced to gradually return to normal drug metabolism. Patients are commonly underdosed due to a misunderstanding of methadone's CNS depressant effects, concerns about worsening a patient's underlying substance use disorder, and a tendency to label patient's subjective experience of withdrawal as manipulation. In this case, with a lack of clear clinical guidance and algorithms to follow for dosing, the patient's subjective experience of withdrawal drove the team to find a previously unreported drug-drug interaction to explain her need for more treatment.

CONCLUSION: This case demonstrates a novel methadone drug-drug interaction with nafcillin as well as elucidating the complexities of methadone dosing. The pharmacokinetics of CYP3A4 inhibitors, furthermore, are not widely understood, and may lead to overly rapid de-escalation of methadone therapy. Methadone dosing is complex and dependent on multiple individual factors and can be complicated by stigma about the patient's underlying addiction and a reluctance to believe a patient's subjective experience of withdrawal. This case demonstrates that a patient's subjective experience should drive methadone dosing and can further help teams identify novel clinical considerations in dosing.

NERVOUS ABOUT MYOPATHY? A CONFUSING CASE OF HYPERACUTE-ONSET ACUTE INFLAMMATORY DEMYELINATING POLYNEUROPATHY

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LEARNING OBJECTIVE #1: Recognize atypical clinical features of acute inflammatory demyelinating polyneuropathy

LEARNING OBJECTIVE #2: Treat Guillain-Barre Syndrome promptly to improve recovery

CASE: A 79-year-old man, without medical history or recent illness, presented after overnight onset of proximal muscle weakness and inability to ambulate. Over two days, he developed dysphagia and could not lift his arms above his head.

Physical exam demonstrated diminished vibration and pain in his lower limbs and 0 to 1+ deep tendon reflexes throughout without myalgias. CBC/BMP were unremarkable. Notable labs included creatinine kinase 274 U/L (30-170 U/L), lactate 2.4 mmol/L (0.67-1.8 mmol/L), and troponin 0.33 µg/L (0-0.5 µg/L). Infectious workup was negative. Family was unaffected. A lumbar puncture revealed protein 45 mg/dL (15-60 mg/dL). Head and spine imaging were unremarkable. Transthoracic echocardiogram (TTE) showed left ventricular ejection fraction (EF) of 20-25% and apical, anterolateral, anteroapical and inferoseptal wall motion abnormalities. Electromyography (EMG) suggested an axonal demyelinating polyneuropathy but was not diagnostic. He received 2 doses of IVIG for presumed GBS without improvement and transferred to our institution.

Autoimmune workup was negative. Repeat EMG showed a sensorimotor polyneuropathy with demyelination without myopathic components, confirming acute inflammatory demyelinating polyradiculopathy. Cardiac MRI with gadolinium revealed diffuse hypokinesis without infarction, scarring, or infiltrate, suggesting potential for functional recovery. Guideline directed medical therapy was initiated for non-ischemic cardiomyopathy with reduced EF. Mild dysarthria with silent aspiration required a nasogastric tube. Eventually, he reported receiving a double dose influenza vaccine 2 weeks prior to symptom onset. After resuming IVIG for 5 total days of treatment, he displayed improvement and transferred to inpatient rehabilitation 15 days after symptom onset.

IMPACT/DISCUSSION: This case illustrates an unusual presentation of GBS and the need to rapidly initiate appropriate treatment. Proximal weakness remains atypical. Rapidly developing profound weakness is also uncharacteristic, as maximum disability typically takes weeks. Mechanism of myocyte injury in rhabdomyolysis from GBS is unclear. Myocardial involvement varies in severity and appears reversible. Cardiomyopathy in GBS appears rare and incidence remains unknown. Proposed mechanisms for GBS-related cardiomyopathy include autonomic and nervous dysfunction from immune-mediated nerve damage. GBS and influenza vaccinations have been temporally correlated, but little evidence supports a causal relationship. It is unclear if a double-dose vaccination confers greater risk. Mainstay of GBS treatment is prompt IVIG infusion.

CONCLUSION: 1. Clinicians should be aware that hyperacute onset of proximal weakness, myositis, and cardiomyopathy are atypical features of GBS.

2. Cardiovascular involvement of GBS may be severe yet reversible with appropriate treatment.

NEW-ONSET DIABETES MELLITUS, THYROTOXICOSIS, RESPIRATORY FAILURE, HYPERCOAGULABLE STATE, AND ALTERED MENTAL STATUS IN A COVID-19 POSITIVE PATIENT

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LEARNING OBJECTIVE #1: Recognize COVID-19 as a possible trigger of new onset diabetes mellitus and thyrotoxicosis

LEARNING OBJECTIVE #2: To identify thyrotoxicosis as a possible cause of persistent agitation and tachycardia in patients admitted with positive COVID-19

CASE: A 56-year-old man with history of hypertension on hydrochlorothiazide-olmesartan with no COVID-19 exposure presented with a one-week of fever, malaise, dyspnea, and cough. Vitals remarkable for tachycardia to 131 bpm and profoundly hypoxicemic with Spo₂ of 66% on room air. The patient was agitated, in severe respiratory distress requiring emergent intubation. Initial labs significant for elevated d-dimer at 7310 ng/mL, glucose

of 587 mg/dL, creatinine of 2.26 mg/dL, anion gap of 18, CRP of 40.7 mg/L, ferritin of 974 ng/mL, LDH of 498 U/L, beta-hydroxybutyrate of 1.36 mg/L, and positive COVID-19. The CXR showed diffuse bilateral pulmonary opacities. The patient was admitted and started on antibiotics, insulin drip and intravenous fluid for pneumonia and diabetic ketoacidosis. Within a few days, the anion gap normalized, and he was transitioned to subcutaneous insulin. Day 9 of admission, the patient had worsening hypoxemia requiring high FiO₂ and PEEP, so intravenous methylprednisolone was added and started on therapeutic enoxaparin due to elevated d-dimers in the setting of COVID-19. Due to persistent agitation and ventilator desynchrony, brain MRI was obtained and showed small acute infarcts. Quetiapine and dexmedetomidine were added to control his delirium. Levetiracetam and phenobarbital were added for suspected seizure as the cause of agitation. EEG did not show any epileptiform activity. Additional labs were performed showing free T₃ of 4.8, TSH of 0.09, positive thyroid peroxidase antibody at 37 and negative thyroid stimulating immunoglobulin, consistent with thyrotoxicosis. Six weeks after admission, the patient was weaned off sedatives and discharge to a long-term care facility where he was weaned off psychotropic medications, continued treatment for diabetes mellitus and started on thyroid replacement therapy for hypothyroidism.

IMPACT/DISCUSSION: COVID-19 is an infection caused by the SARS-CoV-2 and has been reported to present with multiple manifestations affecting multiple different organ systems. There have been reports of autoimmune diseases triggered by COVID-19. Generally, the exact etiology of autoimmune diseases remains unknown, but possible molecular mimicry and SARS-CoV2 triggering organ specific autoimmunity in predisposed patients has been reported suggesting the rationale for immunosuppression in these patients. As seen in our case, patient was found to have thyrotoxicosis and new onset diabetes mellitus.

CONCLUSION: In conclusion, it might be reasonable to screen patients with new onset diabetes mellitus presenting with DKA for COVID-19 until we curb the pandemic, and in COVID-19 patients with persistent agitation and tachycardia, it might be reasonable to rule out thyrotoxicosis as we continue to learn more about this notorious virus.

NEW-ONSET VISUAL HALLUCINATIONS IN A WOMAN WITH DIABETIC RETINOPATHY

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LEARNING OBJECTIVE #1: Present a framework for visual hallucinations

LEARNING OBJECTIVE #2: Recognize that Charles Bonnet Syndrome can present with visual hallucinations in patients with preexisting visual impairment

CASE: A 28-year-old woman presented to the emergency department with acute-onset visual hallucinations consisting of spiders and vague shapes. The patient maintained insight that these hallucinations were not real, but they were distressing to the patient. Her medical history was notable for type 1 diabetes mellitus, legal blindness due to diabetic retinopathy, dialysis-dependent end-stage renal disease and major depressive disorder. Additionally, she had recently undergone treatment for a urinary tract infection with antibiotics. The patient's exam was notable for reduced vision in both eyes. The patient's laboratory workup was notable for an elevated CSF protein of 168. A non-contrasted computerized tomography scan did not show any abnormalities. An ophthalmologist noted that she had neurotrophic keratopathy, possibly of herpetic origin. The patient was treated with acyclovir, her psychiatric medications were adjusted during her hospital stay, and she underwent dialysis. The hallucinations did not resolve, however the patient became more comfortable with their presence

IMPACT/DISCUSSION: Visual hallucinations occur with a wide range of medical conditions, and describing them helps elucidate the etiology. First, it must be determined if the perception is a hallucination or an illusion. Second, the hallucinations should be described as either simple or complex. Third, patients may or may not have insight if the hallucinations are real. Finally, it should be determined if the patient has other sensory hallucinations. With our patient, initially there was a concern that she was experiencing delirium from

her urinary tract infection. However, this patient experienced both simple and complex hallucinations, and delirium typically presents with complex hallucinations. Her hallucinations were only visual, she maintained insight that her hallucinations were not real, and the images the patient was seeing were not illusions as there were no external stimuli that she was misinterpreting. Additionally, the hallucinations did not improve with dialysis or antibiotic cessation. Although the hallucinations did not resolve, the patient became more comfortable with the presence of the hallucinations. In this young woman with pre-existing visual impairment and an acute neurotrophic keratopathy, her simple and complex hallucinations with appropriate insight were most consistent with Charles Bonnet Syndrome.

CONCLUSION: This case gives the opportunity to discuss the approach to visual hallucinations and review the rare, but likely under-diagnosed Charles Bonnet syndrome.

NO COUGH? NO AFB? THEN HOW CAN IT BE TB?

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LEARNING OBJECTIVE #1: Recognize clinical presentation and imaging findings of spinal mycobacterium tuberculosis (Tb) with multi-focal bone involvement.

LEARNING OBJECTIVE #2: Recognize the limitations and strengths of mycobacterium tuberculosis diagnostic modalities.

CASE: A 46-year-old Vietnamese-speaking male with no medical history presented with 1 month of sternal pain, fatigue, and 20 lb weight loss over a few months. He denied difficulty breathing, swallowing, cough, or fevers. Physical exam demonstrated a large left neck mass and tender sternal mass. CT and MRI revealed multiple large neck and mediastinal masses with associated pathologic fractures along with diffuse infiltrative spinal disease with associated soft tissue masses and spinal canal encroachment. No lung lesions were found. Our differential was metastatic malignant disease versus infectious etiology. QuantiFERON gold assay and remainder of the infectious workup was negative. A left neck FNA revealed necrotizing granulomatous inflammation but was negative for acid-fast bacilli (AFB), fungal growth, KOH stain, or malignancy. Given negative FNA, he had an interventional radiology guided biopsy of the sternal lesion which initially had a negative AFB stain but then 2 weeks later the AFB culture became positive for mycobacterium tuberculosis complex. Diagnosis of severe extensive spinal Tb was confirmed. He was started on appropriate therapy of rifampin, isoniazid, pyrazinamide and ethambutol. This was continued for 2 months with plans to consolidate to rifampin and isoniazid for the following 6 to 9 months.

IMPACT/DISCUSSION: Spinal Tb represents about half of musculoskeletal Tb cases and importantly, like our patient, about half of cases will lack lung findings on imaging. Classic imaging findings of spinal Tb are multi-level, contiguous lesions within the vertebral bodies and surrounding soft tissue masses. The intervertebral discs may be spared early in disease, as seen in this case. CT can be helpful in identifying presence of calcifications in soft tissue masses which suggests Tb, however MRI is the imaging modality of choice due to its ability to evaluate the extent of intervertebral disc, soft tissue and spinal canal involvement. Imaging alone may not diagnose Tb, given the wide range of diseases that cause bony destruction. Histopathology is therefore important in aiding in the diagnosis and is particularly suggestive of Tb when necrotizing granulomas with lymphocytic infiltration are found. However, false-negative biopsies are common in extra-pulmonary Tb and AFB stains are positive in about 50% of extrapulmonary lesions.

CONCLUSION: In order to avoid misdiagnosis, clinicians should have a high clinical suspicion for Tb in patients with no lung disease who report systemic symptoms such as weight loss, fever, diffuse bone pain, and on imaging have destructive bone lesions in or outside the spine. Multiple biopsies and/or surgery may be necessary to diagnose Tb in these patients due to possibility of false-negatives from available diagnostic tests.

NON-HELMINTH HYPEREOSINOPHILIA

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LEARNING OBJECTIVE #1: Know common causes of peripheral eosinophilia

LEARNING OBJECTIVE #2: Understand key information needed to work up eosinophilia

CASE: 60 year old man presents with a chronic lower leg wound. Medical history was notable for diabetes, CKD, heart failure (EF 40%) and HTN. On exam he was afebrile, hypertensive, and had lichenification of his lower extremities with a wound on his right lower extremity with purulent drainage. On admission he was found to have a leukocytosis with an elevated WBC to 13.6 and worsening renal function. His WBC differential showed a peripheral eosinophilia with 58.6% (8K/mcL) eosinophils.

Through further history taking, the patient shared that he had been taking 3 packets of Goody's Powder (260mg acetaminophen, 520mg aspirin, and 32.5mg caffeine) per day for the past few months for headaches. Both his AKI and eosinophilia were attributed to his daily aspirin intake and the patient was counseled to stop taking any aspirin or NSAID products and his eosinophilia resolved after stopping these products.

IMPACT/DISCUSSION: Peripheral eosinophilia occurs when eosinophil levels are elevated, defined as absolute eosinophil count (AEC) greater than $1.5 \times 10^9/L$. It can occur in certain disease states and when the eosinophils are activated can cause damage to the tissue. The likelihood of tissue damage and the severity of the peripheral eosinophilia increases with the number of eosinophils present. Symptoms often include weight loss, fatigue, fevers, diarrhea, dyspnea, wheezing, and/or cutaneous manifestations.

Most common causes of eosinophilia include helminth infections, allergic diseases, malignancy, and drug reactions. An important point, while eosinophils are often seen in allergic reactions, hypereosinophilia is rarely caused by allergies alone and should prompt a more extensive work-up.

The initial work-up for hypereosinophilia involves gathering data to confirm or exclude the most common causes as well as more easily treatable issues. This includes history of travel and residence, risk factors for malignancy, and a thorough drug history, including over the counter drugs and all supplements. Commonly used over the counter drugs which can cause a peripheral eosinophilia include NSAIDs, Aspirin, and ranitidine. Other studies that may be useful in identifying a cause HIV, parasite serology (ex: strongyloides antibody), stool ova and parasite, serum B12, serum inflammatory markers (ex: IgE or IL5) and chest imaging to evaluate for lung involvement.

CONCLUSION: Often the treatment, especially for an incidentally found hypereosinophilia, is removal of the offending agent, in this case aspirin. Typical follow-up for asymptomatic eosinophilia is every 6 months to a year until resolution. The recovery period is variable, and once the offending agent is removed it can still take many months to improve. While the patient had small improvements in his eosinophilia and creatinine while inpatient, at 6 month follow-up, after abstaining from aspirin use, his levels had completely normalized.

NON-NEPHROTIC RANGE PROTEINURIA SECONDARY TO ANASTROZOLE THERAPY

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LEARNING OBJECTIVE #1: Recognize that non-nephrotic range glomerulonephritis could be secondary to a medication side effect such as Anastrozole.

LEARNING OBJECTIVE #2: Manage non-nephrotic range glomerulonephritis secondary to medication side effects with conservative management.

CASE: We report a case of a 63-year-old woman with history of essential thrombocythemia and invasive ductal carcinoma of the right breast who was referred to nephrology for 1.2 gm proteinuria. The patient was diagnosed with an invasive ductal carcinoma of the right breast after her screening

mammogram showed a 1.3 centimeter spiculated mass in the right retro-areolar breast with overlying nipple retraction. The patient was started on Anastrozole and four months later developed foamy urine. Initial laboratory evaluation showed minimal proteinuria on UA. Repeat urinalysis done in two months revealed progression of her proteinuria, which when quantified was 1.2 grams. Her new onset non nephrotic range proteinuria was suspected to be due to Anastrozole and was discontinued. Over the next 5 months since stopping the anastrozole the proteinuria gradually completely resolved confirming our initial suspicion that proteinuria was secondary to Anastrozole therapy. We believe patient developed early sclerosing glomerulonephritis with anastrozole which gradually resolved on stopping. Since the patient's creatinine was normal and proteinuria was improving immediately after stopping anastrozole and there were alternate chemotherapy options available, we did not see the need for a kidney biopsy.

IMPACT/DISCUSSION: Anastrozole is a non-steroid selective aromatase inhibitor used in the treatment of postmenopausal breast cancer. Although proteinuria is not a common side effect of Anastrozole, there have been reports of sclerosing glomerulonephritis and crescentic glomerulonephritis with Anastrozole. We report a case of a patient who developed new onset proteinuria four months after starting treatment with Anastrozole secondary to sclerosing glomerulopathy which completely resolved five months after discontinuing Anastrozole. This indicates that when the glomerular damage is diagnosed early, the glomerular change could be reversible with discontinuation of Anastrozole as this was shown in the present case by complete resolution of proteinuria in our patient.

CONCLUSION: Anastrozole can cause non-nephrotic range proteinuria secondary to sclerosing glomerulonephritis and early identification and stopping the medication can lead to complete resolution of proteinuria.

NONSPECIFIC PRESENTATION OF HYDRALAZINE-INDUCED ANCA-ASSOCIATED VASCULITIS

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LEARNING OBJECTIVE #1: Recognize renal disease induced by hydralazine from a nonspecific presentation

LEARNING OBJECTIVE #2: Distinguish between drug-induced lupus and ANCA-associated vasculitis

CASE: ME is a 68 yo African American F with T2DM, HTN, and hypothyroidism who presented for worsening fatigue over the last 3 weeks. Her fatigue initially began a few months prior, and she was found to have a new-onset anemia (Hgb 10.5), positive ANA (1:320) and normal renal function (Cr 0.95). Treatment with iron tablets did not improve her symptoms and she returned to her PCP. At that time, workup revealed elevated creatinine (2.7), anemia (Hgb 9.3), and normal thyroid studies prompting admission to the hospital for her worsening renal function. ROS was significant for 8lb weight loss, which she attributes to decreased appetite. Other ROS and histories non-contributory. Of note, she was started on hydralazine for hypertension one year prior, with most recent dose increase (50mg TID) 10mo prior. Exam was unremarkable. Workup was significant for microhematuria/proteinuria, positive ANA (1:1280), normal C3/C4, positive anti-histone Ab and negative anti-dsDNA, anti-Smith, RF and Sjogren's Ab. Renal US showed parenchymal disease with no acute findings. Drug-induced lupus was suspected, hydralazine was discontinued and she was discharged with down-trending creatinine. She re-presented 2 weeks later with a creatinine of 4.9. Workup showed normal C3/C4 and was otherwise negative (IEF, anti-GBM Ab, cryoglobulin, HIV, hepatitis). Renal biopsy showed highly cellular crescentic GN without evidence of immune complexes. ANCA, anti-MPO and anti-PR3 antibodies were positive, suggesting an ANCA-associated vasculitis. She was treated with prednisone and IV cyclophosphamide for 1 month.

IMPACT/DISCUSSION: Hydralazine can be associated with two autoimmune syndromes, a lupus-like disease and ANCA-associated vasculitis. However, differentiating between the two syndromes continues to be clinically challenging. Renal involvement is rare in the lupus-like syndrome, while arthritis and arthralgias are present in up to 90% of cases. Although ME's

serologies fit the criteria of drug-induced lupus, her uncommon presentation and lack of improvement after hydralazine discontinuation raised suspicion for ANCA-associated vasculitis. Unlike the lupus syndrome, hydralazine-induced ANCA vasculitis is frequently associated with renal involvement (pauci-immune GN), anti-dsDNA Ab and high titers of MPO-ANCA. Appropriate immunosuppressive treatment may be initiated sooner if patients with positive anti-histone Ab are evaluated with concomitant anti-MPO titers to rule out ANCA-vasculitis.

CONCLUSION: - Include drug-induced lupus on differential if nonspecific presentation and patient on culprit meds

- Anti-histone antibodies are diagnostic test of choice for drug-induced lupus
- Include anti-MPO titers to rule out ANCA-associated vasculitis, a more severe presentation induced by hydralazine

OH, RATS! A CASE OF HIGH FEVER AND ACUTE MULTI-ORGAN FAILURE

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LEARNING OBJECTIVE #1: Identify clinical features and risk factors associated with leptospirosis

LEARNING OBJECTIVE #2: Recognize that antibiotics may precipitate a Jarisch-Herxheimer Reaction (JHR)

CASE: A 52 year-old woman from the Bronx, NY with no PMH presented with two weeks of sore throat, four days of weakness, and two days of fevers to 100.5°F. Platelets on admission were 54 k/μL. Empiric ceftriaxone and lactated ringer infusion were started. Over 24 hours, her condition worsened with fever to 104.4 F, progressive jaundice, bilateral lower extremity pain, and weakness. She developed signs of kidney failure with brown urine and decreased output. Subsequent labs revealed WBC count 8.6 k/μL, platelet count 33 k/μL, Cr 4 mg/dL, CK 10k U/L, transaminitis (AST 259 U/L, ALT 146 U/L) and hyperbilirubinemia (total bilirubin 4.8 mg/dL). Respiratory pathogen panel, HIV, hepatitis panel, and antistreptolysin O were negative. On further questioning, she reported recent exposure to rats and raw meat in the restaurant where she worked, and she was noted to have conjunctival suffusion on exam. PCR revealed leptospira positivity in both urine and blood. She started to clinically improve 48 hours after the initiation of Ceftriaxone, a first-line antibiotic for severe leptospirosis. She regained her ability to walk and was discharged home.

IMPACT/DISCUSSION: Leptospirosis is a zoonotic disease caused by a spirochete of the *Leptospira* genus. It is transmitted through animal urine, most commonly via freshwater sources in tropical climates. It rarely spreads through rats and uncooked meat, with one to three reported cases per year in New York City.

Leptospirosis usually presents as a self-limited, influenza-like illness with a characteristic conjunctival suffusion. Laboratory findings include a normal white count, thrombocytopenia, hypokalemia, renal and liver injury, and rhabdomyolysis. Some patients progress to a severe form involving jaundice, renal failure, pulmonary hemorrhage, and ARDS. Positive blood, urine, or CSF cultures confirm the diagnosis, but have low sensitivity and grow slowly. PCR testing can also confirm the diagnosis.

Insufficient evidence exists to support or refute antibiotic use. However, doxycycline, azithromycin, IV penicillins and cephalosporins are considered first-line and can shorten illness duration by two to four days. Antibiotics can precipitate a JHR that causes clinical worsening as bacteria lyse, but the reaction is difficult to distinguish from the illness itself. The patient in this case worsened for 24 hours following her first dose of ceftriaxone, which may have represented a delayed antibiotic response or a JHR.

Patients may require ventilator support, blood products, or renal replacement. Mortality for leptospirosis reaches 10%, but patients who survive tend to have excellent renal and hepatic recovery.

CONCLUSION: 1. Suspect leptospirosis in a patient with risk factors, fever, and conjunctival suffusion.

2. Patients can show clinical worsening prior to improvement with antibiotics.

ORAL ULCERS WERE THE TIP OF THE ICEBERGMinh Tu Tran¹; Zahra Tasneem²; Sami G. Tahhan²¹School of Medicine, Eastern Virginia Medical School, Norfolk, VA²Internal Medicine, Eastern Virginia Medical School, Norfolk, VA. (Control ID #3540150)**LEARNING OBJECTIVE #1:** Recognize that Acute Myelogenous Leukemia (AML) can present as infected oral ulcers due to underlying immunosuppression.**LEARNING OBJECTIVE #2:** Recognize that a leukemoid reaction and reactive thrombocytosis due to infection may hide an underlying bone marrow neoplasm such as AML.**CASE:** A 56-year-old male with Type II diabetes presented to the hospital with 3 weeks of oral ulcers involving the left buccal region with spread to the palate and tongue. He also reported odynophagia, poor oral intake, and 40-lb weight loss. He had not responded to outpatient amoxicillin, fluconazole, and nystatin swish and swallow. On physical exam, he was febrile and had multiple oral necrotic ulcers with fibrinous debris. Labs were remarkable for WBC 13.1 K/uL (normal range: 4 to 11 K/uL). Tissue cultures revealed normal oral flora and biopsy showed non-specific inflammation. His ulcers improved on antimicrobials but he developed a recurrent fever and a progressive worsening pancytopenia. MRI of the jaw was done to assess for further infection and showed early osteomyelitis and hematopoietic marrow reversion. Due to his worsening pancytopenia, recurring fevers and apparent immunosuppression, a bone marrow biopsy was obtained which showed 25% blasts in hypocellular marrow consistent with AML.**IMPACT/DISCUSSION:** AML is classically suspected based on signs and symptoms of anemia, thrombocytopenia, or leukopenia manifesting as weakness, bleeding, or infection. Peripheral smear findings of myeloid blasts can also suggest AML. Oral presentations of AML have been previously reported, mainly in the dental literature, and commonly manifest as gingival hyperplasia, gingival bleeding, petechial hemorrhage, and ulcerations. Our patient presented with suspected infected oral ulcers and initial normal hematologic findings. Usually, abnormal AML cells suppress normal bone marrow activity and lead to anemia, infections and bleeding. But in our case, we postulate that his infections led to a leukemoid reaction and a reactive thrombocytosis delaying his diagnosis. His jaw MRI revealed an incidental finding of bone marrow reversion from fatty to red marrow indicating increased hematopoietic activity. In the setting of new-onset pancytopenia, this finding suggested dysfunctional bone marrow activity alongside increased metabolic demand suspicious for a neoplastic process. This case illustrates an unusual, nonspecific presentation of AML as oral ulcers and the challenges of recognizing AML when first-line laboratory tests are normal. It is important to redirect clinical decision-making and have a low threshold for diagnostic bone marrow testing for AML in the appropriate clinical setting with pancytopenia, infections, fever and suggestive MRI findings.**CONCLUSION:** AML may present without classical symptoms or lab findings. Oropharyngeal infections may indicate systemic diseases, and a broad differential is required when patients do not respond to first-line therapies**ORGANIZING CARE FOR THE POST-COVID DYSPNEA**Xiaohui Wang¹; Pamela Charney²¹Medicine, NewYork-Presbyterian Weill Cornell Medical Center., New York City, KY²Medicine, Weill Cornell Medicine, New Rochelle, NY. (Control ID #3544589)**LEARNING OBJECTIVE #1:** To illustrate a case of delayed presentation of organizing pneumonia (OP) as a sequela of COVID**LEARNING OBJECTIVE #2:** To recognize the differences in dyspnea diagnosis and management in a post-COVID patient**CASE:** 61 year-old man with a history of a prolonged hospitalization for COVID pneumonia (PNA) requiring non-rebreather without intubation presented with acute exacerbation of chronic dyspnea four months after the hospitalization.

After discharge, he demonstrated steady respiratory improvement. However, on his fourth monthly visit, he had severe dyspnea without hypoxia on minimal activity and cold weather. He denied fevers, cough, chest pain and palpitations.

On exam, he had increased work of breathing and tachypnea on ambulation, his tolerance was limited to half a block. Labs were notable for mildly elevated CRP at 1.32 mg/dL and ESR at 36 mm/hr.

CT Pulmonary Angiogram (CTPA) showed bilateral ground-glass opacities (GGO) suggestive of organizing pneumonia (OP) and pulmonary fibrosis.

He was then empirically started on systemic steroid (ie. Prednisone 40mg).

Within a month, patient's dyspnea dramatically improved, with over 10 blocks of exercise tolerance. His repeat CT chest showed decreased ground-glass opacity with persistent fibrosis. His symptoms were attributed to organizing pneumonia (OP) as a sequela to COVID.

IMPACT/DISCUSSION: This case demonstrates a severe respiratory decompensation with a delayed presentation—four months after hospitalization for COVID PNA—that was ultimately attributed to a case of OP and a sequela of COVID.

The cause of OP is theorized to be a pulmonary reaction to injury such as ARDS; therefore are reported in COVID patient who required hospitalization or mechanical ventilation. In these case reports, the onset for OP following COVID typically within one month following the immediate diagnosis, makes this case unusual in its delay presentation. While to definitively diagnose OP requires histological assessment, the radiographical finding of diffuse GGO and the improvement with high dose steroid are characteristic of OP. So one should keep OP on the list of differentials for respiratory decompensations in COVID patients, even months out from the initial infection or hospitalization. In terms of management, the initial modality chosen for the workup of dyspnea in this post-COVID patient was a CTPA to rule out pulmonary embolism as a contributing factor. Since OP was on the differential, he was escalated to empiric prednisone with near resolution of the organizing pneumonia.

CONCLUSION: OP is a post-COVID sequela. While often this entity appears within one month after the acute phase, this case demonstrate that it can have delayed onset of four months after discharge. Post-COVID patients who experiences prolonged respiratory symptoms or respiratory decline with radiographical consolidation consistent with OP and no evidence of infectious causes warrant a trial of relatively high steroids.**OUR UNUSUAL CASE OF CROSSFIT ASSOCIATED RHABDO.**Amanullah Rana¹; Ali Iqbal¹; Marium Mustafa¹; Sarah Tahir²¹GME, Nazareth Hospital, Philadelphia, PA²Royal Blackburn Hospital, Blackburn, Lancashire, United Kingdom. (Control ID #3547405)**LEARNING OBJECTIVE #1:** Recognising when to order CPK levels in patients with atypical presentations of rhabdomyolysis.**LEARNING OBJECTIVE #2:** Association of rhabdomyolysis with elevation in LFTs.**CASE:** A 26-year-old healthy caucasian female with no significant past medical history presented to the Emergency Department with complaints of three days of worsening bilateral lower extremity myalgia. After three months of relatively low physical activity, the patient decided to get back into shape, she started crossfit, and the next day completed a 3 mile hike even though she was sore from the previous day's workout. One day prior to presentation, the patient visited a different ED where they completed a doppler ultrasound of her bilateral lower extremities and after it was negative for DVT, discharged her with analgesics. The patient has never had symptoms like this in the past, has never been tested for metabolic disorders, is currently not on any medication, and denies alcohol or drug abuse.

In the ED: CBC and BMP was unremarkable, myoglobinuria was present, CPK was 18760. AST 390 ALT 132, Creatinine within normal limits. Patient was subsequently started on IV fluids, an ultrasound of the abdomen was done, the liver was unremarkable. Once the Patient's CPK decreased to more acceptable limits and her lower extremity myalgia resolved, she was discharged with lab work and a PCP followup in 3 days.

IMPACT/DISCUSSION: 200,000 cases of rhabdomyolysis are reported a year in America, 45 % are due to exogenous toxins, 11% recurrent, 60% multifactorial, 7% have no causes, exact percentage of exercise induced rhabdo in not known. Rhabdo accounts for 2.1% of injuries associated with cross fit, of them 80 percent are male. Crossfit induced rhabdo is rare, especially in

females, and should be on the differential when assessing upper/lower extremity soreness with a hx of Crossfit.

In patients with rhabdomyolysis, an abnormal AST was present in 93.1%, and an abnormal ALT in 75.0% of patients. The decline in AST was parallel to decline in CPK, we observed a similar pattern of decline in our patient. In patients with no known risk factors of liver disease, resources shouldn't be wasted on working up liver pathology as the LFT elevation is due to muscle breakdown.

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CONCLUSION: Crossfit induced rhabdomyolysis is rare, CPK levels should be taken in patients that present with exertion induced muscle pain. Rhabdomyolysis is associated with elevation in LFTs. AST declines parallel to CPK. AKI occurs in 15-33% of patients with rhabdo and can be prevented with early initiation of IV fluids.

PACING-INDUCED CARDIOMYOPATHY OR CARDIAC SARCOIDOSIS DISEASE PROGRESSION? A DIAGNOSTIC AND THERAPEUTIC CHALLENGE

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LEARNING OBJECTIVE #1: Identify etiologies of cardiomyopathy in patients with cardiac sarcoidosis who also have implantable cardioverter defibrillators

LEARNING OBJECTIVE #2: Describe therapeutic strategies for pacing-induced cardiomyopathy and cardiac sarcoidosis, respectively

CASE: A 56-year-old female with biopsy-proven extracardiac sarcoidosis presented after recent fluorodeoxyglucose positron emission tomography (FDG PET/CT) imaging was completed. Her preceding clinical course was complicated by lung nodules consistent with pulmonary sarcoid, a glomus jugulare tumor status-post craniotomy with confirmed central nervous system sarcoidosis, and palpitations and syncope with complete heart block on ECG, for which she received dual-chamber implantable cardioverter defibrillator (DC-ICD) for presumed cardiac involvement. Her palpitations eventually recurred, and subsequent FDG PET/CT revealed focal uptake in the lateral wall consistent with active cardiac sarcoidosis. As a result, methotrexate dosing was increased and infliximab infusions were initiated.

Follow-up echocardiography at this visit demonstrated interval worsening of left ventricular ejection fraction (LVEF) to 40-45%, decreased from 60-65% prior to DC-ICD placement. Device interrogation showed 73% right ventricular (RV) pacing.

IMPACT/DISCUSSION: Current AHA/ACC/HRS guidelines recommend ICD implantation in patients with cardiac sarcoidosis with conduction abnormalities and LVEF >35%. The adverse effects of chronic RV pacing, however, are well established. In this patient with active sarcoidosis and newly reduced LVEF status-post ICD, the question arises as to which primary pathophysiologic process is driving decreased cardiac function. Both pacing-induced cardiomyopathy and relapsed progression of cardiac sarcoidosis may be present, and either can confound appropriate clinical care under these circumstances. Some clinicians recommend uptitrating immunosuppression before pursuing cardiac resynchronization therapy-defibrillator (CRT-D), which could otherwise improve left ventricle dyssynchrony in patients with RV pacing. Conversely, more aggressive immunosuppression may not necessarily be beneficial in patients with certain risk factors, such as concomitant malignancy or immunodeficiencies. Further enhancements in advanced cardiac imaging may yield a more systematic approach to this clinical scenario, but more research is needed.

CONCLUSION: In the setting of known cardiac sarcoidosis and chronic RV pacing with a newly reduced LVEF, the underlying etiology of

cardiac dysfunction can be difficult to distinguish. While there are no current guidelines on diagnostic and therapeutic strategies for this patient population, clinical context and individual patient risk profiles should inform approaches toward more aggressive immunosuppression, cardiac resynchronization therapy, or both.

PERICARDITIS LEADING TO CARDIAC TAMPONADE FOLLOWING RESOLUTION OF COVID-19 INFECTION

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LEARNING OBJECTIVE #1: Recognize cardiac manifestations related to COVID-19 infection

LEARNING OBJECTIVE #2: Diagnose pericardial disease following COVID-19 infection

CASE: A previously healthy 29-year-old African American lady was diagnosed with COVID-19 infection following a sick contact and was given a steroid taper at an urgent care center. Given mild nature of the disease, she required only supportive therapy at home along with self-isolation. After three weeks, she tested negative and was cleared from home quarantine.

Three days after testing negative, she presented to the ER with chest pain and shortness of breath. At that time, electrocardiogram (EKG) showed sinus tachycardia and echocardiogram showed mild pericardial effusion of less than 1cm. Her significant labs upon presentation included negative troponins, ESR of 74 mm/hr, CRP of 3.39 mg/dL, COVID-19 IgG of 68.9 AU/mL, ANA negative, and HIV negative. She was diagnosed with acute pericarditis and was discharged with Colchicine and Ibuprofen.

Five days following her initial discharge, she returned to the ER due to progressively worsening chest pain and dyspnea. Her vital signs showed tachycardia and blood pressure of 111/85. Physical exam revealed a young woman in apparent distress, jugular venous pulse elevated to the mandible, distant heart sounds with no rubs or murmurs. Pulsus paradoxus was noted upon further examination. Her EKG showed low voltage and electrical alternans and a CT of the chest revealed a large pericardial effusion. Echocardiogram revealed an increased effusion from her study seven days prior at greater than 3.5 cm and evidence of tamponade. Upon recognition of the diagnosis, she underwent emergent pericardiocentesis where 900 mL of serosanguinous fluid was drained and sent for analysis which was unyielding. Considering no response to Ibuprofen, we discharged her on 975 mg aspirin three times daily with a slow taper along with colchicine 0.6 mg twice daily for three months. During her one week follow-up, her symptoms persisted for which aspirin was switched to prednisone. Along with colchicine, prednisone was continued for three weeks followed by a three-month taper which resolved her symptoms.

IMPACT/DISCUSSION: Cardiac manifestations related to COVID-19 infection include demand ischemia, myocarditis, pericarditis and cardiac tamponade. It is often difficult to establish a cause for acute pericarditis. Similarly in our case, although there is no definitive test to prove the causal relationship, this is highly suspicious of being secondary to post viral sequelae from COVID-19 infection when considering the clinical course. Exposure to steroids early in her course may explain the poor response to standard treatment requiring escalation to steroids.

CONCLUSION: - Cardiac manifestations of COVID-19 infection should be promptly recognized.

- Pericardial disease related to post viral sequelae should be suspected following COVID-19 infection just like any other viral infection.

PHENTERMINE AND PHENDIMETRAZINE ASSOCIATED ATRIAL FIBRILLATION REQUIRING CARIOVERSION-A CASE REPORT.

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LEARNING OBJECTIVE #1: Recognize atrial fibrillation as a possible side effect of anorexigenic pharmacotherapy.

LEARNING OBJECTIVE #2: Assess cardiovascular risk before prescribing anti-obesity pharmacotherapy.

CASE: A 54-year-old female presented with palpitations and dyspnea of 1-day duration. Past medical history- hypertension, type 2 diabetes mellitus, and hypothyroidism. Medications-losartan, metformin, levothyroxine. Phentermine and phendimetrazine were started a week earlier by her primary doctor to help her lose weight. Patient denied any substance abuse. Physical exam, BMI- 36.9 kg/m², blood pressure-145/94 mmHg, pulse-170 bpm/irregular, respirations-18/min and oxygen saturation-97% on room air. Laboratory tests including troponins and chest X ray, unremarkable. Electrocardiogram-atrial fibrillation at 172 bpm. Despite diltiazem boluses and continuous diltiazem titration drip her heart rate remained high. Shortly after, she developed severe respiratory distress and was cardioverted at 100J. She reverted to normal sinus rhythm with a rate of 80 bpm. Echocardiogram-Ejection fraction 60%, normal anatomy. Phentermine and phendimetrazine were discontinued and she was discharged on apixaban, metoprolol and diltiazem.

IMPACT/DISCUSSION: Treatment of obesity is multifaceted including lifestyle changes, diet and exercise. Up to sixty percent of weight lost by lifestyle changes is regained in a year.

Pharmacotherapy increases adherence to lifestyle changes by reducing cravings, suppressing appetite and causing early satiety. Pharmacotherapy is used if lifestyle changes are ineffective or when BMI is ≥ 30 kg/m² (≥ 27 kg/m² with comorbidities). Pharmaceutical anorexiant influence monoamine reuptake inhibition and monoamine release resulting in unwanted side effects from sympathomimetic stimulation. Many of these drugs have been withdrawn from the market since their use in 1947. Greater than 30% of the withdrawals were related to cardiotoxicity. Phentermine and phendimetrazine available in the United States, primarily affect monoamine neurotransmitters and resemble amphetamines. They have been withdrawn from use in many countries due to abuse potential. We report the first case of a patient with new onset atrial fibrillation coinciding treatment initiation with phentermine and phendimetrazine. This is important as phentermine with topiramate is the most effective anti-obesity pharmacotherapy available in terms of percent weight loss achieved when on treatment and so is being widely used.

Obesity is associated with cardiovascular effects including atrial remodeling, sympatho-vagal imbalance, elevated plasma volume, increased left ventricular diastolic filling pressures, metabolic changes and hypertension predisposing patients to arrhythmias. These effects along with phentermine and phendimetrazine induced sympathetic stimulation probably predisposed our patient to ectopic activity and atrial fibrillation.

CONCLUSION: Sympathomimetic anorexiant used to treat obesity can cause arrhythmias including new onset atrial fibrillation.

POLYMICROBIAL AND POLYVALVULAR ENDOCARDITIS WITH AGGRESSIVE MORBIDITY AND MORTALITY

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LEARNING OBJECTIVE #1: Recognize polymicrobial endocarditis

LEARNING OBJECTIVE #2: Assess the role of early empiric antifungal treatment for high-risk endocarditis patients

CASE: A 33-year-old female with a history of IV drug use (IVDU), tricuspid valve (TV) endocarditis requiring bioprosthetic TV replacement (9 months prior to admission), subsequent incompletely-treated TV endocarditis, systolic heart failure (ejection fraction <20% with bi-ventricular permanent pacemaker) and previously-treated hepatitis C, presented with septic shock in the setting of presumed TV endocarditis. The patient presented as a transfer from an outside hospital with fever, rigors and hypotension and was intubated prior to arrival. She was admitted to the ICU and was initiated on vancomycin, cefepime and metronidazole.

Lab tests were significant for leukocytosis, thrombocytopenia, hypercreatininemia and elevated liver transaminases. Venous blood gas

analysis showed blood pH of 7.08, triggering initiation of continuous veno-venous hemodialysis.

On day two of admission, blood cultures from the transferring hospital were positive for methicillin-resistant *Staphylococcus aureus*, *Streptococcus* and *Candida tropicalis*. Micafungin was then added to her antimicrobial regimen. A CT scan of her chest, abdomen and pelvis revealed infarcts of the liver, spleen, kidneys and a small non-occlusive deep venous thrombosis in the left iliac vein. A transthoracic echocardiogram revealed two large vegetations on her TV prosthesis and a small vegetation on her aortic valve. The patient had rapidly progressing multiorgan failure and hemodynamic instability. Within 24 hours of admission the patient had deceased.

IMPACT/DISCUSSION: This case highlights the aggressiveness of polymicrobial and polyvalvular endocarditis associated with IVDU. Due to the nature of polymicrobial endocarditis, patients present with more severe disease courses associated with higher mortality rates than those of monomicrobial endocarditis.¹

Furthermore, this case describes candidal endocarditis, which accounts for 50% of all fungal endocarditis.² In particular, *C. tropicalis* endocarditis accounts for just 9% of the total candidal endocarditis spectrum but has a higher associated mortality rate compared to other candidal species.^{3,4} IVDU and valve prosthesis are major risk factors of candidal endocarditis and subsequent candidemia.²

It is established that early detection, polytherapy with antifungals and surgery can reduce mortality from fungal endocarditis.^{5,6} Providers should therefore consider adding empiric antifungal treatment early for high-risk endocarditis patients.

1 Rev Infect Dis. 1991;13(5):963-970

2 Kardiol Pol. 2019;77(7-8):670-673

3 Med Mycol Case Rep. 2019;25:1-9

4 Cureus. 2020;12(1):e6695

5 Braz J Cardiovasc Surg. 2016;31(3):252-255

6 Eur Heart J. 2015;36(44):3075-3128

CONCLUSION: Early detection of infective endocarditis is key to lowering the aggressive nature of the disease. Furthermore, fungal etiology of endocarditis and earlier addition of empiric antifungal treatment should be considered.

POST-COVID-19 HEADACHE - AN UNRECOGNIZED SEQUELAE OF DISEASE

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LEARNING OBJECTIVE #1: Recognize the clinical features of post-COVID headache

LEARNING OBJECTIVE #2: Manage the symptoms of post-COVID headache

CASE: A 23 year old female with no past medical history presents with a 1 month history of ongoing headaches. She was first seen in late fall of 2020 with symptoms of dry cough, congestion, headache and low grade fevers. A nasal swab was positive for COVID-19. The patient had gradual improvement and resolution of all symptoms with exception to her headaches that continued with the same intensity. A repeat COVID PCR 20 days later was negative. There was no prior headache history. Headaches were described as bifrontal, non-pulsatile, 5 out of 10 in intensity, not alleviated by acetaminophen. There was associated nausea but no vomiting, photophobia or phonophobia, altered mental status or neurological deficits. Furthermore, she denied any flu-like symptoms or those that may suggest sinus congestion or inflammation. The patient was advised to start naproxen, maintain adequate hydration, and keep a headache journal. The patient presented 1 week later for treatment failure. There was no indication of medication overuse and a new symptom pattern of headaches upon awakening emerged. Physical exam was unremarkable. At this point in time, she was advised to start riboflavin and on a follow up visit, she reported some responsiveness to riboflavin possibly even more than to naproxen. Given intractable headache with no clear literature description of COVID- associated prolonged headaches, the patient was advised to proceed

with MRI of the brain. Days later, MRI of the brain was found to be unremarkable.

IMPACT/DISCUSSION: There has been some description of COVID-related symptoms that linger beyond the acute phase of the illness. While headache has been observed to be a common neurologic manifestation during the acute phase of the illness, there is little to no description of COVID-associated headache that lasts for weeks after the infection. From our clinical case of this patient, we were able to describe the illness script for this seemingly unrecognized diagnosis. As we begin to see more sequelae of this virus, a post-COVID chronic headache syndrome may emerge as a clinical entity. Much like other COVID sequelae, the presence of an intractable post-COVID headache in this young woman proved to be both physically and psychologically debilitating. For our patient, partial analgesia was achieved with naproxen and riboflavin. Acetaminophen had no impact on the headaches.

CONCLUSION: We describe a case of post-COVID headache syndrome. As we learn more about the long term consequences of COVID-19 infection, we will continue to add to the illness script we initially encountered with our patient and in doing so will better formulate a treatment plan for those who present with intractable headache after COVID-19.

POST-ICTAL, AGITATED, AND TACHYCARDIC: A CAN'T MISS DIAGNOSIS AND A DISSECTION OF MULTI-ORGAN PHYSIOLOGY

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LEARNING OBJECTIVE #1: Explain how the development of systemic ischemia can cause abnormal and progressively worsening lab values.

LEARNING OBJECTIVE #2: Identify an uncommon presentation of an aortic dissection.

CASE: Mr. A was a 46-year-old man with a history of seizures. One morning he had two seizures, thus his wife called 911. On presentation, he was combative so he was given sedatives. He was intubated and admitted to the medical intensive care unit. Per his wife, he had intermittent headaches, chronic abdominal pain, and recent nonproductive cough and chills. Medical and surgical history were otherwise negative. His wife denied family history of seizures. He took no medications, had no allergies, smoked marijuana, and drank alcohol socially.

On admission he was afebrile, tachycardic, hypertensive, and tachypneic. He was intubated and sedated. He had dried blood in his mouth and a precordial systolic murmur. Imaging showed no acute abnormalities. Labs showed potassium 4.7, creatinine 1.3, white blood cell count (WBC) 11.8, lactic acid 4.2. At 11pm potassium and creatinine rose to 6.8 and 1.8, respectively, WBC was 7.9, and lactic acid 3.4. His hyperkalemia was treated with medical therapy including kayexalate. Overnight Mr. A was persistently tachycardic. His inferior vena cava was collapsible on ultrasound so he was given intravenous (IV) fluids. The next morning he had melena. He was agitated so sedation was reinitiated. Morning labs showed lactate 8 and WBC 12.2. He received empiric meningitis treatment.

At 12:47pm, Mr. A had a cardiac arrest. Cardiopulmonary resuscitation was initiated. He received epinephrine and bicarbonate. His blood glucose was thirty. He was started on a dextrose drip and had return of spontaneous circulation. Full body computed tomography showed type A aortic dissection extending to the common iliac arteries with infarcts of the kidney, small bowel, liver, and left adrenal gland. Mr. A passed away that evening.

IMPACT/DISCUSSION: Decisions were made for Mr. A based on his history, presentation, and the order in which his labs resulted. His clinical course likely reflected the progression of his dissection. His seizures and encephalopathy could have resulted from decreased cerebral perfusion, as hypothesized by sparse, prior case reports of seizures secondary to aortic dissection. Hypoperfusion yielded cell death and then hyperkalemia. As his dissection extended, organ failure ensued as noted by his AKI and bowel ischemia. Kayexalate can cause bowel necrosis in the setting of impaired renal function, however this was a red herring as his melena was from compromised gut perfusion as a result of his dissection. His liver infarctions caused impaired gluconeogenesis resulting in hypoglycemia and cardiac arrest.

CONCLUSION: This case highlights two important lessons: to consider aortic dissection in patients presenting with seizure; and, to analyze the order in which multi-organ failure develops and determine if aortic dissection may be the cause.

POST-ICTAL PSYCHOSIS IN THE SETTING OF A FALSE-POSITIVE PCP URINE DRUG SCREEN IN A PATIENT ON LAMOTRIGINE

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LEARNING OBJECTIVE #1: Recognize a false-positive PCP result in a patient on lamotrigine

LEARNING OBJECTIVE #2: Understand the implications of a false-positive illicit drug screen

CASE: A 51-year-old male with Lennox-Gastaut Syndrome presented to the emergency department with acute altered mental status. He exhibited disorganized speech, persecutory delusions, agitation and tactile and auditory hallucinations concerning for acute psychosis. Comprehensive workup was unrevealing except for positive phencyclidine (PCP) and benzodiazepine on the urine drug screen (UDS). Differential diagnosis included inter-ictal psychosis, drug toxicity, or PCP induced psychosis. History revealed no prior illicit substance use, but a recent hospital admission for grand mal seizure with intractable seizures resistant to intravenous levetiracetam, hence was switched to lamotrigine, clobazam, and zonisamide. A negative PCP gas chromatography confirmed no PCP intoxication.

Lamotrigine level was therapeutic. It was concluded he had post-ictal and interictal psychosis and the false positive PCP was due to lamotrigine. Once able to tolerate oral intake, his outpatient antiepileptics were resumed with no additional seizures. Patient's mental status improved significantly throughout his admission. Physical therapy recommended temporary placement at a skilled nursing facility. However, due to the false-positive PCP result, he was denied from multiple facilities despite explanation that the false positive UDS was due to lamotrigine. Patient received in-patient therapy with return of his baseline function and was discharged home. False positive PCP secondary to lamotrigine was added to his problem list in the electronic medical record to prevent future issues.

IMPACT/DISCUSSION: UDS are commonly used in clinical practice as they are cheap and easy to use; however, immunoassays have poor specificity that may lead to false-positive results. False-positives can occur when a medication has a cross-reactivity with the immunoassay often due to a similarity in the structure of the parent medication or one of its metabolites to the tested drug. Unexpected results should be confirmed with gas chromatography-mass spectrometry or high-performance liquid chromatography which are more accurate. The exact incidence of false-positive PCP with lamotrigine is unknown and reported cases are exceedingly rare. This case highlights the importance of recognizing medications that have been reported to cause false-positive results with common substances of abuse. Careful history and medication review must be taken in patients presenting with positive UDS and one should consider the potential for false-positive and be aware of medications that may cause false-positives UDS.

CONCLUSION: Patients on lamotrigine, especially at high-doses, can have a false-positive PCP urine drug screen. Early recognition of medication-related causes of false-positives on urine immunoassay testing can minimize unnecessary workup and prevent consequences of misinterpreted results, thus optimizing patient care.

PRIMARY AMPULLARY CANCER: A RARE CAUSE OF ABDOMINAL PAIN

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LEARNING OBJECTIVE #1: Distinguish primary ampullary cancer from periampullary neoplasms.

LEARNING OBJECTIVE #2: Manage primary ampullary cancer.

CASE: A 34-year-old woman with history of celiac disease presented with diffuse abdominal pain for 3 days. She also experienced nausea and decrease appetite. There was nonspecific abdominal tenderness upon examination. Lab showed abnormal liver function test: alkaline phosphatase (561 U/L), GGT (632 U/L), ALT (149 U/L), AST (91 U/L), bilirubin (0.5 mg/dL). Abdominal ultrasound revealed dilated intra-hepatic and common bile duct 14mm with sludge but no gallstones, pericholecystic fluid or wall thickening. Magnetic resonance cholangiopancreatography (MRCP) found focal 18 mm lesion at the papilla of Vater with severe extrahepatic and moderate intrahepatic biliary dilatation. Biopsy and biliary sphincterotomy with stent placement were achieved with Endoscopic retrograde cholangiopancreatography (ERCP). Pathology study found invasive moderately differentiated adenocarcinoma. Immunohistochemistry (IC) stain was negative for MLH1, MSH2, MSH6, and PMS2. The patient underwent Whipple operation. Final staging was pT3bN1M0. Concurrent chemoradiotherapy with capecitabine was started. Subsequently, the patient received adjuvant chemotherapy FOLFOX (Folinic acid (leucovorin), Fluorouracil (5-FU), Oxaliplatin (Eloxatin)) for 10 cycles. She had several repeat image studies every 3 to 6 months and no evidence of disease has been identified for 2 years after her initial presentation.

IMPACT/DISCUSSION: Primary ampullary tumor is rare with low incidence of approximately four per million. It is thought to arise from adenoma, the benign precursor lesion, of the ampulla of Vater. Its pathohistological and biological behavior are similar to that of intestinal carcinomas rather than pancreaticobiliary cancers. It is important to identify primary ampullary cancer due to its better outcome than the more common periampullary malignancies. Distinguishing primary ampullary tumor from the periampullary mass lesions can be difficult with clinical manifestations and image studies alone. Sometimes the distinction between them can only be made until histopathologic study. ERCP is the most useful tool as it can identify the tumor, provide biopsy and decompressing stent placement. Ampullary cancer can be potentially recognized endoscopically. Whipple operation is the standard treatment for ampullary tumors. There is no well-established adjuvant therapy but some studies suggest adjuvant chemotherapy or chemoradiotherapy. Most clinicians utilize CA19-9 or CEA and repeat CT scan every six months for the first five years.

CONCLUSION: Primary ampullary tumor often presents similar to periampullary neoplasms. ERCP and biopsy can be used to distinguish them. Tumor markers such as CA19-9 or CEA and repeat CT scan are used for cancer surveillance.

PRIMARY CARDIAC ANGIOSARCOMA (PCA)—A DIAGNOSTIC DILEMMA

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LEARNING OBJECTIVE #1: Recognize locally invasive complications that raise suspicion for PCA.

LEARNING OBJECTIVE #2: Expedite diagnosis of PCA with multi-modal imaging.

CASE: 53yo female presented with acute-on-chronic, constant, non-exertional chest pain now with extension to the back, shoulders, and hip with associated headaches and facial swelling. She was diagnosed with non-ischemic cardiomyopathy one year prior after transthoracic echocardiography (TTE) showed ejection fraction (EF) of 40% and coronary angiography showed clean coronaries. On presentation, labs showed an elevated erythrocyte sedimentation rate and D-dimer. EKG had first degree AV block and ventricular bigeminy. Troponins were negative. Chest x-ray showed cardiomegaly. TTE showed normal EF, hypokinetic septum, thickened interatrial septum, with normal valves and atrial chamber sizes. Computerized tomography (CT) chest angiography found a large inter-atrial mass causing severe narrowing of the superior vena cava (SVC) and pulmonary veins.

Positron emission tomography and CT showed metastatic disease involving the pulmonary pleura and bones. Days after cardiac mass biopsy, she suddenly

developed pulseless ventricular tachycardia (VT) and underwent 35 minutes of unsuccessful resuscitation. Autopsy and tissue pathology later revealed a primary cardiac angiosarcoma that caused myocardial fibrosis and infiltration of the SA and AV nodes, likely causing her death.

IMPACT/DISCUSSION: PCA is a rapidly progressive malignancy with median survival of weeks to months. Treatment with surgical resection, chemotherapy, and/or radiation can prolong survival, and earlier diagnosis is protective. Non-specific presenting symptoms make diagnosis challenging. Common clinical symptoms include dyspnea, chest pain, weight loss, and malaise, which ultimately derive from the infiltrative nature of disease and its effects on surrounding structures. PCA most often originates in the right atrium. Local invasion of the myocardium can produce non-ischemic cardiomyopathy. Extension to the tricuspid valve or compression of the SVC may lead to SVC syndrome. Disruption of local conduction pathways commonly causes atrial arrhythmias. By contrast, the extent of tumor infiltration in this patient likely predisposed her to ventricular arrhythmias and represents the first reported case of VT secondary to PCA. Evaluation should include multi-modal imaging to delineate etiology of presentation. TTE is the gold standard imaging modality for evaluating PCA but is limited in characterizing soft-tissue abnormalities. PCA has characteristic enhancement patterns on CT and MRI. Thus, when the diagnosis of PCA is in question, cardiac CT and MRI should not be delayed. Definitive diagnosis ultimately requires tissue biopsy.

CONCLUSION: Expediting CT and/or MRI in instances of patients presenting with concern for infiltrative cardiac disease may be key to facilitate diagnosis of primary cardiac angiosarcoma and improve outcomes.

PRIMARY CARE FOLLOW-UP UNMASKS CHRONIC SHOULDER PAIN AS SOLITARY PLASMACYTOMA

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LEARNING OBJECTIVE #1: Distinguish between common etiologies of shoulder pain and abnormal patterns warranting further work-up

LEARNING OBJECTIVE #2: Recognize the importance of follow-up primary care appointments with tailored physical examinations

CASE: A 58-year-old woman who works as a housekeeper with a history of hyperlipidemia and hypertension presented to a routine follow-up visit with left clavicular and shoulder pain. She initially presented with this pain 8 months prior and was seen in the orthopedic clinic. X-rays were normal, but MRI revealed rotator cuff tendinopathy and degenerative changes consistent with arthritis. Her shoulder pain initially improved with PT and NSAIDs, but her clavicular pain never fully resolved. At the current appointment, joint examination revealed unusual swelling in the left sternoclavicular (SC) joint. Subsequent X-ray and CT images revealed 3.5 cm lytic lesion in the left clavicular head with erosion of the cortex, a distinct change from prior imaging. Histology and flow cytometry of CT-guided biopsy revealed diffuse infiltrate of atypical plasma cells (CD38+CD56+CD138+). Serologies including CBC, BMP, and LFTs were all normal. Kappa light chain (9.1 mg/dL) and kappa:lambda ratio (5.75) were elevated, and serum protein electrophoresis displayed IgG kappa monoclonal protein (.5 gm/dL). PET/CT ruled out any additional focus of disease. Flow cytometry of bone marrow biopsy demonstrated that 10% of total marrow cellularity comprised of atypical plasma cells (CD28+CD56+CD117+CD138+). The patient met criteria for solitary plasmacytoma with minimal marrow involvement. The PCP disclosed this diagnosis and connected the patient with oncologic care. She was treated with radiation and is now in full remission. She has not shown evidence of progression to multiple myeloma.

IMPACT/DISCUSSION: Routine primary care follow-up appointments enabled early detection of an uncommon tumor with a rare presentation and ultimately led to the patient returning to her normal, independent life. Without these follow up appointments, her chronic shoulder and clavicular pain could have reasonably been attributed to arthritis and injury, delaying tumor detection and worsening her prognosis. Although SC joint arthritis was supported by the initial imaging, thorough patient history and tailored physical examination

elucidated abnormal clavicular swelling and unresponsiveness to conservative treatment thus prompting further investigation.

CONCLUSION: -Targeted physical exam can identify atypical abnormalities that may result in diagnoses out of the ordinary

-SC arthritis is rarely symptomatic and lack of response to conservative therapy may indicate more concerning pathology

-Patient rapport and warm handoff to subspecialist may help prompt treatment initiation with time- sensitive diagnoses

PRIMARY ENDOMETRIAL DIFFUSE LARGE B CELL LYMPHOMA, A RARE MANIFESTATION AND DIAGNOSTIC DILEMMA IN ASYMPTOMATIC PATIENT.

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LEARNING OBJECTIVE #1: Diagnose primary endometrial lymphoma when such pathology is picked up incidentally in asymptomatic patient.

LEARNING OBJECTIVE #2: Distinguish lymphoma from other similar pathologies using Immunophenotypical studies.

CASE: 49 y/o postmenopausal female having Past medical history of DM,HTN,HLD referred by OB/GYN to hematology/oncology for evaluation of abnormal cervical polyp biopsy report suggestive of High grade B cell lymphoma(Ki-67-80%).Review of her systems positive for fatigue and anorexia only and negative for all B-symptoms and abnormal postmenopausal bleeding.All labs were normal except hypochromic normocytic anemia. Bone marrow biopsy revealed normocellular marrow with no morphological and immunophenotypical evidence of lymphoma. FISH studies negative for MYC-break apart rearrangement,BCL2-IGH translocation t(14;18) and BCL6 break point translocation.Primary was still unknown.Initial staging PET CT showed a 3.8x2.7cm SUV max30.4 malignant appearing mass extending up to left posterior cervix and 11mm left axillary lymph node SUVmax2.9. Excisional biopsy of node was negative for malignancy.Biopsy of posterior cervical mass from three different sites consistent with findings of diffuse infiltration by lymphoid cells positive for BCL6,pax5+,CD20,CD19,MIB1100% and negative for CD3,CD45,CD43,CD138,Melan A,S100 and Vimentin.Diagnosis of low grade primary endometrial DLBCL made and staged as 1E according to Ann Arbor staging system. Baseline echocardiogram was normal.Patient received 4-6 cycles of R-CHOP therapy and tolerated therapy well.Course complicated by mucositis;managed conservatively and severe neutropenia without fever;that resolved after receiving GCS-F with IV fluids hydration.Interval PET CT after 2nd cycle and completion of therapy; both negative for any evidence of new disease activity. Patient is in clinical remission for 1year with regular follow up.

IMPACT/DISCUSSION: In Literature,Criteria that must be fulfilled for primary endometrial lymphoma diagnosis,as proposed by Fox et al.Include,confinement of disease to uterus at the time of first diagnosis,no identifiable leukemia on a full blood count,no evidence of disease at other sites of body, and several months must have passed between an identifiable secondary site and primary tumor site.Our case met the criteria. It is important to consider a broader differentials for diffuse lymphoid cells infiltration on biopsy before diagnosing B cell lymphoma;including Lymphoma like lesions,poorly differentiated carcinomas,high-grade sarcomas,amelanotic melanoma,and hematopoietic malignancies i.e. plasmablastic lymphoma.Immunophenotypical studies help in differentiating these neoplasms.Presently, a combined treatment approach is preferred as chemotherapy prevents disease relapse and radiation therapy decreases the likelihood of local recurrence.

CONCLUSION: Primary Endometrial lymphoma is a challenging diagnosis in asymptomatic patient. It is pertinent to adopt a more thorough approach to avoid delay in diagnosis and offering appropriate care.

PROTEIN-CALORIE MALNUTRITION: RECOGNITION AND MANAGEMENT OF A DISABLING NUTRITIONAL COMPLICATION OF BARIATRIC SURGERY

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LEARNING OBJECTIVE #1: Describe eligibility criteria for bariatric surgery, and identify common types of bariatric surgery and their mechanisms of weight loss.

LEARNING OBJECTIVE #2: Identify and manage patients with late malabsorptive complications of bariatric surgery.

CASE: Ms. J is a now 45-year-old woman with prior history of morbid obesity and type 2 diabetes. She first underwent roux-en-y gastric bypass in 2007; she had non-sustained weight loss after this surgery and thus underwent revision to biliopancreatic diversion with duodenal switch in 2011. After years out of care, Ms. J. presented to the ED in 2018 with years of escalating functional decline and immobilizing lower extremity edema. She reported chronic worsening diarrhea and wore diapers throughout the day due to frequent incontinence of watery, greasy stools. She was admitted to the medical service with severe-protein calorie malnutrition (albumin < 1 at presentation) and debilitating anasarca. She was initiated on TPN and she was discharged with close primary care and surgical follow-up. In September 2019, she underwent open revision of her initial gastric bypass surgery with lengthening of her common alimentary channel from 130 to 430 cm. She was weaned off TPN one month after this revision, and she has since had normalization of her stools and maintenance of her BMI at 27 kg/m².

IMPACT/DISCUSSION: Current guidelines indicate that patients may be considered for bariatric surgery when BMI is at least 40 kg/m² without comorbid illness, or when BMI is 35-39.9 kg/m² with at least one serious co-morbidity. Bariatric surgeries include purely restrictive (e.g., lap band, intragastric balloon, sleeve gastrectomy) and mixed restrictive and malabsorptive procedures (e.g., roux-en-y, biliopancreatic diversion with duodenal switch). Bariatric surgery today carries low 30-day mortality, and patients often achieve sustained, dramatic weight loss in addition to optimization or reversal of obesity-related comorbidities. However, months to years after surgery, patients who undergo malabsorptive procedures may develop life-limiting complications including severe malnutrition and debilitating stool incontinence. These patients may come into the general internist's care years after surgery, and the internist must be able to promptly initiate nutritional rehabilitation and consider surgical re-referral for possible revision for these patients.

CONCLUSION: 1. Patients with BMI \geq 40 kg/m² without comorbid illness, or with BMI of 35-39.9 kg/m² with at least one serious obesity-related comorbidity may be eligible for bariatric surgery.

2. Patients may undergo restrictive or mixed restrictive and malabsorptive bariatric surgical procedures.

3. Bariatric surgeries that reduce small intestine transit time may lead to severe malnutrition through malabsorption, and these patients must be promptly initiated on TPN for nutritional rehabilitation and re-evaluated by surgical colleagues in consideration of revision.

QUITE THE HEADACHE: A CASE OF ITP AS INITIAL PRESENTATION OF CHRONIC HCV INFECTION

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LEARNING OBJECTIVE #1: Recognize extrahepatic complications of hepatitis C virus (HCV) infection.

LEARNING OBJECTIVE #2: Understand the implications of HCV treatment in primary care.

CASE: A 65 year-old woman presented with a persistent throbbing bi-temporal headache for 5 days. The headache was severe and had lasted longer than any prior headaches. She also noted poor right arm coordination, stating "when I go to grab something, I miss".

She also noted a large hematoma on her leg after bumping a guitar case and bruises on her arms and legs over the past few days.

Past medical history notable for "easy bruising" and an episode of heavy bleeding with a miscarriage requiring hospitalization and transfusions. Remote history of IV drug use over 30 years ago. Father and brother both died of HIV, but she denies current HIV risk factors.

On exam, she was afebrile, normotensive but tachycardic with a heart rate in the 130s. She had scattered oral petechiae. Skin exam demonstrated petechiae

on her shins and extremity hematomas. Neurologic exam demonstrated dysmetria with right-sided finger-nose-finger testing. The remainder of the heart, lung, and neurologic exam was normal.

Initial labs were remarkable for a platelet count of 7 k/cmm with a normal hemoglobin and white blood cell count. Creatinine was normal. Hepatic panel showed an AST of 117 IU/L and ALT of 90 IU/L with a normal bilirubin and alkaline phosphatase.

An MRI stroke series showed small subacute bilateral subdural hematomas. Additional workup for thrombocytopenia showed a negative HIV antibody test and negative Coombs test.

With her mildly elevated transaminases, hepatitis serologies were checked. She was immune to hepatitis B, but HCV antibody was positive and HCV PCR showed 1.8 million IU/mL.

She was diagnosed with Immune Thrombocytopenia Purpura (ITP). She received IVIG and steroids with recovery of platelet count.

For her HCV, she was started on glecaprevir/pibrentasvir. 3 months later, her HCV PCR was negative, indicating cure.

IMPACT/DISCUSSION: This case demonstrates the challenges of HCV management and the breakthrough of treatment.

HCV infection may lead to various autoimmune phenomena including ITP, cryoglobulinemic vasculitis and glomerulonephritis.

Early diagnosis of HCV can prevent progression to cirrhosis, but also potentially life-threatening extra-hepatic sequelae.

Primary care physicians were demonstrated to provide equivalent HCV cure rates to specialists in a NIH pilot study [Kattakuzhy, et al. *Ann Intern Med*, 167, 311 (2017)]. General internists should be aware of outpatient HCV management as treatment regimens may increasingly move into general internal medical practices.

CONCLUSION: This patient presented with an atraumatic subdural hemorrhage and was found to have ITP secondary to long-term chronic HCV. Fortunately, both conditions resolved with targeted therapies. Internists often encounter patients with chronic HCV, and aggressive treatment can prevent serious long term sequelae of this hidden infectious epidemic.

RARE CASE OF GRANULOMATOUS GASTRITIS SECONDARY TO ESOPHAGEAL ADENOCARCINOMA

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LEARNING OBJECTIVE #1: Recognize the association between granulomatous gastritis and esophageal cancer.

LEARNING OBJECTIVE #2: Recognize the importance of a multidisciplinary approach when dealing with advanced malignancy.

CASE: 66-year-old male with history of schizophrenia presented with a one-month history of anorexia, nausea, vomiting, and weight loss. Physical exam revealed cachexia with evidence of muscle wasting, and labs were notable for microcytic anemia. Computed Tomography (CT) chest, abdomen, and pelvis showed a large, necrotic mass in the distal esophagus and proximal stomach with diffuse gastric wall thickening, multiple necrotic liver lesions, and multiple pulmonary nodules. Given concern for malignancy, he underwent upper gastrointestinal endoscopy with biopsy.

Endoscopy revealed a large, partially obstructing, ulcerating mass in the lower third of the esophagus extending into the stomach in addition to a circumferential mass in the stomach itself. Biopsy of the esophageal mass and gastric mass revealed intramucosal adenocarcinoma and chronic inactive gastritis with non-caseating granuloma, respectively. A multidisciplinary discussion was held with the family, in light of the patient's poor performance status and metastatic cancer. He underwent J-tube placement as he was not deemed a candidate for esophageal stent due to concern for eventual gastric obstruction. Later, he received palliative radiation treatment over 13 days with improvement in swallowing abilities, and ultimately transitioned to hospice care.

IMPACT/DISCUSSION: Granulomatous gastritis, with an incidence of <0.35% of all gastric biopsies, is an extremely rare clinical entity characterized

by organized aggregation of lymphocytes, histiocytes, and plasma infiltrate within the stomach. These granulomas can be either caseating, non-caseating, or necrotizing. Most common causes of granulomatous gastritis include Crohns' disease and sarcoidosis, however esophageal adenocarcinoma is a rare cause, seen in less than 5% of cases. Clinical signs include nausea, vomiting, and weight loss due to gastric outlet obstruction. Management is aimed at treating the underlying cause, which in our case, was metastatic esophageal adenocarcinoma. Given the high recurrence of esophageal cancer despite surgery, palliative treatment is considered a better approach in patients with advanced cancer and poor functional status. In addition, a multidisciplinary team including physicians, social workers, and palliative or hospice care service should help assist patients with metastatic cancer decide on treatment options.

CONCLUSION: Physicians should consider gastric malignancies as part of the differential for granulomatous gastritis, as prompt recognition can prevent metastatic disease and poor prognosis, and in cases of metastatic disease, a multidisciplinary approach can help maximize one's quality of life.

RARE COMPLICATION OF A COMMON DISEASE IN A COVID-19 SURVIVOR

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LEARNING OBJECTIVE #1: Recognize gastric ulcer penetration without alarming acute abdomen.

LEARNING OBJECTIVE #2: COVID-19 survivors may develop long-term gastrointestinal (GI) complications.

CASE: A 72-year-old woman was hospitalized for 20 days and was mechanically ventilated for 6 days due to acute hypoxic respiratory failure in the setting of COVID-19 pneumonia. During that time, she was treated with hydroxychloroquine and famotidine. Five months after her hospitalization, she presented to the emergency department with intermittent, worsening, but mild abdominal pain. She denied nausea or vomiting, but admitted fever and chills. On physical examination, she was tachycardic, but vitals were stable and her abdomen was soft. Epigastric tenderness was present without guarding, rebound or rigidity. Her labs were significant for a white blood cell count of 18.6 k/uL, prothrombin time 16.9 sec, partial thromboplastin time 49.1 sec, aspartate aminotransferase 119 U/L, alanine transaminase 91 U/L, direct bilirubin 1.2 mg/dl, and total bilirubin: 1.6 mg/dl. Hemoglobin was 10.5 g/dl and slowly dropping. Abdominal CT revealed 6 x 7 x 6 cm hepatic abscess with gastrohepatic fistula secondary to penetrating gastric ulcer. Treatment plan was to percutaneously drain the abscess while broad-spectrum antibiotics and PPI were initiated. Unfortunately, the patient decompensated due to septic shock and required fluid resuscitation and pressure support. Emergent exploratory laparotomy was performed with successful gastric omental patch repair, hepatic drainage, and peritoneal lavage. H. pylori stool antigen test was negative. At post-operation day 10, the patient was medically cleared for discharge. At one-month follow-up, the patient fully recovered and was on famotidine and pantoprazole treatment.

IMPACT/DISCUSSION: Gastric ulcer penetration with fistula to surrounding viscera and abscess formation can result in high mortality and may not present with alarming acute abdomen on physical examination because ulcer perforation can be walled-off. Gastrohepatic fistula is rare, mostly caused by radioembolization therapy and radiofrequency ablation, or by percutaneous gastrostomy tube displacement. We hypothesize that peptic ulcer disease can be a potential long-term complication of COVID-19 disease, which could be explained by multiple mechanisms: stress from the severe illness and from mechanical ventilation and/or by persistent coagulopathy with microthrombi formation and increased bleeding risk at the same time. Direct damage to the mucosa by the virus or inflammation secondary to uncontrolled cytokine storm can be contributing factors.

CONCLUSION: A growing body of literature reports GI symptoms and short-term complications related to COVID-19 disease. It is uncertain whether

the formation of a gastric ulcer is directly related to inflammation caused by COVID-19. Overall, there is a need for further studies to clarify the long-term effects of COVID-19 infection on the GI system.

RARE SYNCHRONOUS DUAL PRIMARY MALIGNANCIES OF PANCREAS AND LUNG

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LEARNING OBJECTIVE #1: Diagnose synchronous primary pancreas and lung cancers.

LEARNING OBJECTIVE #2: Manage synchronous dual malignancies of pancreas and lung.

CASE: This is an 81 years old man with diabetes and 20-pack-year smoking history presented with unintentional weight loss of 30 pounds in a year. Extensive workup at the primary care clinic was unremarkable. Computed tomography (CT) scan of the chest, abdomen and pelvis identified multiple lung mass, lymphadenopathy and an ill-defined pancreatic lesion. Subsequent Positron emission tomography (PET) scan showed focal activity of the aforementioned masses. Endobronchial ultrasound (EBUS) biopsy of right lower lobe nodule, hilar and mediastinal lymph node confirmed poorly differentiated adenocarcinoma. Immunohistochemical stains was positive for TTF-1, and negative for p40. Endoscopic ultrasound guided pancreas needle core biopsy found well-differentiated invasive ductal adenocarcinoma which was negative for TTF-1. The staining pattern and histologic difference would be consistent with a primary pancreatic adenocarcinoma independent of the pulmonary lesions. Patient began chemoradiotherapy for lung cancer first given the severity of the lung cancer. Carboplatin and pemetrexed were started together with radiation. Despite our effort, repeat CT showed evidence of disease progression in the lung. As for the pancreatic cancer, the baseline CA 19-9 was 340 U/mL. Upon completion of lung cancer treatment, capecitabine with radiation for pancreas was provided. Repeat image 4 months after initial diagnosis showed shrinkage of the pancreatic lesion. The CA 19-9 also decreased to 61 U/mL.

IMPACT/DISCUSSION: Synchronous multiple cancers are multiple primary tumors diagnosed within six months interval. More patients are found with multiple primary tumors due to the progress in diagnosis and treatment of cancers. Among the various combination of synchronous tumors, the presence of both primary pancreatic and lung cancers is extremely rare. There are only a few case reports in the literature. Clinician should not assume the synchronous masses are metastatic. Early diagnosis and treatment are crucial due to the prognosis difference in metastatic pancreatic cancers and synchronous primaries. Two separate biopsies should be pursued to confirm the two primary cancers. The treatment guideline of synchronous cancers is not well-established. Since the overall prognosis is dependent on the more aggressive cancer, it is reasonable to focus on the more advance malignancy initially.

CONCLUSION: Dual synchronous pancreas and lung cancers should be confirmed with separate biopsies. Management should target the more advanced malignancy.

RASH AS A RED HERRING IN DIAGNOSING ACUTE MYELOID LEUKEMIA: A CASE REPORT

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LEARNING OBJECTIVE #1: Recognize etiologies of pancytopenia

LEARNING OBJECTIVE #2: When to explore other etiologies of pancytopenia

CASE: 37-year-old male presented with a 2 day history of fever and rash following a wisdom tooth extraction and use of amoxicillin. He was also receiving ozone therapy via autohemotherapy. Physical examination showed temperature of 38.8°C, heart rate of 120 beats per minute, respiratory rate of 20 breaths per minute, blood pressure of 116/86 mmHg. He had left buchal edema

and ecchymosis on his left soft palate and a non-blanching, nontender, morbilliform rash sparing the palms and soles. Laboratory results showed white blood cell count of 1.6 thousand/uL, hemoglobin of 8.7 gm/dL, platelets of 52 thousand/uL, lactic acid of 2.9 mmol/L, bilirubin of 2.2 mg/dL, and a procalcitonin of 0.28 ng/mL. Patient was started on vancomycin and piperacillin. He was negative for HIV Ab and HIV RNA PCR, serum EBV PCR, RPR, bacterial and fungal blood cultures, serum parvovirus PCR, and ANA. He improved with resolution of his fever and rash, but remained pancytopenic. Hematology was consulted and bone marrow biopsy showed acute myeloid leukemia with 57% blasts. Patient subsequently refused any treatment for his pancytopenia and has since been lost to follow up.

IMPACT/DISCUSSION: Pancytopenia can be rheumatological such as systemic juvenile idiopathic arthritis, systemic lupus erythematosus, and Sjogren syndrome; genetic or metabolic secondary to lysosomal storage diseases or glycogen storage diseases; Infectious causes such as Epstein-Barr virus, cytomegalovirus, human immunodeficiency virus, tuberculosis, Bartonella Henselae; or secondary to malignancies such as leukemia, lymphoma, myelodysplastic syndrome and aplastic anemias. History and physical examination are important however it can be misleading. Our patient presented with a high fever and rash shortly after a dental procedure which led to thinking that it was due to sepsis from an infectious cause. Sepsis is an acquired cause of pancytopenia and if it is not resolving with the infection then it is important to work up other causes, especially if not resolved by two weeks. When all the testing came back negative and fevers and rash started to resolve with worsening of pancytopenia, other causes were investigated. Ozone therapy was also a red herring. It is a non-FDA approved drug taken by people and our patient was using it via autohemotherapy, which is when blood is drawn from the patient, exposed to ozone and then re-injected into the patient. It can cause pulmonary embolisms, gas embolisms, skin discoloration, and can lead to malignancies by free radical damage. However no studies showed pancytopenia related to ozone therapy. In our case, the rash was due to amoxicillin, and ozone was not associated with the pancytopenia.

CONCLUSION: Highlighting the importance of a thorough workup when diagnosing a patient is important, especially when there are many different aspects to the case that can be confounding the diagnosis and the patient continues to worsen.

RECOGNIZING A RARE CASE OF MYCOBACTERIUM XENOPI

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LEARNING OBJECTIVE #1: Diagnose rare non-tuberculous mycobacteria in a patient with non-specific pulmonary consolidation.

LEARNING OBJECTIVE #2: Recognize risk factors for mycobacterial infections.

CASE: A 60-year-old man with a history of COPD, pulmonary nodules, current tobacco abuse, and Zenker diverticulum presented with one week of productive cough, shortness of breath, and nighttime fever and chills. Approximately one month prior to presentation the patient underwent a routine low-dose screening CT scan showing significant consolidation in the posterior segment of the right upper lung lobe. He was asymptomatic for the proceeding three weeks until he began having a cough productive of thick green sputum, headaches, and nausea with a 5-pound weight loss. After a week of progressive symptoms, he presented to the emergency room where a repeat CT scan showed persistent consolidation but now with cavitation. On further questioning, the patient-reported a remote history of 50-day-long incarceration and a negative PPD test.

The patient was worked up for malignant and infectious etiologies of his symptoms including respiratory viral panel, bacterial and fungal cultures, acid-fast smear, HIV and RPR testing, and GeneXpert and Quantiferon-TB Gold. Augmentin was initiated for empiric aspiration pneumonia coverage. Acid-fast smear returned positive, but GeneXpert results showed no *M. tuberculosis*. Bronchoscopy was performed with brushings and cytology negative for malignancy. Non-tuberculous mycobacterium (NTM) coverage was initiated with azithromycin, ethambutol, and rifampin. Bronchoalveolar lavage cultures eventually grew *Mycobacterium xenopi*. The patient was discharged

on 9-12 months of azithromycin, ethambutol, and moxifloxacin. Unfortunately, this undomesticated patient did not present for his follow-up appointment with infectious disease and his current status is unknown.

IMPACT/DISCUSSION: NTM is rare but does occur at a non-negligible frequency, especially in patients with risk factors, of which this patient had several. While this man had previously been incarcerated, the most commonly associated risk factor with NTM is a pre-existing pulmonary disease (such as COPD and lung nodules). This patient's alcohol abuse also qualifies as a risk factor for NTM.

Mycobacterium xenopi is an "atypical atypical" finding in that it is an exceedingly rare species within this genus. Once identified, it requires prolonged antimicrobial treatment with close outpatient follow-up to monitor adherence and routine lab work. Unfortunately, this patient's lack of follow-up thus far poses a risk for the development of resistance in an organism that has already proven difficult to treat.

CONCLUSION: 1. NTM infections are rare but clinically significant and require prolonged antimicrobial therapy.

2. It is important to obtain a thorough history in order to screen for risk factors when approaching an undifferentiated lung opacity in order to devise a proper work-up.

RECOGNIZING THE STEPS: EBV AS A CAUSE OF FALSE-POSITIVE HIV TEST

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LEARNING OBJECTIVE #1: Describe current recommended diagnostic testing algorithm for HIV (MK)

LEARNING OBJECTIVE #2: Recognize potential causes of false-positive HIV tests (MK, PBL)

CASE: A 24-year-old woman presented to ID clinic for persistent mycoplasma genitalium infection. Incidentally, she reported several weeks of subjective fevers and night sweats. Laboratory evaluation revealed a **positive HIV Ag/Ab immunoassay**, elevated LFTs and a lymphocytosis. Reflex confirmatory HIV testing was ordered and revealed a **negative confirmatory 4th generation HIV 1/2 Ag/Ab test**. A follow-up **HIV-1 viral RNA load was negative**.

Two weeks later, patient presented to her PCP with complaints of anxiety, due in part to the possible new diagnosis of HIV. Along with continued subjective fevers and night sweats, she reported significant fatigue. Acute Epstein Barr virus was raised as a possible unifying diagnosis for her fatigue, night sweats, fevers, lymphocytosis, and transaminitis. EBV titers ordered at that visit were consistent with recent primary infection with **positive IgM and IgG EBV Viral Capsid Antigen and IgG EBV Nuclear Antigen**. At that visit, HIV Ag/Ab immunoassay remained positive and 4th-generation HIV Ag/Ab and HIV-1 viral RNA load remained negative.

IMPACT/DISCUSSION: The CDC updated recommendations for HIV diagnostic testing in the United States in 2014. Current recommendations still recommend a stepwise approach for diagnostic testing. The initial recommended screening test is an immunoassay that detects antibodies to HIV as well as the p24 antigen; this test has improved sensitivity compared to prior generations that solely detect antibodies. If the initial test is reactive, the preferred confirmatory test is a differentiation immunoassay that distinguishes between HIV-1 and HIV-2 antibodies. Indeterminate or negative immunoassay results are further confirmed using quantitative RNA testing. Major benefits of the newer algorithm include more accurate diagnosis of acute HIV infection, faster turnaround time and a reduced number of indeterminate results.

Despite these benefits, initial false positive testing can still occur, a potential source of anxiety for patients. False positive screening HIV tests are well-described in the literature and have been attributed to a variety of conditions seen commonly in primary care including pregnancy, infections such as EBV, autoimmune diseases such as lupus, Sjogren's, and autoimmune hepatitis, and hematologic malignancies such as Hodgkin lymphoma and T-cell lymphoma.

CONCLUSION: -False-positive HIV tests can have significant social and personal consequences. There have been reports of false-positive HIV

screening tests due to various infectious diseases, autoimmune conditions, and hematologic malignancies.

-It is crucial for primary care providers to understand the current recommended HIV screening algorithm, to recognize the possibility of initial false positive screening test results and to be comfortable counseling patients on the interpretation of results.

RECURRENT ABDOMINAL PAIN IMPROVED BY MIGRAINE MEDICATION RECONCILIATION

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LEARNING OBJECTIVE #1: Recognize that migraine and related medications might be associated with abdominal pain.

LEARNING OBJECTIVE #2: Review detailed history and medication history, including the severity of illness and frequency of medication use.

CASE: A 66-year-old man was referred to the outpatient clinic for his abdominal pain and chronic diarrhea. His abdominal pain started four months ago, gradually worsened. A month before the admission, he was referred to a gastroenterologist. Upper gastrointestinal endoscopy and colonoscopy with biopsies were performed, but there were only non-specific findings. When he came to our hospital, there was no abnormality in blood tests except for mild eosinophilia, and there were no abnormal findings in contrast-enhanced computed tomography images of the whole body, computed tomography angiography, abdominal ultrasound and stool tests for ova, white blood cell, fecal fat, and *H. pylori* antigen assay. On the same day, he was admitted to our hospital for further examination. On that evening he complained of epigastric and left epigastric pain with percussion tenderness. Acetaminophen was ineffective, thus pentazocine was required to relieve his pain. We interviewed him again on the next day and found out that he had a migraine for 30 years and had been consuming 15 zolmitriptan per month for the past 20 years, and about 24 tablets per month for the past 4-5 years. Furthermore, he had been experiencing the same abdominal pains, although less frequently, since the time the dosage of zolmitriptan increased 20 years ago. He had been taking lomerizine as prophylaxis, but when the prophylaxis was switched to amitriptyline after admission and he was instructed to withhold the zolmitriptan, the frequency of the abdominal pain decreased quickly. After discharge from the hospital, zolmitriptan is used only a few times a month and the abdominal pain has not recurred.

IMPACT/DISCUSSION: There are possible explanations for the resolution. One theory is that the pain was caused by zolmitriptan. Since the diagnostic tests did not have any abnormalities, possible diagnoses include non-obstructive mesenteric ischemia, irritable bowel syndrome, and somatization disorders. There are few case reports of triptans causing non-obstructive mesenteric ischemia.

Another theory is that the abdominal pain was caused by abdominal migraine since the pain improved significantly after initiating prophylaxis. Although most cases of abdominal migraine are pediatric cases, there have been several reports of adult cases of abdominal migraine. In this case, the patient showed improvement in abdominal pain with avoidance of zolmitriptan by starting prophylaxis and reducing headache frequency, and we suspected mild intestinal ischemia associated with zolmitriptan or abdominal migraine.

CONCLUSION: Unexplained abdominal pain in migraine patients taking frequent triptans might improve with medication reconciliation.

RECURRENT PRESYNCOPE ON EXERTION DUE TO PULMONARY EMBOLISM

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LEARNING OBJECTIVE #1: Diagnose pulmonary embolism when recurrent presyncope on exertion is observed.

LEARNING OBJECTIVE #2: Pulmonary embolism may present with moderately elevated liver enzymes due to ischemic liver injury.

CASE: A 78-year-old woman presented with two days of recurrent fainting provoked by exertion or orthostasis. Two weeks prior to the onset of the symptom, the patient was treated conservatively for a right ankle sprain. She had a medical history of hypertension. Physical examination revealed tachypnea (24 breaths/min), a loud P2, and a holosystolic murmur at the fourth left sternal border. Laboratory data showed abnormalities pertaining to the levels of D-dimer (16.6 $\mu\text{g/mL}$), N-terminal pro-brain natriuretic peptide (12886 pg/mL), aspartate transaminase (428 U/L), alanine transaminase (283 U/L), lactate dehydrogenase (796 U/L), alkaline phosphatase (796 U/L), γ -glutamyl transpeptidase (380 U/L), total bilirubin (3.2 g/dL), direct bilirubin (2.0 mg/dL), and C-reactive protein (3.89 mg/dL). Electrocardiogram revealed negative T waves in leads III and V1, and a transitional zone in lead V5. Echocardiography showed severe tricuspid regurgitation, right atrial and ventricular dilation, and an interventricular septal shift (D-sign). Chest radiography showed a Westermark sign. Contrast-enhanced computed tomography revealed the presence of a thrombus in the right pulmonary artery. The patient was diagnosed with pulmonary embolism (PE) and treated with heparin and edoxaban. The symptoms improved within one-month post-treatment.

IMPACT/DISCUSSION: Impact

How did this case change your thinking?

I learned three important facts in this case.

1. Recurrent presyncope on exertion indicates a consideration for PE as a differential disease.
2. PE may present with moderately elevated liver enzymes due to ischemic liver injury.
3. Although the Westermark sign has low sensitivity (approximately 10%) for PE, it is highly specific.

Discussion

The frequency of fainting or syncope in PE is 22%. In this case, exertional and orthostatic fainting may have represented a Bezold-Jarisch reflex, which caused bradycardia and dilation of peripheral blood vessels with blood pressure lowering. Hyperbilirubinemia associated with PE is predominantly caused by indirect bilirubin due to a congested liver or thrombus. The level of alkaline phosphatase in hepatic congestion is generally normal or only slightly elevated. However, hepatic congestion in combination with ischemic liver injury due to low cardiac output and hypoxemia results in moderate alkaline phosphatase and direct bilirubin elevation. A Westermark sign is one of the several reported signs of PE on chest radiographs. It represents decreased vascularization at the lung periphery due to mechanical obstruction or reflex vasoconstriction in PE. Although the Westermark sign has low sensitivity (approximately 10%) for PE, it is highly specific.

CONCLUSION: Physicians should suspect pulmonary embolism from recurrent presyncope on exertion.

RECURRENT SMALL BOWEL OBSTRUCTION IN THE SETTING OF RAPID ATRIAL FIBRILLATION

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LEARNING OBJECTIVE #1: Recognize the importance of controlling atrial fibrillation in an acute setting.

LEARNING OBJECTIVE #2: Understand the effects of recurrent surgery in the gut.

CASE: A 59-year-old male presented to the emergency department with two weeks of progressively increasing abdominal pain, nausea, obstipation, and abdominal distention. In addition to a prior cholecystectomy and appendectomy, the patient had a history of two surgical resections for ischemic bowel. Three adenomatous polyps were removed via colonoscopy one year prior to presentation. His temperature was 99 F, heart rate 130 bpm, respiratory rate 18/min, oxygen saturation 98 percent on room air, and blood pressure 92/56. Pertinent physical examination showed a rapid irregularly irregular pulse and non-displaced PMI with no murmurs or rubs. The abdominal exam showed hypoactive bowel sounds. There was diffuse abdominal tenderness with no guarding or rigidity. Complete blood count, comprehensive metabolic panel, amylase, lipase and urinalysis were within normal limits. Electrocardiogram demonstrated atrial fibrillation with rapid ventricular response (RVR). There

were no acute ST-T changes noted. 2D echocardiogram showed no atrial enlargement, normal wall motion, and left ventricular ejection fraction of 55-60 percent. Radiographs demonstrated distended loops of small bowel with no free air. CT abdomen and pelvis with contrast showed dilated loops of small bowel without bowel wall thickening. The patient was treated with IV normal saline, diltiazem, ceftriaxone and metronidazole. The following day he converted to normal sinus rhythm. After three days of bowel rest and nasogastric tube decompression his abdominal distention and tenderness resolved. His diet was advanced over the following two days and was discharged on day 5 on oral diltiazem.

IMPACT/DISCUSSION: We described a male patient with a small bowel obstruction that resolved with conversion of atrial fibrillation to normal sinus rhythm. Loss of atrial kick and rapid heart rate led to reduced cardiac output, hypotension and mesenteric hypoperfusion. Small bowel obstruction due to reduced gut perfusion from cardiac arrhythmia is well documented in medical literature. In this case, the patient had multiple episodes of paroxysmal atrial fibrillation complicated by mesenteric hypoperfusion and bowel paralysis. To our knowledge, this case is the first reported example of multiple episodes of small bowel obstruction caused by paroxysmal atrial fibrillation.

CONCLUSION: The reported case of recurrent small bowel obstruction was likely secondary to mesenteric hypoperfusion because of uncontrolled atrial fibrillation. Atrial fibrillation has a strong correlation with mesenteric ischemia due to thromboembolism. Although this patient did not develop serious complications, such as volvulus, it highlights the importance of heart rate/rhythm control in an acute setting.

REFRACTORY HYPOGLYCEMIA DUE TO THYROID DYSFUNCTION: A RARE ASSOCIATION

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LEARNING OBJECTIVE #1: Treat persistent hypoglycemia secondary to severe hypothyroidism

LEARNING OBJECTIVE #2: Recognize the association between thyroid function and glycemic control

CASE: 29-year-old female with a history of thyroid cancer status post thyroidectomy and hypothyroidism on levothyroxine presented with altered mental status and low blood glucose (BG) levels while at work. Physical exam was notable for altered mentation, bloodwork revealed BG in the range of 38-52 mg/dL , thyroid stimulating hormone (TSH) 99.18 uIU/mL and free thyroxine (T4) <0.25 ng/dL . Patient admitted to having not taken her levothyroxine for several weeks prior to presentation. Despite three ampules of 50% dextrose (D50) and initiation of a 5% dextrose in normal saline (D5NS) infusion, BG remained in the range of 50-70 mg/dL . Patient was admitted to the Intensive Care Unit (ICU) for further evaluation and close monitoring of hypoglycemia.

Patient was started on 50 mcg intravenous (IV) levothyroxine for thyroid function abnormalities. Despite being on continuous dextrose infusion for multiple days, she continued to remain hypoglycemic, requiring dextrose pushes. Oral hypoglycemic drug screen was negative and insulin and cortisol levels were found to be normal. Endocrinology recommended continuing thyroxine intravenously until thyroid levels improved as hypothyroidism could have contributed to malabsorption causing hypoglycemia. IV dextrose infusion was continued for a total of twelve days during hospitalization. Thyroid function was rechecked after eight days of treatment with IV levothyroxine, with improvement seen (TSH 39.33 uIU/mL and free T4 0.43 ng/dL). This interestingly correlated with simultaneous improvement in serum BG levels, therefore the refractory hypoglycemia was attributed to severe hypothyroidism from medication non-compliance.

IMPACT/DISCUSSION: Thyroid hormone plays an important role in glucoregulatory functions of the body. Hypothyroidism may cause hypoglycemia by multiple mechanisms including reduced glucagon secretion, slowing

of insulin clearance, decreasing growth hormone levels, impairing cortisol response by causing relative adrenal insufficiency, and reduced gluconeogenesis and glycogenolysis.

It is very important for physicians to be aware of this possibility and to assess thyroid function in patients with hypoglycemia not explained by dietary changes, hypoglycemic medications or physical activity. In symptomatic or hemodynamically unstable patients with severe hypothyroidism, thyroid hormone replacement should be done intravenously to maximize absorption.

CONCLUSION: Physicians should consider hypothyroidism as a differential diagnosis for the diagnosis of hypoglycemia when common causes are ruled out as prompt recognition can prevent severe hypoglycemic complications, including cardiac arrest.

REFRACTORY IMMUNE THROMBOCYTOPENIA IN A PATIENT WITH SYSTEMIC LUPUS ERYTHEMATOSUS

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LEARNING OBJECTIVE #1: Diagnose immune thrombocytopenia (ITP) in patients with systemic lupus erythematosus (SLE).

LEARNING OBJECTIVE #2: Treat patients with refractory thrombocytopenia.

CASE: An 85-year-old woman was sent to our hospital by her hematologist for severe thrombocytopenia 5000/uL found on routine lab work. Past medical history included congestive heart failure, atrial fibrillation, and chronic thrombocytopenia (27000/uL two months prior). The examination was unremarkable, without signs of bleeding, bruising, or splenomegaly. Bloodwork revealed pancytopenia with hemoglobin 7.6 g/dL, leukopenia 2.7 thou/uL, and thrombocytopenia 5000/uL. Platelets were transfused with no increase in platelet count, raising concern for ITP. Extensive workup, including bone marrow biopsy (BMB), was done which ruled out infections, nutritional deficiencies, malignancies, hemolysis, and most autoimmune diseases as causes. However, antinuclear antibody (1:1280), anti-double-stranded DNA antibody (482 IU/mL), and anti-histone antibody (7.1 units) were strongly positive. Peripheral blood smear (PBS) revealed megakaryocytes, therefore the diagnosis of secondary ITP from newly diagnosed SLE was made. Treatment was challenging as platelets did not improve with steroids or IVIG, therefore romiplostim and 1mg/kg of prednisolone were initiated for the treatment of refractory ITP, with subsequent improvement.

IMPACT/DISCUSSION: ITP is an autoimmune disorder characterized by immune-mediated destruction of platelets. Primary ITP is an acquired disorder without an underlying cause, whereas secondary ITP is associated with various causes including autoimmune diseases, infections, and medications, with SLE being a common cause. Hematological manifestations of SLE are cytopenia(s), lymphadenopathy with or without splenomegaly. In cases of mild thrombocytopenia >50,000/uL, ITP is an incidental diagnosis. However, with platelet count less than <50,000/uL, easy bruising with minor trauma, petechiae, and ecchymoses can occur. Platelet counts <10,000/uL, as in our patient, increase the risk for internal bleeding. Diagnosis is one of exclusion with megakaryocytes seen on PBS in some cases, and work-up is required to identify underlying etiologies. BMB is required in elderly patients with atypical presentations or with no response to initial treatment. Clinical presentation drives treatment, with mild cases requiring no treatment and severe cases often requiring steroids as first-line treatment. In cases refractory to steroids, additional treatment strategies such as intravenous immunoglobulin and immunosuppressive agents such as azathioprine, cyclophosphamide, and cyclosporine have shown to be successful.

CONCLUSION: Severe thrombocytopenia (<10,000/uL) is a rare presentation associated with increased mortality, therefore treatment is essential. Although most cases improve with steroids alone, physicians should be aware of cases refractory to steroids as seen in our case to effectively initiate appropriate alternative treatment for better prognosis.

REMITTING SERONEGATIVE SYMMETRIC SYNOVITIS WITH PITTING EDEMA (RS3PE) ASSOCIATED WITH A DPP4-INHIBITOR

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LEARNING OBJECTIVE #1: Distinguish RS3PE from other rheumatologic syndromes based on its specific diagnostic criteria and risk factors

LEARNING OBJECTIVE #2: Recognize the association between DPP-4 inhibitors and RS3PE

CASE: An 80-year-old male with hypertension and type 2 diabetes presented with several days of bilateral upper and lower distal extremity swelling and pain, fever and malaise. Two weeks earlier, he had been initiated on sitagliptin for uncontrolled blood sugars. On examination, he was febrile to 102.8F and had pitting edema of bilateral hands and feet. Tender symmetric metacarpal phalangeal greater than proximal interphalangeal joint synovitis and swelling of finger digits without overt dactylitis was present.

Laboratory workup was significant for a normocytic anemia, elevation of C-reactive protein (6.9 mg/dL), erythrocyte sedimentation rate (108 m/h) and ferritin (360 ng/mL). HLA-B27 was positive. The remainder of the rheumatologic workup including rheumatoid factor, ANA, dsDNA, MPO and PR3 antibodies were negative. Urinalysis was bland and infectious workup was unremarkable. Radiographs of the hands demonstrated mild osteoarthritis but no joint destruction. Venous duplexes of lower extremities showed no thromboses and echocardiogram demonstrated normal ejection fraction. A malignancy workup including colonoscopy and abdominal computerized tomography imaging was unremarkable. Despite discontinuation of his chronic nifedipine and a week of 20 mg of prednisone, he did not improve. The temporal association between sitagliptin and the onset of his symptoms was recognized, and a clinical diagnosis of RS3PE was made. Sitagliptin was discontinued yielding resolution of his symptoms and normalization of inflammatory markers.

IMPACT/DISCUSSION: RS3PE is a rare but distinct rheumatologic syndrome. Our patient met all four diagnostic criteria including pitting edema of limbs, acute onset of polyarthritis, age greater than 50 years old and rheumatoid factor seronegativity. Approximately 50% of patients have an HLA association. There are well-established associations between RS3PE, malignancies and chronic infections. The link with solid and hematologic cancers has been particularly well-described and age-appropriate cancer screening is an essential clinical step in all patients with RS3PE, particularly among those who have a poor response to steroids. RS3PE has also been seen with DPP-4 inhibitors, as occurred in our patient, but the association goes unrecognized. The FDA warns against severe arthralgias, while other international health agencies specifically note DPP-4 inhibitor association with RS3PE.

CONCLUSION: RS3PE syndrome is underdiagnosed by physicians due to unfamiliarity with it and the lack of pathognomonic features. It is associated with malignancy, but also with DPP-4 inhibitors.

RS3PE causes significant morbidity unless promptly diagnosed and treated. Given that DPP-4 inhibitors are commonly prescribed, clinicians should be vigilant for the development of this syndrome in patients taking these medications.

RITUXIMAB-ASSOCIATED ENTEROVIRAL MENINGOENCEPHALITIS IN A MIDDLE AGE FEMALE

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LEARNING OBJECTIVE #1: Recognize the clinical features of meningoencephalitis in an immunosuppressed patient

LEARNING OBJECTIVE #2: Diagnose meningoencephalitis when initial imaging and cerebrospinal fluid (CSF) analysis is unremarkable

CASE: A 49-year-old female presented with a two-day history of fevers, myalgias, and malaise. She had granulomatous polyangiitis in remission with methotrexate and rituximab, the last rituximab infusion was 3 months ago. One week prior she developed a maculopapular rash on her hands and painful oral

sores and was diagnosed with hand foot and mouth disease. There were no reported sick contacts, recent travel, or animal exposures.

On examination she had neck stiffness without any cranial nerve, motor, or sensory deficits. She was treated empirically for bacterial and viral meningitis. An MRI brain showed no abnormalities. Lumbar puncture was performed. CSF revealed leukocyte count 84/uL (79% neutrophils, 6% lymphocytes, 7% monocytes), erythrocyte count 3/uL, glucose 62 mg/dL, and protein 32 mg/dL. Opening pressure was not obtained. Initial CSF studies were unrevealing for any viral, fungal, or bacterial pathogen. Metagenomic next generation sequencing (mNGS) was collected as a send out lab.

Four days after symptom onset she developed intermittent confusion, expressive aphasia, and diffuse motor weakness. A CT brain showed no acute changes. Electroencephalography showed mild diffuse encephalopathy. Empiric doxycycline was added to cover potential rickettsial infections. Her mental status improved over the next three days to baseline. An Immunoglobulin G (IgG) level was normal (520 mg/dL).

On hospital day 9 the mNGS returned positive for enterovirus A71 in high titers and was negative for other pathogens. Antibiotics and antivirals were discontinued. Patient was at her baseline mental status and was discharged home.

IMPACT/DISCUSSION: Enterovirus A71 is a virulent strain of Picornavirus which primarily affects young children and manifests as HFMD or aseptic meningitis. On rare occasions it can cause severe neurologic manifestations. Encephalitis is clinically differentiated from meningitis from the presence of altered mental status, speech abnormalities, and neurologic deficits.

The humoral immune system is responsible for clearance of enteroviruses via B-cell mediated antibody production. Rituximab is an anti-CD20 monoclonal antibody which causes B-cell depletion that can predispose to enterovirus infections in adults and has been linked to rare cases with fatal neurologic complications including meningoencephalitis. Diagnosis is most commonly via polymerase chain reaction (PCR) from CSF. Treatment is supportive.

CONCLUSION: Enterovirus is a common cause of encephalitis in children and can affect adults with impaired humoral immune systems.

CSF analysis of enterovirus meningoencephalitis will be consistent with aseptic meningitis: variable white blood cell count and neutrophil count, normal glucose, and low protein. Diagnosis is confirmed with PCR.

Treatment of enterovirus meningoencephalitis is supportive.

SAFELY REPLACING A PEG TUBE USING A PORTABLE X-RAY SYSTEM AT A PATIENT'S HOME

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LEARNING OBJECTIVE #1: Recognize health care costs reduction in PEG tube replacement in a patient's home using a handy portable X-ray system

LEARNING OBJECTIVE #2: Manage accidental removal of percutaneous endoscopic gastrostomy tube in a patient's home with a handy portable X-ray system

CASE: An 81-year-old woman was receiving home medical care for left hemiparesis and dysphagia after cerebral infarctions. She underwent Percutaneous endoscopic gastrostomy (PEG) tube placement a year before. The home-care doctor visited the patient's home because her husband called and stated that her PEG tube had been accidentally removed. Since the gastrocutaneous fistula was stenotic, the same diameter PEG tube as the previous tube could not be inserted even though the guidewire passed. The home-care doctor presented two options to the patient and her husband. The first option was to undergo replacement immediately at home. The other was to undergo replacement two days later at the hospital, but with a higher possibility of requiring re-gastrostomy. The couple chose PEG tube replacement at home after the home-care doctor discussed the two options' benefits and risks in detail.

After the narrowed fistula was incised crosswise, a new PEG tube was inserted without resistance. Following the gastric fluid was suctioned out of the tube, amidotrizoic acid was injected through the PEG tube. Abdominal X-ray in the supine position using the CALNEO Xair™ showed normal gastric mucosal

folds and confirmed that the tip of the PEG tube was in the stomach. It took five minutes to take and review the X-ray image. The next day, she had no problems around the PEG tube. She experienced no problems after tube feeding was re-started. A similar accidental removal occurred two months later, and we managed it in the same way.

IMPACT/DISCUSSION: PEG is a widely used procedure for patients who need enteral feeding because of head and neck cancer or neurological disorders. There are some ethical issues in the decision to perform PEG, e.g., indications for patients with difficulties in decision making. In Japan, the number of PEG procedures has been decreasing these days. However, the number of PEG tube replacements has not decreased because life expectancy after PEG has been extended.

The handy portable X-ray system named CALNEO Xair™, which weighs only 3.5 kg, can be carried easily by hand. To our knowledge, this is the first case report of PEG tube replacement at a patient's home with the CALNEO Xair™. After the replacement, the position of the tip of the PEG tube was checked quickly with an abdominal X-ray. There were no complications with the procedure and subsequent course after the events. There may be many a need for PEG tube replacement at home, as in the present case. Furthermore, the appropriate resolution could avoid hospitalization for re-gastrostomy, which would reduce health care costs.

CONCLUSION: The handy portable X-ray system is expected to be a useful method for checking the location of the tip of a replaced PEG tube in a patient's home.

SARCOIDOSIS VERSUS PRIMARY MALIGNANCY: LET THE MONOCYTES DECIDE

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LEARNING OBJECTIVE #1: Recognize the relevance of peripheral monocytes without lymphocytosis in the diagnosis of sarcoidosis

LEARNING OBJECTIVE #2: Distinguish between sarcoidosis and sarcoid-like reaction

CASE: A 68-year old Haitian man with no past medical history presented with subacute dyspnea, fatigue, and unintentional weight loss of 33 lbs. He presented to the hospital 1 week after a chest radiograph (CXR) demonstrated a left hilar mass. Pertinent laboratory findings on admission included white blood cell count of 4.6 10E3/uL, elevated eosinophil percent of 10.6%, eosinophil number 0.49 10E3/uL and elevated monocyte percent of 16.4%. Computed tomography (CT) of the chest showed 7.1 cm left suprahilar mass with compression of the left upper lobe bronchus and significant bilateral mediastinal and hilar lymphadenopathy.

Endobronchial ultrasound bronchoscopy with transbronchial and fine needle aspiration biopsies showed caseating granulomas. Bronchoalveolar lavage cytology was negative for acid fast bacilli (AFB) and malignancy. Interferon gamma release assay and urine Histoplasma antigen were negative. Further evaluation of eosinophilia and monocytosis showed total IgE levels elevation, 903 IU/mL. Strongyloides antibody IgG, anti-neutrophilic cytoplasmic, serum fungitell and Aspergillus galatomanan antigen assay were all negative. Due to lack of persistent monocytosis $\geq 1000/\text{microL}$ and splenomegaly chronic myelomonocytic leukemia was deemed less likely.

Due to the presence of caseating granulomas, lack of evidence of malignancy, negative AFB cultures, hypercalcemia and eosinophilia the patient was determined to have sarcoidosis. He was started on prednisone 40mg daily with a prolonged taper and repeat chest imaging. The patient declined further evaluation via surgical biopsy. Follow up imaging and lab work showed notable regression of the left hilar mass, bulky mediastinal adenopathy and hypercalcemia.

IMPACT/DISCUSSION: Sarcoidosis is a chronic noncaseating granulomatous disease involving multiple systems associated with nonspecific constitutional symptoms. The pulmonary system is involved in the majority of cases and often is associated with dyspnea, fatigue, and weight loss. Rare presentations of sarcoidosis are difficult to identify due to characteristics similar to primary malignancy. Sarcoidosis diagnosis is reliant on imaging to classify disease stage. Atypical radiographic findings, such as a solitary lung mass, increase diagnosis complexity and requires a broad differential. Elevated

peripheral monocytes, particularly intermediate monocytes, supports a diagnosis of sarcoidosis versus inflammatory sarcoid-like reaction (a noncaseating granuloma associated with microbial infection or malignancy). Therefore, in cases of diagnostic uncertainty biopsies from a minimum of two non-contiguous sites are required for diagnosis.

CONCLUSION: This case illustrates the relevance of peripheral monocytes, particularly intermediate monocytes CD14++ and CD16+, without lymphocytosis in sarcoidosis unlike sarcoid-like reaction.

SARS-COV-2 ASSOCIATED TRANSVERSE MYELITIS

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LEARNING OBJECTIVE #1: Recognize transverse myelitis as a potential sequelae of SARS-CoV-2 infection and vaccination.

LEARNING OBJECTIVE #2: Diagnose postviral transverse myelitis

CASE: 34 yo female with no significant PMH presented to the ER with generalized weakness and urinary retention. Two weeks prior she developed a severe intractable headache prompting an Urgent Care visit, COVID 19 PCR was positive. One week later her legs felt weak and she was unable to carry her toddler. She developed urinary retention, only able to void small amounts by straining. On day of presentation leg weakness worsened to where she could not climb downstairs and unable to arise from sitting position. She developed patches of ascending numbness.

In ER her vital signs were unremarkable. Bladder scan demonstrated 1L of urine and foley catheter was placed. Neurological exam showed no visual field loss, EOMI, normal bulk/tone with strength 5/5 in upper and lower extremities. Sensation to pinprick was reduced in feet compared to legs. Examination of reflexes showed bilateral 2+ brisk biceps and brachioradialis reflex, brisk 2+ bilateral patellar reflexes. NIF and vital capacity were normal. In the ER she attempted to ambulate and fell.

She underwent a lumbar puncture. CSF studies: elevated WBC and protein. Further CSF studies including ACE, OCBs, IgGSR, HSV PCR, VZV PCR were negative.

Further work up included other infectious and rheumatological entities. Serum studies (Vitamin B12, ESR, ACE, Aquaporin 4 Ab negative, RPR, Ro SSA, La SSB, HIV, ANA, ANCA MPO, proteinase-3 AB, RF, anti-MOG, Lyme Ab) were unremarkable. Repeat COVID 19 PCR negative.

MRI brain showed precontrast 2 flair bright lesions at the ponto-midbrain junction, largest posterior and abutting the 4th ventricle. MRI cervical spine with multiple large expansile T2 bright lesions, MRI thoracic spine with central T2 hyperintensity throughout the cord both without post contrast enhancement. Initially she was treated with steroids, due to minimal improvement she was treated with course of IVIG. She was able to ambulate and urinate without difficulty on hospital day 5 and discharged.

IMPACT/DISCUSSION: Neurological disorders as sequelae of SARS CoV 2 infection are becoming increasingly common. Transverse myelitis is a neuroimmune spinal cord disorder estimated to effect between 1-8 individuals per million annually. TM presents with rapid onset weakness, bowel/bladder dysfunction and sensory alterations. Post infectious TM has been described post COVID 19 infection and also in vaccine trials. While there is no cure for TM it is important to recognize it early and start treatment aimed to limit permanent neurological deficits.

CONCLUSION: As we continue to encounter those who are battling and those who have survived SARS CoV2 infection, it is important to maintain a broad differential/awareness for uncommon manifestations & sequela of SARS CoV2.

While postinfectious TM is a rare condition, it is important to identify, address underlying infection and attempt to halt progression of inflammatory process.

SARS-COV-2 PROVOKED SCLERODERMA RENAL CRISIS IN A PATIENT WITH A RECENT ELECTIVE MEDICAL ABORTION

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LEARNING OBJECTIVE #1: Recognize the presentation of autoimmune disease following recent viral illness, particularly SARS-CoV-2.

LEARNING OBJECTIVE #2: Diagnose and manage scleroderma renal crisis.

CASE: A 35-year-old G3P1 woman with hypertension and iron deficiency anemia presented with one week of headache, dyspnea and vaginal bleeding after elective first trimester abortion. Physical exam notable for blood pressure of 266/144 mmHg.

Creatinine was 5.16 mg/dL, elevated from 0.9 mg/dL one year prior. Hemoglobin was 9.4 g/dL, platelet count 49,000/uL and peripheral blood smear showed moderate schistocytes. Lactate dehydrogenase (LDH) was 1,829 IU/L and haptoglobin was undetectable. Direct antiglobulin test was negative. Patient was positive for SARS-CoV-2 by nasopharyngeal swab.

She was started on nicardipine drip for hypertensive emergency. Plasmapheresis exchange therapy was initiated for empiric treatment of thrombotic thrombocytopenic purpura (TTP). Platelet count and LDH improved, although haptoglobin remained low.

On hospital day three, ADAMTS13 activity returned as 72 percent, excluding TTP. She developed diffuse facial and anterior chest telangiectasias (Figure 1). Given refractory hypertension, elevated creatinine, and diffuse telangiectasias, scleroderma renal crisis was suspected (1, 2, 3). Notably, patient had no autoimmune disease history. Captopril was initiated and plasmapheresis exchange therapy continued for five days, after which platelet count recovered. Autoimmune work-up demonstrated positive ANA with titer of 1:640, nucleolar pattern on immunofluorescence and positive Sjogren's antibody Anti-SS-A greater than 8 AI. Anti-double-strand DNA antibody and anti-Smith antibody were negative. Repeat creatinine two months after admission was 1.8 mg/dL.

IMPACT/DISCUSSION: The temporal nature of hypertensive emergency following SARS-CoV-2 infection implicates SARS-CoV-2 as a causal factor in triggering scleroderma renal crisis. Despite testing positive for SARS-CoV-2 infection during admission, the patient remained asymptomatic throughout her hospital course, without respiratory complaints, fever or anosmia.

Infectious diseases have been hypothesized in the pathogenesis of autoimmune conditions. Parvovirus B19 and CMV serve as potential triggers for scleroderma by causing defects in vasculogenesis and bone marrow suppression (4). SARS-CoV-2 disrupts the endothelium, leading to both a pro-coagulative state and increased inflammation (5). It may drive autoimmune syndromes in genetically susceptible individuals, correlating with reports of atypical Kawasaki disease in children with concomitant SARS-CoV-2 infection (6, 7, 8). Perhaps an underlying autoimmune condition such as scleroderma was unmasked in the pro-inflammatory state instigated by our patient's SARS-CoV-2 infection.

CONCLUSION: It is critical to recognize initial manifestations of autoimmune conditions following acute SARS-CoV-2 infection. Our case emphasizes the need for further research into a link between SARS-CoV-2 infection and autoimmune disease.

SECONDARY HYPOGONADISM DUE TO EMPTY SELLA SYNDROME

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LEARNING OBJECTIVE #1: Describe clinical features and workup of secondary hypogonadism

LEARNING OBJECTIVE #2: Recognize the importance of reviewing prior abnormal results when patients re-engage with care

CASE: A 64-year-old man with history of coronary artery disease, hypertension, sleep apnea, and obesity presented to clinic for the first time in 3 years with low energy and hot flashes. He felt depressed but denied changes in weight or cognition.

Three years ago, he had decreased libido and erectile dysfunction with testosterone at 31ng/dL, however the results were not communicated to him. He had

prior headaches, but none since beginning CPAP for sleep apnea and losing weight several years ago.

Vital signs were normal except BMI of 42kg/m². He had bilateral small testes with normal secondary sex characteristics and prostate exam. Repeat total testosterone and free testosterone were 13ng/dL and 1.2pg/mL respectively. Luteinizing hormone (LH) was 0.8mIU/mL, and follicle stimulating hormone (FSH) was 1.8mIU/mL.

MRI of the brain showed expansion of the sella with minimal pituitary parenchyma. The neurologist suspected prior pseudotumor cerebri causing empty sella syndrome, with normalization of intracranial pressure with weight loss and CPAP. He was started on topical testosterone with resolution of symptoms.

IMPACT/DISCUSSION: In male hypogonadism, one fails to produce a normal amount of testosterone or sperm. Primary hypogonadism arises due to dysfunction of testes, while secondary hypogonadism arises due to hypothalamic or pituitary dysfunction.

Clinical presentation differs by age of onset; pre-pubertal onset leads to absence of secondary sexual characteristics, while post-pubertal onset may cause decreased libido, hot flashes, gynecomastia, body hair loss, and low energy.

Testosterone levels fluctuate diurnally, so serum total testosterone should be measured at its peak between 8 and 10am and repeated for confirmation. Obesity can falsely depress total testosterone due to decreased sex hormone-binding globulin; free testosterone should be normal in those without hypogonadism and low in those with it. LH and FSH can distinguish between primary and secondary causes. Secondary hypogonadism should prompt measurement of cortisol, thyroxine, prolactin, and iron saturation. Very low testosterone or neurologic symptoms should prompt brain MRI.

Our patient had low total testosterone 3 years ago but was lost to follow-up. A detailed review during the visit was important in making the correct diagnosis and providing further treatment. Delayed treatment could have been prevented with a notification system on the electronic medical record (EMR). It is important to establish systems to aid physicians in reviewing prior results during care transitions and re-establishment of discontinuous care.

CONCLUSION: Diagnosing male secondary hypogonadism requires appropriate clinical presentation, low total testosterone or sperm levels, and normal or low LH and FSH. Review of prior results is important at times of transition and re-establishment of care.

SEROTONIN SYNDROME IN THE AMBULATORY OFFICE?

A CASE REPORT

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LEARNING OBJECTIVE #1: Recognize serotonin syndrome (SS) in the outpatient setting to prevent mortality and morbidity

LEARNING OBJECTIVE #2: Identify commonly prescribed medications in the ambulatory setting that may cause SS

CASE: A 46-year-old female presented to our outpatient clinic with complaints of nausea, palpitations, tremors and diaphoresis. She denied any dyspnea, chest pain, change in appetite, any recent weight change, recent medication changes, new exposures, or changes in bowel or urinary habits. Patient had a notable past medical history of COPD, depression, insomnia, lumbar stenosis and erythromelalgia. Her home medications included acetaminophen/oxycodone 10mg as needed every 6 hours, gabapentin 600mg three times daily, clonazepam 0.5mg twice daily, pentoxifylline 400mg three times daily, zolpidem 10 mg every night, tramadol 50 mg as needed three times daily and trazodone 50 mg once daily at night. On presentation, the patient was afebrile and hemodynamically stable. Physical exam was positive for hyperreflexia in lower extremities but was unremarkable otherwise. Using the Hunter Serotonin Toxicity Criteria, a clinical diagnosis of serotonin syndrome was made secondary to concomitant use of tramadol and trazodone. The suspected medications were discontinued, and close follow-up was planned. Patient returned to the clinic in 5 weeks with complete resolution of symptoms.

IMPACT/DISCUSSION: Serotonin syndrome (SS) is a life-threatening condition associated with increased serotonergic activity in central nervous system (CNS). The most common clinical features include change in mental status, restlessness, hyperreflexia, myoclonus, diaphoresis, shivering and tremor. The underlying mechanism involves excess stimulation of 1A and 2A serotonin (5-hydroxytryptamine or 5-HT) receptors. SS is a clinical diagnosis made using the Hunter Serotonin Toxicity Criteria, which is fulfilled when a patient has taken a serotonergic agent and meet one of the following conditions; 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. In our case patient was taking tramadol and trazodone, very common medications prescribed in our daily practice.

CONCLUSION: This case emphasizes the importance of early recognition of SS in outpatient setting to prevent significant mortality and morbidity. It should serve as a reminder to clinicians to perform an accurate medication reconciliation and discuss possible adverse effects of medications.

SEVERE DIGITAL ISCHEMIA IN A YOUNG ADULT

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LEARNING OBJECTIVE #1: Recognize the clinical features of mixed vascular disease

LEARNING OBJECTIVE #2: Distinguish causes of progressive digital ischemia

CASE: A 36-year-old female presented with painful worsening bilateral gangrene in her hands and right foot for two months. She initially developed blisters in her toes and fingertips which progressed to painful dry gangrene in her hands and right foot. She denied vision changes, joint pain, atypical skin rashes. Her medical history included end-stage renal disease (ESRD), diabetes mellitus (DM), hyperlipidemia, obesity, hypertension, 12 pack-year smoking history. She had no family history of early cardiac disease, clotting disorders, or autoimmune diseases. Physical exam revealed painful gangrene of both hands involving all fingers and necrosis of all digits of the right foot. Laboratory >studies were significant for leukocytosis, elevated ESR, CRP. Relevant negative testing included ANCA, vasculitis panel, and lupus antibodies. Arterial duplex revealed atherosclerotic plaque with reduced doppler flow noted in bilateral deep arteries of the upper extremity (UE) and lower extremity (LE). Angiography showed a patent abdominal aorta and severe microvascular disease with calcifications in UE & LE vasculature. An echocardiogram revealed no source of embolus. Post amputation histology of the 4th right toe showed gangrenous necrosis without vasculitis.

IMPACT/DISCUSSION: Digital gangrene is caused by small vessel occlusions in the hand or feet from atheroembolism or arteritides. The diagnostic dilemma posed by this patient was amplified by the need for a timely diagnosis. Clinical reasoning included the differential for UE ischemia including embolism, atherosclerotic plaque, thromboangiitis obliterans (TAO), Takayasu arteritis, autoimmune vasculitis, and calciphylaxis.

Premature atherosclerotic disease was considered due to her risk factors and plaque burden seen on imaging. There were no findings suggestive of autoimmune vasculitis. Digital ischemia is the most common presentation of TAO, albeit definitive diagnosis was challenging due to unusual characteristics such as DM and atherosclerosis on imaging. Calciphylaxis is a syndrome of vascular calcification characterized by occlusion of microvessels resulting in painful, ischemic skin lesions. Patients with ESRD can also have microvascular calcifications from concurrent monckeberg's arteriosclerosis. Due to the overlap in treatment with our differentials, we pursued management with intense risk factor modification, vasodilator therapy, and smoking cessation. Empiric treatment with sodium thiosulfate and vitamin K was initiated for calciphylaxis. She required wound management and amputations for the gangrenous lesions.

CONCLUSION: The diagnosis for diffuse subacute digital ischemia can be challenging as the diagnostic findings are shared between various etiologies.

Complex vascular diseases should involve a multidisciplinary discussion with appropriate clinical reasoning between medical and surgical specialists to optimize patient care.

SEVERE KETAMINE-INDUCED UROPATHY ASSOCIATED WITH CHOLANGIOPATHY REQUIRING PERCUTANEOUS NEPHROSTOMY

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LEARNING OBJECTIVE #1:

Emphasize that ketamine addiction can cause severe damage to the urinary and hepatobiliary systems.

LEARNING OBJECTIVE #2: Highlight that severe ketamine-induced uropathy (KIU) can be managed with percutaneous nephrostomy to protect young patients from chronic renal disease.

CASE: A 29-year-old Asian female with a 9-year history of ketamine abuse presented to the emergency department with sharp, epigastric pain for 2 weeks. The pain was associated with nausea and generalized weakness. Physical examination was remarkable for epigastric tenderness. Blood work showed Na 112 mmol/L, HCO₃ 3.9 mmol/L, Cr 7.0 mg/dL, AG 24, pH 7.24, ALP 224 U/L, ASP 169 U/L, ALK 2248 U/L, and total bilirubin 5.3 mg/dL. Foley was placed to monitor urine output, which demonstrated oliguria. Renal/bladder US showed worsening severe bilateral hydronephrosis and renal scar. CT scan showed bladder and ureteral wall thickening with hydroureteronephrosis. MRCP and EUS, revealed no sign of significant pathology of the hepatobiliary and pancreatic systems. Liver biopsy showed bile ductule proliferation with associated neutrophilic infiltrate consistent with ketamine induced changes and rare focal hepatocytic ballooning within the hepatic lobule. Hepatitis panel revealed positive HBV VL. Immunostains of liver biopsy for HBsAg or HBeAg were negative. Patient underwent percutaneous bilateral nephrostomy tubes placement, improving urine output and resolution acute kidney injury resolution. Repeat renal/bladder US showed near complete resolution of bilateral hydronephrosis. Transaminitis and hyperbilirubinemia markedly improved without intervention. Patient was discharged home on the 17th day after admission.

IMPACT/DISCUSSION: Ketamine-induced uropathy (KIU) is becoming more prevalent in the U.S. Chronic recreational ketamine use can cause structural damage to the renal and hepatobiliary systems. Although the underlying mechanism for urinary tract and hepatobiliary destruction in KIU remains unknown, severe cases can cause ureteral and biliary inflammation and strictures, hydronephrosis, and impaired renal and hepatic function. Studies have postulated that ketamine and its metabolites might have a direct toxic effect on urothelial cells and hepatocytes, inducing microvascular changes and the evocation of an autoimmune response. As most patients are young, it is imperative that their upper urinary tract is protected to prevent chronic renal disease with percutaneous nephrostomy or ureteral stenting in cases of severe hydronephrosis. Consequently, the drainage and diversion of urine away from bladder through percutaneous nephrostomy reduces lower urinary tract symptoms. Currently, only abstinence has been shown to reverse some of this ketamine's damage.

CONCLUSION: Chronic recreational ketamine use can cause structural damage to the kidneys, bladder, and hepatobiliary system. In severe cases of hydronephrosis in young patients, percutaneous nephrostomy should be used to protect the upper urinary tract.

SEVERE NEW-ONSET TYPE 2 DIABETES MELLITUS IN YOUNG-ADULT PATIENT POST- COVID-19 INFECTION

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LEARNING OBJECTIVE #1: Recognize the signs of severe new-onset type 2 diabetes mellitus.

LEARNING OBJECTIVE #2: Identify a possible connection between COVID-19 infection and hyperglycemia.

CASE: DM is a 16-year-old cis-gender female with a history of morbid obesity (BMI 53) and recent COVID-19 infection (two months prior to presentation), and family history of type 2 diabetes mellitus (DM2), presenting with severe abdominal pain and altered mental status. In the ED, vitals were: BP 131/75, HR 121, RR 30, temp 98F, and SpO₂ 100%. Physical exam was significant for epigastric tenderness to palpation, guarding, lethargy and confusion; patient was alert and oriented only to self. Labs were: glucose 1808 (H), HbA1c 12 (H), Cr 3.47 (H), lipase 2749 (H), pH 7.06 (L), HCO₃ 10.3 (L), serum osmolality 450 (H), COVID-19 antibody positive and COVID-19 PCR negative. Imaging demonstrated cerebral edema, pancreatic thickening with adjacent fat stranding and abdominal ascites. Patient was diagnosed with new DM2 and admitted to the ICU for management of hyperosmotic hyperglycemic state, including IV insulin and potassium. The course was complicated by acute pancreatitis, acute kidney injury (AKI), rhabdomyolysis, upper GI bleed and persistent hypertension. The patient was intubated for a declining Glasgow coma scale score, underwent continuous veno-venous hemofiltration dialysis for two days for AKI, and required endoscopic clipping for upper GI bleed. Mental status improved and she was transitioned to BiPap after ten days, and later to room air. Insulin infusion was transitioned to subcutaneous therapy upon normalization of glucose. Blood pressure was treated with calcium-channel blocker and beta-blocker therapy, and ultimately normalized. After one month the patient was discharged to sub-acute rehabilitation for ongoing physical therapy. Two months after discharge the patient had lost 100 pounds and HbA1c decreased to 7.

IMPACT/DISCUSSION: DM's presentation is a severe phenotype of new-onset DM2 in a young-adult. While routine HbA1c screening in the adult population yields diagnosis of approximately two-thirds of patients with DM2, symptomatic presentations are not uncommon. This patient's oxygen and dialysis requirements illustrate the severity of her presentation. While obesity and family history are known risk factors for DM2, this patient's COVID-19 infection is a third potential risk factor. Recent cases have shown a link between SARS-CoV-2 and worsening glycemic control, possibly due to damage of pancreatic islet cells expressing ACE2, leading to hyperglycemia. Previous reports have defined this link in adult (>18 years old) patients. DM's young-adult age highlights the need to understand adult general medicine principles among providers treating adolescent patients.

CONCLUSION: This case emphasizes the importance of considering adult pathologies, like DM2, in young-adult patients with pertinent risk factors. Clinicians can consider current and prior COVID-19 infection a potential risk factor for DM2.

SEVERE SKIN MANIFESTATIONS OF KWASHIORKOR SECONDARY TO UNHEALTHY ALCOHOL USE FOLLOWING DUODENAL SWITCH

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LEARNING OBJECTIVE #1: Recognize cutaneous manifestations of kwashiorkor

LEARNING OBJECTIVE #2: Identify risk factors for protein calorie malnutrition

CASE: A 40-year-old woman 2 years status post biliopancreatic diversion with duodenal switch (BPD/DS) presents with a 1-week history of a diffuse, hyperpigmented, mildly pruritic, desquamating rash. She reports persistent diarrhea since her surgery and 3 months of non-adherence to her vitamin supplement regimen. A similar rash has appeared during prior periods of non-adherence. She also drinks 40 standard drinks per week. Physical examination reveals diffuse, waxy, desquamating patches and plaques reminiscent of peeling enamel paint. The findings are most prominent on friction-exposed surfaces. She also has atrophic glossitis and everted fingernail edges. Initial labs reveal hypokalemia (3.2 mg/dL), hypomagnesemia (1.5 mg/dL), hypoalbuminemia (1.7 mg/dL), and undetectable prealbumin and transferrin. Further laboratory testing reveals micronutrient deficiencies including vitamins A (undetectable), C (undetectable), and alpha-tocopherol (4.2 mg/L), as well as

copper (65 µg/dL), zinc (26 µg/dL), ceruloplasmin (15 mg/dL), and transferrin (undetectable). She also has positive fecal fat and undetectable pancreatic elastase. Dermatology consultants agree the rash's appearance is highly consistent with kwashiorkor. The patient's pruritus subsides with emollient application, and the desquamation improves with a regular diet and alcohol abstinence. She is discharged with close nutrition follow-up, scheduled laboratory monitoring, and oral micronutrient supplementation.

IMPACT/DISCUSSION: The combination of BPD/DS and heavy alcohol consumption induced profound protein calorie malnutrition, as well as deficiencies of both water and fat-soluble micronutrients. Although kwashiorkor classically presents with edema and ascites secondary to hypoalbuminemia, the desquamating rash may precede involvement of other organ systems as in this case. Patients who undergo weight loss surgery should be counseled to avoid unhealthy alcohol use and to supplement micronutrients in accordance with American Society for Metabolic and Bariatric Surgery guidelines.

CONCLUSION: • Both alcohol use and gastric bypass are risk factors for severe protein, micronutrient, and calorie malnutrition.

- Often overlooked by internists, surgical and social history are vital elements of the H&P that can elucidate causes of abnormal findings.
- Patients status post weight loss surgery should avoid unhealthy alcohol use and supplement micronutrients aggressively.

SHINGLES: A HARBINGER OF HIV

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LEARNING OBJECTIVE #1: Recognize that human immunodeficiency virus (HIV) can present as herpes zoster

LEARNING OBJECTIVE #2: Diagnose HIV in patients that present with indicator conditions without high risk features in their history

CASE: A 49-year-old woman with past medical history significant for systemic lupus erythematosus and seizure disorder presented after an unwitnessed seizure. She had recently developed a painful vesicular rash in the on the left side of her neck after being treated with valacyclovir for a perianal rash. She admitted recent weight loss and diffuse lymphadenopathy. She reported one family member with human immunodeficiency virus (HIV) but denied intravenous drug use or recently new sexual partners.

She was empirically started on intravenous acyclovir due to concerns for encephalitis. Lumbar puncture was performed and cerebrospinal fluid (CSF) studies were unremarkable. Magnetic resonance imaging of the brain was not completed due to patient experiencing claustrophobia. Serum HIV-1 antibody screen was positive.

Further evaluation found HIV viral load of 535,929 copies/mL and CD4 count of 369 (360-1,500 /uL). The patient completed a seven-day course of valacyclovir after discharge and was started on HAART therapy.

IMPACT/DISCUSSION: Herpes zoster reactivation has been shown to be one of the most frequent indicator conditions associated with a missed opportunity for HIV testing, with a median delay of HIV diagnosis of 7.8 months [1]. This delay in treatment impacts short term and long-term prognosis for patients infected with HIV. By promoting prompt HIV testing in patients presenting with herpes zoster reactivation, even without high risk features in the history, the delay in diagnosis and treatment can be prevented.

CONCLUSION: This case illustrates the importance of screening for HIV when patients have an unusual presentation and or lack high-risk features in their history. It is important to consider new HIV diagnosis with varicella zoster virus reactivation.

Reference

1. Maxime I, Serge N, Albert M, Michel YJ, Lambert D, Abo Y, et al. Missed opportunities for HIV testing among newly diagnosed HIV-infected adults in Abidjan, Cote d'Ivoire. *PLoS One* 2017;12(10), <https://doi.org/10.1371/journal.pone.0185117>.

SIGNAL VERSUS NOISE: A CASE OF ADVANCED HIV/AIDS IN THE SETTING OF LUPUS AND INTERSTITIAL LUNG DISEASE

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LEARNING OBJECTIVE #1: Identify signs and symptoms of advanced Human Immunodeficiency Virus (HIV)/Acquired Immunodeficiency Syndrome (AIDS)

LEARNING OBJECTIVE #2: Avoid availability bias by regularly refocusing the differential diagnosis

CASE: A 55-year-old woman with lupus and Sjogren's syndrome with interstitial lung disease undergoing evaluation for lung transplantation was admitted with 2 months of progressive diffuse weakness, fatigue, non-productive cough, dysphagia, and 40-pound weight loss. On exam, she was hypotensive, tachycardic, and had oral thrush. Her labs showed a white blood cell count of $3.0 \times 10^9/L$ and sedimentation rate 114 mm/hr. Tests were sent to evaluate for lupus flare (dsDNA and complements), indolent infection and malignancy (chest and abdominal computerized tomography [CT] and blood cultures), and COVID-19 given her cough (PCR) which were all unremarkable. On hospital day 3, she developed a fever and underwent repeat cultures and COVID-19 testing which were again negative. She eventually underwent an endoscopy to evaluate her dysphagia, revealing extensive esophageal candidiasis. HIV antibody test was sent and was positive. She was later found to have CD4 count of 9 cells/mL, viral load of 690,000 copies/mL, and bronchoscopy cytology with Grocott stain positive for pneumocystis, confirming the diagnosis of World Health Organization Clinical Stage 4 HIV/AIDS. She currently remains in the hospital and is being treated with Biktarvy (bictegravir, emtricitabine, and tenofovir alafenamide), fluconazole, and trimethoprim/sulfamethoxazole.

IMPACT/DISCUSSION: HIV affects more than 1 million Americans, of which an estimated 14% are unaware of their condition. Each year, an additional 36,000 people are infected, primarily by those who do not know their status and remain untreated. Chronic, uncontrolled HIV can present as fatigue, weight loss, oropharyngeal candidiasis, or no symptoms at all; it progresses naturally to AIDS, defined by CD4 count <50 cells/mL or presence of an AIDS-defining opportunistic infection (like pneumocystis pneumonia). HIV is particularly difficult to diagnosis in patients with concurrent lupus due to overlap in symptoms and lab findings, ranging from fever and malaise to hematologic changes. Complicating the matter, HIV antibody tests in patients with lupus can sometimes result in false positives, requiring confirmatory testing via Western blot or viral load assay. Notably, this patient underwent many tests and had a several day delay in the diagnosis of HIV/AIDS during her hospitalization. She was evaluated for COVID-19 twice as well as lupus flare before being tested for HIV. Revisiting the differential diagnosis frequently could have minimized the influence of availability bias in this case.

CONCLUSION: This case highlights the importance of considering a diagnosis of chronic HIV infection in all patients with fatigue and weight loss. HIV can be missed even when patients regularly access care, underscoring the need for improved screening in all individuals.

SKELETAL MANIFESTATIONS OF HYPERPARATHYROIDISM

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LEARNING OBJECTIVE #1: Recognize tertiary hyperparathyroidism (HPT) as a potential sequela of unresolving secondary HPT.

LEARNING OBJECTIVE #2: Management of tertiary HPT status post parathyroidectomy requires adequate follow-up to optimize successful control of parathyroid hormone (PTH) and prevent possible skeletal exacerbations.

CASE: A 26-year-old African American female patient with a past medical history of end-stage renal disease on hemodialysis, HPT status post three gland parathyroidectomy, congestive heart failure, valvular disease status post mitral, aortic, and tricuspid valve replacements, and suspected lupus (states previous diagnosis but antinuclear antibody negative times three) that presented as a transfer from an outside hospital with concerns of acute compartment syndrome.

Laboratory assessment revealed an adjusted calcium of 8.7 mg/dl, vitamin D of 9.3 ng/ml and a PTH of 2778 pg/ml—consistent with severe tertiary HPT. X-ray of the tibia showed extensive demineralization and fractures at the right distal femoral diaphysis and proximal tibial diaphysis. Due to the extensive demineralization, internal fixation could not be performed, and the fracture was placed in a splint. Further review of the imaging showed extensive calvarial bone hypertrophy, salt and pepper appearance of the skull, biconcave “cod fish” appearance of the vertebra, and considerable demineralization of the entire skeleton. It can be noted that, in 2019, the patient’s Z score ranged from -6.2 to -7.7, highlighting the severe fragility of her bones.

During her most recent hospital course, the patient suffered left and right femur fragility fractures when her positioning in bed was changed. She also had acute on chronic anemia, likely secondary to the large hematomas in her femurs and tibia, that necessitated multiple transfusions.

Eventually, she was deemed stable to follow up with orthopedics outpatient and resume outpatient dialysis regimen. She was discharged to a long-term care facility with plans for outpatient initiation of denosumab versus eventual parathyroidectomy.

IMPACT/DISCUSSION: HPT is a high bone turnover state, and the action of PTH on bone is a unique one with intermittent administration favoring bone formation and continuous secretion favoring bone resorption. This can result in various skeletal manifestations, such lytic bone lesions, also known as brown tumors, salt and pepper appearance of the skull due to interspersed lytic lesions, and codfish vertebra, all of which were present in our patient.

CONCLUSION: Chronic kidney disease associated bone mineral disorder can manifest as osteoporosis, osteomalacia, hyperparathyroidism, adynamic bone disease, or a combination of the above. This case represents an uncommon presentation of tertiary HPT. Despite removal of three parathyroid glands in 2018 and adherence to dialysis, this patient continued to have uncontrolled PTH. The question remains as to how to manage such a fragile patient, whether via total parathyroidectomy or with pharmacological management such as with denosumab.

SKIN INVOLVEMENT IN SMALL LYMPHOCYTIC LYMPHOMA—A RARE ENTITY

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LEARNING OBJECTIVE #1: Diagnose small lymphocytic lymphoma in a patient with leukemia cutis.

LEARNING OBJECTIVE #2: Recognize the broad differential for cutaneous lesions, including malignancy.

CASE: A 69-year-old male with past medical history of hypertension and type 1 diabetes mellitus presented to our clinic with non-specific complaints of night sweats, fatigue, and multiple skin lesions for the past five months. Physical exam revealed several subcutaneous nodules without ulceration involving the neck, abdomen, and back, with the largest being approximately 3.5 cm x 4 cm. Laboratory investigations showed a white blood cell count of 4 thou/uL, hemoglobin (Hb) of 11.6 g/dL, and platelet count of 182 thou/uL. Work-up for vasculitis, infectious, and autoimmune causes were negative. Given his constitutional symptoms, there was a concern of an underlying malignancy. Consequently, the patient underwent a positron emission tomography (PET)-computed tomography

(CT) scan which revealed numerous hypermetabolic subcutaneous nodules throughout the body. With a high suspicion for blood cell malignancy, a bone marrow biopsy (BMB) was performed that revealed no lymphomatous involvement. Excisional skin biopsy of a subcutaneous lesion was negative for malignancy. However, due to high clinical suspicion, a repeat biopsy of another subcutaneous nodule was also performed, revealing findings consistent with small B-cell lymphoma with plasmacytic differentiation. The tumor cells were positive for CD5 and kappa. He was subsequently initiated on multiple chemotherapy regimens with various complications. The patient was ultimately treated with rituximab with bendamustine therapy with significant improvement.

IMPACT/DISCUSSION: Leukemia cutis (LC) is the infiltration of neoplastic leukocytes into the epidermis or dermis portions of skin, resulting in cutaneous lesions. It is an underrecognized and rare manifestation of chronic lymphocytic leukemia (CLL)/small lymphocytic lymphoma (SLL), seen in less than 5% of cases. Typically, LC occurs late in the natural history of the malignancy, however, our case is unique, as the patient presented with skin involvement leading to his diagnosis. The lesions associated with LC can mimic many non-malignant conditions, such as drug reactions, infections, inflammatory or autoimmune conditions. Therefore high clinical suspicion should exist in patients presenting with constitutional symptoms and skin involvement to consider evaluating for malignancy, especially with an otherwise negative workup. Increased awareness can lead to prompt diagnosis of underlying malignancy to improve outcomes.

CONCLUSION: This case illustrates the unusual presentation of leukemia cutis. Given the wide differential for skin lesions, physicians should consider CLL as a differential when patients with skin lesions have associated constitutional symptoms and negative workup for other causes. In the era of advanced cancer treatment, early diagnosis can lead to better outcomes.

SLOW-GROWING HUGE ANTERIOR MEDIASTINAL LIPOMA TREATED ONLY BY WATCHFUL WAITING

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LEARNING OBJECTIVE #1: Recognize asymptomatic huge mediastinal lipomas not always require resection.

LEARNING OBJECTIVE #2: Distinguish between lipoma and liposarcoma with computed tomography (CT) or magnetic resonance image (MRI) before determination of watchful waiting.

CASE: A 79-year-old woman with hypertension, lipid disorder, and hypothyroidism, underwent chest X-ray at a medical checkup, which revealed a mass shadow in the right lower lung field. Although she was asymptomatic, her right respiratory sounds were decreased. Thoracic CT without enhancement 9 years earlier revealed a mass lesion measuring 17.4 cm × 4.5 cm × 6 cm in her right anterior mediastinum. The left border of the mass contacted the right margin of the heart and protruded into the right thoracic cavity. The mass was homogenous (−100 Hounsfield units (HU)), which suggested a diagnosis of mediastinal lipoma (Figure A). There were no remarkable findings in her echocardiography and pulmonary function test. Although we recommended resection of her huge tumor, she refused it owing to the absence of any symptoms and her old age.

She was treated with watchful waiting for 9 years without any symptoms. Follow-up recent CT showed a significant increase in the size of the mass to 18.9 cm × 8.0 cm × 8.0 cm (Figure B), with no change in its homogenous appearance or HU value. T1- and T2-weighted images on MRI undergone for re-exclusion of liposarcoma showed a homogenous mass with smooth edge, with the signal intensity reduced by the fat suppression technique. These findings suggested the diagnosis of mediastinal lipoma. Therefore, we decided to continue watchful waiting owing to her lack of complaints.

IMPACT/DISCUSSION: Mediastinal lipoma is an intrathoracic lipoma, mainly occurring in the anterior mediastinum, with a low frequency of 1.6%–2.3% of all mediastinal tumors. Although usually asymptomatic, mediastinal lipomas may compress the lungs or heart, resulting in respiratory symptoms, such as cough or dyspnea, and heart failure or even death. While some cases undergoing tumor resection have been reported, surgery is generally indicated only when a patient shows serious manifestations or when liposarcoma cannot be ruled out. It was reported that both CT and MRI could distinguish lipomas from liposarcomas. In our case, liposarcoma was completely ruled out by CT performed twice and MRI once. Although the lipoma in our patient had grown into a huge mass within 9 years, it remained completely asymptomatic, without aggressive treatments, owing to its soft texture and benign character.

CONCLUSION: Anterior mediastinal lipoma, even when extremely large, may be able to be managed under watchful waiting if there are no serious manifestations, such as respiratory signs or heart failure. Liposarcoma must be ruled out before making a decision of treating the patient with suspected anterior mediastinal lipoma with watchful waiting.

SMALL FIBER NEUROPATHY POTS AND GOTTRON SIGN IS COVID19 THE CULPRIT

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LEARNING OBJECTIVE #1: Recognize clinical features of SFN and its association with PoTS

LEARNING OBJECTIVE #2: Assess for SFN with a focused and cost-effective approach

CASE: A 47 year old woman with a medical history of migraine. She was diagnosed with POTS in her twenties, but it has been quiescent since that time. She presented to the clinic with multiple complaints that began gradually in June 2020, including episodes of facial swelling, palpitation, dizziness, skin discoloration underneath the eyes, brain fog, cold sensation, heaviness in the feet, burning in the right arm and diffuse deep bone pain. A few weeks after her initial presentation, she developed hypoglycemic episodes, diarrhea and loss of seventeen pounds over five months. She has a family history of ovarian cancer. On physical exam, she had macular violaceous erythema without edema at the dorsal aspect of the metacarpophalangeal and distal interphalangeal joints (Gottron Sign). Vital signs were remarkable for heart rate of 150 upon standing, 130 when sitting, 70 when lying down, and hypotension. Neurological examination was normal. Over the course of seven months, she had extensive laboratory work up, imaging, and special studies completed at different centers. She tested negative for SARS-CoV-2. Cardiac ambulatory monitoring showed sinus tachycardia. Epidermal nerve fiber biopsy showed significantly reduced epidermal nerve fiber density consistent with small fiber neuropathy. She received antihistamine, hydration, salt tablets, midodrine, fludrocortisone and pulse steroid therapy, which significantly improved her symptoms while awaiting intravenous immunoglobulin.

IMPACT/DISCUSSION: PoTS is an elevation in the heart rate upon standing with manifestations of orthostatic intolerance such as dizziness and palpitation. Multiple syndromes are associated with PoTS, including mast cell activation syndrome and SFN. SFN presents with both dysautonomia and neuropathic pain.

CONCLUSION: SFN is found in 50% of patients with PoTS. Our patient was diagnosed with an episode of PoTS during her twenties associated with only tachycardia and orthostatic hypotension. The recent recurrence of the PoTS-related symptoms along with the presence of other systemic manifestations warranted an investigation for other explanations. Early diagnosis and recognition of SFN and the association with POTS could have led to a more focused and cost-effective evaluation. Thus, increasing awareness among internal medicine physicians about SFN and PoTS is crucial, especially since a subset of patients with COVID-19 may present with autonomic nervous system problems, including PoTS after diagnosis. While our patient tested negative for SARS-CoV-2, it does not exclude prior infection. Since post-Covid syndrome remains a diagnosis of exclusion, she will need continued follow-up for potential paraneoplastic syndromes and autoimmune disorders that could be associated with her constellation of neurologic and dermatologic manifestations.

SORTING THROUGH THE SMOKE: POLYCYTHEMIA VERA IN A PATIENT WITH COPD

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LEARNING OBJECTIVE #1: Recognize the potential of smoking and its common sequelae to obscure the diagnosis of other underlying disease, including rare neoplasms.

LEARNING OBJECTIVE #2: Distinguish between primary and secondary polycythemia based on history and lab findings.

CASE: A 76-year-old woman with COPD and Warthin tumors presented to the general medicine clinic with a self-resolving episode of acute right facial pain and swelling. She had extensive dental disease and attributed her recent symptoms to a dental abscess. Review of systems was significant for increasing fatigue and shortness of breath, as well as generalized pruritus. She had an active 40 pack-year smoking history. Physical exam revealed bilateral, non-tender parotid gland nodules, significant tooth decay, and numerous excoriations on her back.

CBC showed a hemoglobin of 19.3 g/dL, WBC count of 11,940 per μ L, and platelet count of 530,000 per μ L. She had a history of mild, intermittent hemoglobin elevations (14-16 g/dL), leukocytosis (11,450-26,550 per μ L), neutrophilia (7,710-24,690 per μ L), and thrombocytosis (368,000-582,000 per μ L) over the past 4 years. These elevations had previously been considered multifactorial reactive processes, attributed to COPD and chronic inflammation associated with smoking and dental disease. Erythropoietin levels were measured twice and found to be low-normal at 2.5 and 2.7 mIU/mL (reference range 2.6-18.5). JAK2 V617F mutation testing eventually confirmed the diagnosis of polycythemia vera (PV). She started therapy with phlebotomy and hydroxyurea, resulting in significant improvement of her pancytosis.

IMPACT/DISCUSSION: Growing evidence has implicated smoking in the development of PV, a myeloproliferative neoplasm characterized by increased RBC mass and ubiquitous JAK2 mutations. Smokers are more likely to develop JAK2 mutations and PV, possibly due to chronic inflammation, oxidative stress, and direct mutagenesis to hematopoietic stem cells. Nevertheless, PV is not commonly diagnosed in patients with COPD; however, there may be under-recognition of their coexistence, as erythrocytosis and leukocytosis in such patients may instead be labeled as secondary processes attributed to hypoxia and inflammation.

Our patient's case underscores the potential of smoking not only to promote neoplasia but also to obscure the recognition of other underlying pathology. The diagnosis of PV was delayed in part because she had risk factors for chronic reactive hematopoiesis, namely COPD and dental disease, which offered a more common explanation initially. However, the emergence of systemic symptoms, including pruritus, along with her history of Warthin tumors, another rare neoplasm associated with smoking, prompted reevaluation of her diagnosis.

CONCLUSION: Common lab abnormalities in smokers may be indicative of rare neoplastic disease. PV should always be ruled out in patients with erythrocytosis, even in the presence of risk factors for more common secondary polycythemia, such as COPD.

SPILLING THE T: SEZARY SYNDROME EXPOSED

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LEARNING OBJECTIVE #1: Consider breadth of differential for erythrodermic rash

LEARNING OBJECTIVE #2: Recall diagnosis and treatment of Sezary syndrome

CASE: A 66-year-old female presented to rheumatology clinic with progressively worsening pruritus and rash for two years, previously diagnosed and treated as eczema without improvement. Extensive, patchy erythema with scale was present across upper and lower extremities, with diffuse alopecia, skin fissuring, Raynaud's, leg edema, and submandibular lymphadenopathy. A myositis panel revealed strongly positive Jo 1 antibody, elevated aldolase, and normal CK, ANA, and ENA. Consensus was anti-synthetase syndrome in the spectrum of amyopathic dermatomyositis, and she was prescribed mycophenolate mofetil.

Follow-up visits revealed continued erythrodermic rash, covering nearly 90% of her skin, with violaceous patches compatible with dermatomyositis, and pruritic scale on her hands, feet and back consistent with atopic dermatitis. Differential expanded to atypical erythrodermic amyopathic dermatomyositis, atopic dermatitis, and erythrodermic psoriasis. Punch biopsies showed interface dermatitis with rare necrotic

keratinocytes and mild spongiosis. Vinegar wraps with topical steroids were prescribed.

Subsequently, the patient worsened, with 25 lb weight loss, lymphocytosis on CBC, and CT revealing axillary, iliac and inguinal adenopathy. Biopsy of an axillary lymph node demonstrated a CD4+, CD6-, and partial CD7- T cell population with neoplastic appearance, and similar in the peripheral blood, confirming Sezary syndrome.

IMPACT/DISCUSSION: Sezary syndrome is an aggressive cutaneous T cell lymphoma characterized by an erythrodermic rash, lymphadenopathy, pruritis and atypical circulating lymphocytes called Sezary cells. The diagnosis poses a challenge as it clinically and histologically mimics benign skin conditions and inflammatory dermatoses. Classically, patients present with diffuse exfoliative, intensely pruritic rash, progressing over months to years. Common signs include alopecia and thickened skin on the palms and soles, as in our patient, with nail changes that can be mistaken for eczema or dermatomyositis. Diagnosis is based on the presence of erythroderma covering $\geq 80\%$ of body surface area, abnormal lymphocyte population on flow cytometry or absolute count, and clonal T cell receptor rearrangement. Resultant impairment of cellular immunity means immunosuppressives should be avoided; treatment is extracorporeal photopheresis and systemic chemotherapy.

CONCLUSION: Our patient illustrates the importance of a broad differential including Sezary syndrome in the evaluation of widespread, unremitting, erythrodermic rash, with prompt peripheral blood cytometry or lymph node biopsy examined for abnormal T cells. Prognosis and successful treatment depend on early recognition and avoiding immunosuppression prescribed at high dose for lengthy periods due to erroneous anchoring on atopic or inflammatory dermatoses.

STAPHYLOCOCCUS AUREUS BACTEREMIA AND SYSTEMIC LUPUS ERYTHEMATOSUS

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LEARNING OBJECTIVE #1: Recognize the clinical features of systemic lupus erythematosus (SLE)

LEARNING OBJECTIVE #2: Distinguish the various causes of fever

CASE: A 39-year-old woman was admitted because of fever and nausea. Two months earlier, the patient had noticed purpuric skin lesions in the lower limb and scaly skin on both ear lobes. She also had a fever and a malar rash on her cheek. Ten days before hospitalization, nausea developed, and the patient was transferred to our hospital for further evaluation. She reported a history of frequent epistaxis. Medical history was significant for well-controlled atopic dermatitis. On physical examination, her temperature was 39.7°C, and other vital signs were normal. Physical examination revealed non-palpable purpura in the limbs and a butterfly rash on her face. Laboratory studies revealed pancytopenia, slightly high C-reactive protein level, prolonged activated partial thromboplastin time, and low C3 and C4 complement levels. The contrast computed tomography findings were unremarkable. Due to infection concerns, she was treated with intravenous cefepime. On the following day, the blood cultures grew *Staphylococcus aureus*. Confusion and motor aphasia had developed. Magnetic resonance images of the head revealed increased only fluid-attenuated inversion recovery signal intensities in the right lobe. Additional laboratory results were positive for antinuclear antibodies, anti-double-stranded DNA, lupus anticoagulant, and anti-cardiolipin IgG. SLE was diagnosed. Neuropsychiatric SLE (NPSLE) was determined to be the cause of confusion. She received a high dose of methylprednisolone and underwent plasmapheresis. Her symptoms gradually ameliorated, and she was subsequently treated with cyclophosphamide.

IMPACT/DISCUSSION: We encountered the case of a woman with a rare manifestation of both unsuspected *S. aureus* bacteremia (SAB) and previously undiagnosed SLE. Fever is a common manifestation in early SLE and is seen in 34.5% of the patients. A retrospective cohort study of bacteremia in patients with SLE undergoing treatment reported that the most common pathogen was *S. aureus*. However, the development of SAB in patients with untreated SLE has not been well- documented. The

risk factors for the incidence of SAB are indwelling prosthetic devices, a breach of the skin or mucosal barrier, and colonization. Frequent epistaxis and atopic eczema considered as impaired cutaneous barriers may have been responsible for SAB in our patient. Glucocorticoids or other immunosuppressants are recognized as risk factors for infection. However, NPSLE is associated with a high mortality rate. Therefore, clinicians should assess the state of patients with both autoimmune and infectious diseases, and determine the best way to treat them.

CONCLUSION: We described a patient with SAB and previously undiagnosed SLE. This case serves as an important reminder to clinicians that a previously healthy person presenting with severe infection carries the potential risk of compromised immunity.

STRONGLY CONSIDER STRONGYLOIDES: EOS-PECIALLY IN PEOPLE FROM ENDEMIC AREAS

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LEARNING OBJECTIVE #1: Recognize a common presentation of strongyloidiasis.

LEARNING OBJECTIVE #2: Select an appropriate therapy for strongyloidiasis during pregnancy.

CASE: 34yoF with a childhood history of rheumatic heart disease is admitted for evaluation of onemonth of hemoptysis, exertional dyspnea, and fatigue during her second trimester of pregnancy.

She was up to date on routine prenatal care. Examination revealed a well-appearing woman with agravid uterus, bibasilar crackles, and no leg edema. Laboratory evaluation showed mild peripheral eosinophilia. A chest CTA showed no embolism and diffuse ground glass opacities, mediastinal lymphadenopathy, and bilateral pleural effusions. A trial of antibiotics did not improve her symptoms. A TTE demonstrated severe MS and moderate PH. Loop diuretics and beta-blockade were trialed, again without improvement in symptoms.

RHC demonstrated a PW of 33mmHg and a mean PA of 58mmHg. It was decided to perform a percutaneous balloon mitral valvuloplasty which proceeded without complication. Her symptoms did not completely improve.

On further interview, it was found that she emigrated from Ecuador at the age of ten. A Strongyloides serology was sent and resulted positive.

IMPACT/DISCUSSION: The cause of this patient's presentation was most likely strongyloidiasis, which can present with constitutional symptoms like fevers and chills and pulmonary symptoms like dyspnea and hemoptysis. However, commonly it presents asymptotically as incidental peripheral eosinophilia in a person from an endemic area. Asymptomatic immigrants from endemic countries are given ivermectin upon entry into the US, but this is a recent advent, and our patient was not preemptively treated. Asymptomatic disease is treated to avoid activation, especially in the immunosuppressed such as in pregnancy like in our patient. Symptomatic pregnant patients should be treated in the second or third trimester to avoid maternal and fetal complications such as disseminated disease. Albendazole is preferred over ivermectin during pregnancy, though it is still pregnancy category C due to limited data. Strongyloidiasis was a delayed diagnosis in our patient due to an anchor bias on the patient's history of rheumatic heart disease and MS. Her radiographic findings of bilateral pleural effusions were presumed cardiogenic rather than infectious in light of co-occurring mediastinal lymphadenopathy and ground glass opacities. No doubt her MS clouded the clinical picture, but the RHC shows a TPG of 25mmHg and thus an element of pre-capillary PH that could only be properly explained by strongyloidiasis and not by MS. Our patient should have been tested for strongyloidiasis much earlier in her hospital course, upon result of her peripheral eosinophilia and especially upon her imaging.

CONCLUSION: 1. Strongyloidiasis should be strongly suspected in someone from an endemic area with a peripheral eosinophilia.
2. Symptomatic strongyloidiasis in pregnancy should be treated in the second or third trimester with albendazole to avoid disease progression.

STRONGYLOIDES HYPERINFECTIO SYNDROME IN A METASTATIC BREAST CANCER PATIENT

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LEARNING OBJECTIVE #1: Recognize *Strongyloides stercoralis* as a potential diagnosis in immunocompromised patients with pulmonary and gastrointestinal manifestations

LEARNING OBJECTIVE #2: Evaluate for pulmonary Strongyloidiasis with direct examination of respiratory samples

CASE: A 45-year-old female with recently diagnosed breast cancer presents to the emergency department for persistent nausea, vomiting, and abdominal pain. A CT head obtained one month prior had demonstrated multiple intracranial lesions concerning for metastatic brain lesions and a subsequent biopsy diagnosed invasive ductal carcinoma. In the interval, she was started on dexamethasone and completed whole brain radiotherapy.

On presentation to the ED, the patient was afebrile, tachycardic to 107 bpm, tachypneic to 22 breaths/min, and normotensive with moderate epigastric tenderness on physical exam and a normal CBC and CMP on initial labs. CT abdomen/pelvis demonstrated diffuse colonic thickening, while CT thorax revealed diffuse ground glass opacities and right lower lobe peribronchovascular nodularity. Stool PCR was negative.

On hospital day 3, Ceftriaxone and Azithromycin were started after blood cultures grew gram negative rods that eventually speciated to *Klebsiella pneumoniae*. Gastroenterology proceeded with endoscopy and sigmoidoscopy, visualizing friable gastric mucosa and colitis, however no mucosal breaks or pseudomembranes were noted. The stomach, duodenal bulb, sigmoid colon, and rectum were biopsied.

On hospital day 5, the patient had escalating oxygen requirements with chest x-ray showing severe cardiac decompensation and worsening bilateral parenchymal and alveolar consolidations. She was intubated and a tracheal aspirate was examined under the microscope, revealing active *Strongyloides stercoralis* larvae. The gastrointestinal biopsy pathology, finalized shortly afterwards, similarly reported evidence of Strongyloidiasis in the stomach and duodenum. The patient was started on Ivermectin 200 mcg/kg daily for Strongyloides Hyperinfection Syndrome, extubated on hospital day 8, and later discharged with a four week course of Ivermectin.

IMPACT/DISCUSSION: *Strongyloides stercoralis* infections are often acquired when larvae in contaminated soil or feces contact and penetrate skin. The larvae travel through venous circulation to the lungs, where they are coughed up and ingested. Within the intestines, larvae mature into adult worms and produce eggs, perpetuating the infection. Patients with impaired cell-mediated immunity such as those on corticosteroids are at particular risk for hyperinfection, a syndrome of accelerated autoinfection leading to excessive parasite burden. These cases are more likely to develop severe clinical consequences such as shock and respiratory failure.

CONCLUSION: The diagnosis of Strongyloidiasis can be challenging and requires a high level of suspicion. In patients with pulmonary manifestations and especially those with high larvae burden, direct examination of a respiratory sample can lead to rapid confirmation of the diagnosis.

STRONTIUM: NOT ALL IT'S CRACKED UP TO BE

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LEARNING OBJECTIVE #1: Recognize strontium as a cause of a falsely elevated dual-energy X-ray absorptiometry (DXA) scan.

LEARNING OBJECTIVE #2: Describe the importance of a thorough medication and supplement review in patients with osteoporosis.

CASE: A 61-year-old woman initially presented to our clinic with a sternal fracture after being embraced too tightly by a friend. Her physical exam was notable for tenderness to palpation over the 4th intercostal space bilaterally. Sternal x-ray showed a non-displaced fracture along with diffuse demineralization of her sternum. Subsequent DXA scan showed osteoporosis of the lumbar spine (T-score -3.5) and osteopenia in the femoral neck (T-score -1.8) and total hip (T-score -1.7). Her workup for secondary causes of

osteoporosis was normal. The patient declined traditional medical therapies and instead elected to pursue treatments primarily with her integrative medicine doctor, in addition to calcium and vitamin D supplementation.

Three years later, she had a DXA for continued monitoring of her osteoporosis. Surprisingly, bone densitometry showed osteopenia of the lumbar spine (T-score -1.6), normal hip (T-score -0.4) and normal femoral neck (T-score -0.7). This demonstrated a remarkable increase of 20% in hip bone density and 31.7% in lumbar spine bone density in only three years. Review of her herbal supplements showed that, in addition to calcium and vitamin D, she had been taking Growth Factor S, which notably contains 680 mg of elemental strontium.

IMPACT/DISCUSSION: This case illustrates the artificial elevation in bone densitometry that may occur with supplementation of strontium. Because strontium attenuates X-rays more strongly than calcium, bone mineral density may be incorrectly reported. Although an actual improvement in bone density may exist, the strontium can cloud the picture, making it difficult to monitor true disease progression. Strontium may cause false elevations for up to 10 years despite discontinuation of the supplement. In addition, studies suggest that strontium mainly thickens the outer cortical bone, which reduces the tensile strength of the bones and may make them more prone to fracture. It is therefore critical to recognize the possibility of inaccurate DXA scans for years following initiation of strontium supplements. Physicians should be wary of large increases in bone density in short time intervals and be sure to ask patients about strontium supplementation.

CONCLUSION: Strontium ranelate is commonly sold as an over the counter supplement in the United States for bone health and has been approved in Europe to help treat osteoporosis. Strontium mineralizes into bone over time and becomes incorporated into the skeleton. It has a higher attenuation than calcium when measured using bone densitometry, which can overestimate true bone density. This can lead to a false elevation in dual-energy X-ray absorptiometry (DXA) scans, making disease monitoring for osteoporosis difficult and misleading.

STUCK IN THE MECKEL: AN UNCOMMON ETIOLOGY OF SMALL BOWEL HEMORRHAGE

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LEARNING OBJECTIVE #1: Recognize Meckel's Diverticulum as an uncommon etiology of gastrointestinal hemorrhage

LEARNING OBJECTIVE #2: Assess the role of a Meckel's scan in the evaluation of gastrointestinal bleeding

CASE: A 49-year-old male presented with 3-days of melena and tachycardia. He had similar symptoms two years prior; extensive work up did not identify a source of bleeding, and his symptoms resolved without intervention. On exam, the heart rate was 112bpm and blood pressure was 130/81. There was no abdominal tenderness and a rectal exam was heme positive. An initial hemoglobin was 13.5, which decreased to 9.7 over 48 hours. Small bowel enteroscopy was unrevealing. Capsule endoscopy and retrograde balloon enteroscopy revealed fresh blood in the mid-ileum and colon but a source was not identified. A CT angiogram did not identify a bleeding source. At this point a Meckel's scan was performed which demonstrated a focus of increased uptake in the right abdomen consistent with a Meckel's diverticulum. Diagnostic laparoscopy with small bowel resection was performed and pathology confirmed gastric heterotopia. The patient's hemoglobin stabilized and his recovery was uneventful.

IMPACT/DISCUSSION: Only 5% of gastrointestinal bleeding (GIB) occurs in the small intestine, representing a diagnostic difficulty for clinicians. Upper endoscopy is often able to diagnose the 80% of bleeding that occurs proximal to the ligament of Treitz while colonoscopy is useful for bleeding in the colon and terminal ileum. Capsule endoscopy, angiography, and computed tomography may assist with the diagnosis of small intestinal bleeding (SIB), but may miss the diagnosis. If SIB is identified but a source is unknown, Meckel's diverticulum should be considered in the differential. In these situations, a Meckel's scan may be helpful in making the diagnosis.

Meckel's Diverticulum (MD) is the most common congenital anomaly of GI tract, present in 2-4% of the population. It is caused by incomplete obliteration of the omphalo-mesenteric duct, resulting in a true diverticulum within the small bowel. MD are often lined by a combination of native ileal and heterotopic mucosa, most commonly ectopic gastric tissue. MD are largely asymptomatic in adults, but complications can occur. The most common complications are related to gastric acid secretion and include ulceration, bleeding, and obstruction. Intussusception and tumors have also been described. The incidence of symptoms is inversely related to age and males are three times more likely to develop complications.

A Meckel's scan utilizes Technetium-99m scintigraphy to identify ectopic gastric tissue. The test sensitivity is 85% and specificity is 95% but these may be lower in adults than children. The accuracy improves when a patient is anemic. Although uncommon in the general population, a MD should be on the differential for SIB and a Meckel's scan can assist with diagnosis.

CONCLUSION: Meckel's diverticulum should be considered in patients with small bowel GIB. A Meckel's scan can assist with diagnosis.

SUBACUTE ENDOCARDITIS FOLLOWING DENTAL WORK IN AN IMMUNOCOMPETENT PATIENT: FROM TOOTHACHE TO HEARTBREAK

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LEARNING OBJECTIVE #1: Recognize the clinical manifestations of subacute endocarditis.

LEARNING OBJECTIVE #2: Recognize mitral valve prolapse as a risk factor for endocarditis.

CASE: A 51-year-old perimenopausal female with known mitral valve prolapse (MVP) presented to care due to worsening fatigue in the setting of new-onset anemia. The patient had a failed root canal in July and a repeat procedure in September, receiving clindamycin prophylaxis both times. She reported myalgias, anorexia with 30-pound weight loss, fatigue, chills, drenching sweats, and lower extremity weakness. On admission she was afebrile, tachycardic to 118, normotensive, breathing well on room air. Physical exam was significant for a 3/6 holosystolic murmur greatest at the apex radiating to the axilla and diffuse, mild weakness. Labs revealed WBC 14.1k/uL and hemoglobin 8.4 g/dL, characterized as anemia of chronic disease; she was up-to-date with cancer screenings, and had a negative HIV titer and rheumatologic workup. TTE demonstrated a 1.5 cm x 1.5 cm vegetation on the mitral valve. Blood cultures grew *Haemophilus parainfluenzae*, fulfilling Duke's criteria for subacute infective endocarditis (IE); later imaging revealed acute asymptomatic occlusion of the right subclavian and axillary arteries. She was treated with ceftriaxone monotherapy and underwent mitral valve replacement.

IMPACT/DISCUSSION: IE is defined as acute or subacute based on the rate of progression and, at times, the underlying pathogen. Diagnosis of IE is often difficult given its varied presentations and nonspecific laboratory abnormalities. History of invasive procedures with the potential for bacteremia, such as dental procedures, and preexisting valvular pathology are important risk factors. Currently, the 2017 ACC/AHA guidelines do not recommend antibiotic prophylaxis for those with mitral valve prolapse. The primary indications for IE prophylaxis are a history of IE or prosthetic cardiac valves; this evidence is rated as Class IIA, LOE C-LD. These guidelines are largely based on the low prevalence of IE and estimates that antibiotic prophylaxis prevents less than 10% of cases. However, IE can have a one-year mortality of up to 25%, which should affect risk-benefit calculations. As well, a 2018 Journal of the American College of Cardiology case control study by Zegri-Reiriz et al showed that patients with MVP had rates of IE over three times higher than other high-risk groups (e.g., prosthetic valves). This suggests that mitral valve prolapse should be reclassified from a medium-risk to a high-risk condition. To make definitive recommendations, a randomized clinical trial—never before undertaken—would be necessary.

CONCLUSION: IE can have a wide presentation and can masquerade with features of rheumatologic or malignant processes. IE should always be

considered in patients with nonspecific complaints, especially after recent dental work or in the setting of valvular pathology. MVP should be considered an important risk factor for IE, especially when considering antibiotic prophylaxis.

TAMPONADE AFTER HOURS: THE IMPORTANCE OF POCUS TRAINING IN INTERNAL MEDICINE RESIDENCY

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LEARNING OBJECTIVE #1: Describe common presentations in general medicine that can be rapidly diagnosed with point of care ultrasonography.

LEARNING OBJECTIVE #2: Demonstrate the utility in formal point of care ultrasonography training to internal medicine resident physicians.

CASE: A 90-year-old male with a past medical history of hypertension, type II diabetes, prostate cancer, and recent urinary tract infection presented with chief concerns of confusion and weakness. The patient and his caregiver relayed a week-long history of disorientation, generalized weakness and cough. He denied fevers, chest pain, shortness of breath, or urinary symptoms. In the emergency department, he received antibiotics, small fluid boluses, and general medicine was called for admission for altered mental status presumed secondary to recent urinary tract infection.

Upon evaluation by the admitting overnight team, vital signs included T 36.6, HR 120-150bpm, BP 128/70, RR 18, SpO2 98% at rest and 85% upon repositioning in bed. His physical exam revealed an elderly male in no acute distress, JVP of 9cm, distant irregularly irregular heart sounds, clear lungs bilaterally, disorientation to time and short-term memory loss, with an otherwise normal neurologic exam.

His physical exam prompted concern for pericardial effusion and the admitting resident physicians performed bedside point-of-care ultrasonography demonstrating a large circumferential pericardial effusion. Pulsus paradoxus was present with an inspiratory decrease in systolic blood pressure from 128 to 110 mmHg. Cardiology was consulted, and formal echocardiography confirmed early tamponade physiology. The patient underwent pericardiocentesis with evacuation of 1500cc of straw colored fluid and improvement in hemodynamics.

IMPACT/DISCUSSION: Point-of-care ultrasonography (POCUS) is a diagnostic tool which initially gained popularity in expediting care in emergency room and critical care settings. Over the last decade, POCUS has become accessible to ward physicians including internal medicine residents. POCUS can be a valuable means to rapidly evaluate a wide range of common general medicine pathology including cardiac disease (tamponade, ventricular dysfunction), pulmonary disease (edema, pneumonia, pneumothorax), as well as guidance for bedside procedures. However, accuracy with POCUS is user dependent and training is required to gain competency. In this case, internal medicine resident physicians received formal POCUS training in their program which assisted in expedited management of early pericardial tamponade in an after-hours setting when formal echocardiography was not immediately available.

CONCLUSION: POCUS is one tool to assist in rapid evaluation of patients with a variety of general internal medicine pathology.

Integration of POCUS training into resident education can empower internal medicine resident physicians to competently utilize this tool in urgent and after hour situations.

TEETH, HEART, BRAIN: THE CONNECTION EXPLAINED

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LEARNING OBJECTIVE #1: Distinguish the signs and symptoms of headache that require imaging

LEARNING OBJECTIVE #2: Recognize patent foramen ovale plus poor dentition as risk factors for brain abscess formation

CASE: A 54-year-old man with HTN, migraines, and history of NSTEMI presented to clinic with 4 days of diffuse, throbbing atraumatic headache ranked 6/10 severity associated with malaise, cough, dizziness, and nausea. He denied neck pain, vision changes, or shortness of breath. He had no known sick contacts and tested negative for COVID-19. On exam, he was afebrile, normotensive, mildly tachycardic, and tachypneic. He appeared somnolent but was able to follow commands; he was not oriented to place. His gait was slow and unsteady; PERLL with photophobia. His scalp was tender in the occipital region with no nuchal tenderness or rigidity. With the exception of poor dentition, the rest of his physical exam was normal. Lab studies revealed a WBC of 11,000 cells/mm³, ESR of 24 mm/hr and CRP of 15.0 mg/L. All other labs were within normal limits. MRI of the brain demonstrated a 3.1 x 3.0 cm, rim-enhancing mass in the left frontoparietal lobe with significant edema and midline shift. Biopsy confirmed abscess formation; tissue culture revealed fusobacterium nucleatum and parvimonas micra. TEE found a small patent foramen ovale with right-to-left shunting. He was treated with abscess drainage and ceftriaxone/metronidazole with full resolution of his symptoms.

IMPACT/DISCUSSION: This case is an example of extreme pathology presenting without extreme symptomatology. Only 20% of intracranial abscesses present with a classic triad of headache, fever, and focal neurological deficit, as demonstrated by the lack of two cardinal symptoms in this patient and minimal abnormal lab results. In addition, this patient's immunocompetent status placed brain abscess further down the differential. However, with the subtle findings in history and exam, brain imaging was indicated.

Fusobacterium nucleatum and parvimonas micra are anaerobic bacteria associated with periodontal disease. Evidence of poor dentition in this patient, combined with a right-to-left-shunting PFO and no further source of infection, raises concern for paradoxical embolism reported rarely in the literature. This patient's silent PFO acting as a catalyst for disease serves as a reminder for broad differentials. On autopsy in the general population, roughly 25% of individuals are found to have an incidental PFO. While brain abscesses are rare, their potential for severe morbidity lends reason to be diligent in the evaluation of headache.

CONCLUSION: - Consider brain abscess on differential for severe headache among both immunocompromised and immunocompetent patients

- Remain diligent in assessment, diagnosis, and treatment of severe headache

TESTOSTERONE THERAPY IS NOT ALWAYS BENIGN: A RARE CASE OF INFERIOR MESENTERIC VEIN THROMBOSIS

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LEARNING OBJECTIVE #1: Recognize that IMVT is a potentially lethal complication that can progress to bowel ischemia. Early recognition of patients with IMVT is crucial in successful treatment with prompt anticoagulation.

LEARNING OBJECTIVE #2: Highlight the importance of reviewing a patient's medications and potential interaction with his or her known diagnoses.

CASE: A 72 year-old man with a history of polycythemia vera (PV) with a known negative Janus Kinase 2 mutation presented with acute left lower quadrant (LLQ) pain. The pain was sharp, constant, non-radiating, and rated 10/10 on a subjective scale. The pain was exacerbated by eating without any alleviating factors. His medical history is notable for hypertension, hyperlipidemia, benign prostate hyperplasia, type 2 diabetes mellitus, and nephrolithiasis. The patient endorsed only chills and nausea. He reported that two months ago he started testosterone therapy. On physical examination, the patient was febrile to 39.2 centigrade, his vital signs were within normal limits. His abdominal examination revealed intact bowel sounds, with a soft, non-distended abdomen with LLQ tenderness on palpation with no guarding, rebound, or costovertebral angle tenderness. Laboratory studies revealed a normal basic metabolic panel. Complete blood count was significant for an elevated white blood count to 13,000 per cubic mm, as well as elevated hematocrit 50.1% and hemoglobin 16.0 g/dL. CT scan of the abdomen and

pelvis revealed thrombosis of the inferior mesenteric vein with an approximately 1.7 cm linear thrombus extending into the contiguous splenic vein.

IMPACT/DISCUSSION: Our case is the first known of IMVT caused by testosterone-induced secondary polycythemia in the setting of polycythemia vera. It elucidates the importance of adding this diagnosis to the differential in patients presenting in the appropriate clinical context such as abdominal pain in patients with a prothrombotic state. In addition, the case highlights the importance of reviewing a patient's medications and potential interaction with his or her known diagnoses. The treatment for MVT usually involves the discontinuation of potential offending agents and prompt anticoagulation for 3–6 months. In our case, testosterone therapy was discontinued and heparin started promptly. Patient's symptoms resolved within the first 24 h after initiation of anticoagulation.

Apixaban was started before discharge for a total of 6 months. Repeat CT imaging revealed resolution of the thrombus.

CONCLUSION: This is the first case described in the literature of IMVT caused by secondary polycythemia from a testosterone implant in the setting of PV. This case highlights the importance of adding this diagnosis to the differential in patients presenting in the appropriate clinical context and the importance of reviewing a patient's medication, and potential interaction with his or her known diagnoses.

THE ART OF THE MEDICATION RECONCILIATION

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LEARNING OBJECTIVE #1: Recognize the importance of a medication reconciliation

LEARNING OBJECTIVE #2: Recognize that older individuals are at greater risk for adverse drug events

CASE: A 65-year-old male with a history of hypertension and previous cryptogenic strokes was admitted for hypotension and altered mental status. He had a prior history of two admissions for cryptogenic strokes of unclear etiology this past year. During these admissions, he presented with hypotension and altered mental status. Imaging during both admissions was notable for acute infarctions in the cerebral hemispheres bilaterally and remote infarctions in other areas of the brain including the pons. His blood pressure regimen was optimized prior to discharge. During this current admission to the General Medicine Service, the patient was found unresponsive and hypotensive at home. Given his past medical history, a stroke work up was performed. CT Head and MRI Brain were unremarkable for a new infarction. TSH, VDRL, B12, Folate, Chest X-Ray and Urinalysis were negative. A lumbar puncture revealed glucose 79, protein 45, WBC 1, and a negative gram stain. He was started empirically on meningeal coverage and fluid resuscitated.

Upon further questioning with family and patient, we reviewed a bag of medications and there were discrepancies from what was stated in the computer. In the bag, there were 3 bottles of carvedilol at 2 different doses, 1 bottle of isosorbide dinitrate and hydralazine combination, 4 bottles of hydrochlorothiazide at different doses, 1 bottle of amlodipine and 1 bottle of benazepril. The patient was taking all of these medications on a daily basis. Of note, the medication bottles were also from two different pharmacies. With all of the prior medication adjustments made during previous admissions, the etiology of his initial presenting symptoms was altered mental status and hypotension secondary to polypharmacy leading to an adverse drug event and frequent hospital admissions. His polypharmacy did put him at risk of a stroke secondary to hypotension as well as falls and confusion from low blood pressure. He was exposed to diagnostic testing that may not have been necessary.

IMPACT/DISCUSSION: The case demonstrates the many adverse drug events that can occur without proper education and medication reconciliation. A multidisciplinary approach should be taken by utilizing our pharmacists for help. When medications are discontinued in our Electronic Health Record, they may not be discontinued automatically at an outside pharmacy. It is best practice to call the pharmacy to verify the changes. In the future, this patient may benefit from a health health nurse visit.

CONCLUSION: Polypharmacy has become a major issue for many elderly patients. It is defined as the use of multiple medications by a patient. Polypharmacy is associated with increased risk for adverse drug events. This can lead to issues with medication adherence and understanding. Medication reconciliation is important to perform for every patient that is admitted into the hospital.

THE CONUNDRUM OF CROCODILE SKIN

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LEARNING OBJECTIVE #1: Recognize that pellagra can mimic psoriasis resulting in diagnostic delay

LEARNING OBJECTIVE #2: Assess for niacin deficiency in chronic alcoholic patients as it is an easily treatable condition which left untreated can contribute to significant comorbidities

CASE: A 45-year-old female with past medical history of alcoholic liver cirrhosis presented with a one-month history of diarrhea, worsening fatigue, leg swelling, decreased ability to ambulate, and diffusely pruritic rash. She was admitted one-month prior with similar symptoms, and punch biopsy at that time demonstrated psoriasiform hyperplasia. Skin examination showed a disfiguring diffuse hyperkeratotic rash with prominent, grayish-white desiccated scaling overlying a well demarcated erythematous base; this was confluent across all extremities as well as the trunk and mons pubis, estimated to cover at least 90% of her total body surface area. Various lesions displayed hyperpigmentation, thickness and peeling owing to denudation of the surface layers. Repeat punch biopsies demonstrated near confluent parakeratosis, hypogranulosis, intracorneal pustules and psoriasiform epidermal hyperplasia consistent with psoriasis. Immunofluorescence and fungal staining were both negative. She was immediately started on niacin 500 mg TID, a multivitamin, and vitamins B1, B6, B9 and B12. Serum niacin level showed both decreased nicotinic acid (<20 ng/mL) and nicotinamide (<21 ng/mL). She experienced dramatic improvement of her rash, achieving nearly complete resolution.

IMPACT/DISCUSSION: Pellagra is characterized by the classic presentation of diarrhea, photosensitive pigmented dermatitis located in sun-exposed areas, dementia, and eventual progression to death. In resource-rich countries, the common predisposing factors for pellagra are alcohol dependency, post bariatric surgery, anorexia nervosa, malabsorptive disease and certain drugs. Alcohol heightens the effects of nutritional deficiencies by impairing conversion of tryptophan to niacin, induction of zinc deficiency, and disturbances of glutamate and GABA neuronal activity. Routine inpatient treatment of patients with alcohol abuse relies heavily on the repletion of thiamine and folate, possibly overlooking other nutritional deficiencies. This was especially true of our patient where B12, folate and thiamine were all normal. Our case depicts the need to portray strong suspicion for prompt identification in chronic alcoholics especially if they have symptoms of confusion, rash and appear chronically malnourished.

CONCLUSION: Delay in diagnosis may occur due to the fact that the skin manifestations of pellagra mimic other dermatologic conditions, particularly psoriasis. The photosensitivity dermatitis presentation in pellagra appears clinically and histologically parallel to the dry, raised erythematous lesions covered with silvery scales observed in psoriasis. As such, pellagra is often challenging to diagnose, easy to treat and hence tremendously crucial to identify to prevent fatal sequelae.

THE DANGER OF ANCHORING - A STRANGE CASE OF A GUITARIST'S NUMBNESS

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LEARNING OBJECTIVE #1: Maintain a strong index of suspicion for stroke in young patients with numbness

LEARNING OBJECTIVE #2: Be vigilant of anchoring bias during diagnostic evaluation

CASE: A 33-year-old male professional guitarist with a history of T1DM and HTN was referred to PM&R clinic for EMG evaluation due to numbness concerning for peripheral neuropathy. Three months ago, he was hit by a moving golf cart that injured the left side of his body. Two weeks later, he developed numbness and pain of his left upper extremity and face. He presented to the ED, where the physical exam was notable for impaired left PIP and DIP extension, with intact finger flexion. Cranial nerve exam was normal. There was no pronator drift in bilateral upper extremities. CT head was negative for overt signs of a stroke or other acute abnormalities. MRI C-spine was also negative.

Given his recent injury, negative CT head, repetitive upper limb use as a professional guitarist, and young age, his symptoms were thought to be due to a peripheral neuropathy sustained as a result of his golf cart accident and long hours playing guitar. He was discharged to follow up with a neurologist, who later assessed him with having a peripheral neuropathy, although did admit that this does not explain his facial numbness. The patient was then referred to PM&R for an NCS/EMG study, which later showed findings consistent with mild peripheral polyneuropathy of ulnar and median nerves. However, as these findings do not explain the patient's facial numbness, an MRI brain was obtained to further assess for central pathology. MRI of the brain showed a right MCA infarct that correlated with his left-sided numbness and thus provided a unifying diagnosis. Occupational therapy was started, with symptoms improvement over months.

IMPACT/DISCUSSION: This case describes a young guitarist who presented with left-sided numbness and pain, which was initially attributed to solely peripheral neuropathy sustained from suspected guitar playing and a recent golf cart accident, who was later found to have concurrent polyneuropathy and right MCA infarct. Although the patient was referred to PM&R clinic for NCS/EMG evaluation, and the study did indeed reveal polyneuropathy, it did not explain the entirety of the patient's symptoms, which prompted MRI brain study that later discovered a right MCA stroke. This case highlights the importance of not anchoring to a diagnosis and constantly engage in the clinical reasoning until diagnostic studies, history, and physical exams make sense. It also reminds us to have a high index of suspicion for stroke as a cause for peripheral numbness regardless of the patient's age.

CONCLUSION: Stroke is an unusual diagnosis in young adults. This case describes a case of MCA stroke in a young patient who presented with symptoms that were initially attributed to an alternate seemingly convincing diagnosis. It serves to highlight the importance of not anchoring on a diagnosis and to actively engage in the clinical reasoning process throughout the entire patient care.

THE EROSIIVE STORY OF GROUP B STREPTOCOCCAL PNEUMONIA

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LEARNING OBJECTIVE #1: Recognize the potential for long-standing aspiration pneumonia to evolve into a transdiaphragmatic pulmonary abscess.

LEARNING OBJECTIVE #2: Understand the role of non-invasive percutaneous drainage to manage large suppurative abscesses.

CASE: A 36-year-old man presented to the ED with 2 weeks of lower extremity swelling and jaundice. On further questioning, he described frequent episodes of alcohol abuse to the point of unconsciousness and a chronic cough for approximately 2 years. On presentation, he was tachycardic to the 120s but had otherwise stable vitals. Physical exam revealed scleral icterus and sublingual jaundice, decreased breath sounds in the left lower lobe, hepatomegaly without ascites, and lower extremity edema. Initial labs were notable for a WBC of 15.2, sodium of 123, AST of 44, total bilirubin of 8, and INR of 2. CT chest/abdomen/pelvis showed no cirrhosis or ascites but revealed an incidental left lower lobe pulmonary abscess extending beyond the diaphragm and

involving the left psoas and kidney. The patient was started on IV antibiotics and underwent a CT-guided aspiration of the left sub-diaphragmatic fluid collection with placement of a retroperitoneal (RP) drain. Wound and urine cultures grew group B streptococcus (GBS), but blood cultures remained negative. The patient subsequently experienced improvement in his cough as well as resolution of his leukocytosis. On discharge, repeat CT imaging showed near resolution of the left psoas retroperitoneal abscess and decreased size of the intrapulmonary abscess. He was discharged on antibiotics and the RP drain was removed once output ceased.

IMPACT/DISCUSSION: Given the patient's history of alcohol abuse, he likely had recurrent aspiration pneumonia, leading to a pulmonary abscess with erosion into the RP space. The diaphragm is generally considered an effective barrier between the pleural and abdominal cavities, even in cases of suppuration.¹ However, GBS has been shown to have heterogenous and invasive tendencies—causing pulmonary abscesses, empyema necessitans, and perinephric abscesses—particularly in patients with cirrhosis and the elderly.² While this patient did not have cirrhosis on imaging, he had signs of severe liver disease. Notably, the abscess was drained sub-diaphragmatically to avoid entering the pleural space given the potential for creation of a bronchopleural fistula. With the sub-diaphragmatic approach and antibiotics, he demonstrated clinical and radiographic improvement.

CONCLUSION: This case highlights a complication of untreated aspiration pneumonia from invasive GBS infection and demonstrates the utility of percutaneous drainage for large transdiaphragmatic abscesses.

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THE GOLD STANDARD? VANISHING LATENT TUBERCULOSIS IN THE OFFICE

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LEARNING OBJECTIVE #1: Recognize the limitations of interferon-gamma release assays (IGRA) as diagnostic tests for Latent Tuberculosis Infection (LTBI)

LEARNING OBJECTIVE #2: Assess quantitative as well as qualitative results when interpreting IGRA tests to avoid exposing patients to unnecessary treatment for LTBI

CASE: A 43-year-old male firefighter with a history of OSA and GERD presented for a telemedicine visit after a positive QuantiFERON Gold Test (QGT) during routine occupational screening. He is tested annually and has always been negative. He denied cough, hemoptysis, dyspnea, fever, chills, night sweats, fatigue and weight loss. Exposures included a grandmother with tuberculosis (TB) in the 1940s and a co-worker, diagnosed with LTBI in the prior year, with whom he shares an office. In addition, the patient's work brings him into homes across the city. He was born in the US and is HIV negative. The initial QGT was interpreted as positive (TB1-Nil for tube 1 was 0.32 IU/mL and TB2-Nil for tube 2 was 0.49 IU/mL). Chest x-ray was normal. Because the patient was healthy with a low likelihood of TB infection, the QGT was repeated. TB1-Nil for tube 1 was 0.37 IU/mL and TB-Nil for tube 2 was 0.20 IU/mL, which was reported as negative.

IMPACT/DISCUSSION: LTBI is diagnosed when patients have evidence of TB infection without active disease. IGRAs can provide evidence of TB infection by measuring the amount of interferon-gamma release when blood is exposed to TB antigens in vitro. Patients with TB infection (active or latent) release interferon-gamma in response to TB antigen exposure, resulting in a positive test.

Although IGRAs are 95% specific for the diagnosis of TB infection, their reproducibility is a concern. Factors contributing to lack of reproducibility include tube agitation, specimen temperature during transport and delays in

incubation. This is important for patients at low risk of TB, as a single positive IGRA test may not reflect infection.

In addition, when undergoing annual testing with IGRAs, it is unclear how best to determine when a patient has converted from a negative test result to a positive one. Using the qualitative test result alone (negative/positive) results in falsely high conversion rates, suggesting that many of these patients have false positive test results. Therefore, repeat testing is recommended when the IGRA result is 0.35-1.0 IU/mL. To ensure diagnostic accuracy, some authors suggest repeating the IGRA test for all patients who convert from negative to positive.

CONCLUSION: For patients with a low pretest probability of TB infection, a single positive IGRA result is insufficient to diagnose TB infection.

Rather than relying on the qualitative result alone, clinicians must critically analyze the quantitative IGRA result. This approach identifies patients who may have false positive results so that they are not falsely diagnosed with TB infection and exposed to unnecessary treatment.

THE GREAT IMITATOR WEARS A MASK

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LEARNING OBJECTIVE #1: Build a differential for fever and a rash

LEARNING OBJECTIVE #2: Maintain a broad differential in COVID-19-focused clinics

CASE: A 27-year-old male COVID ICU nurse presents on an urgent care video visit in April, 2020 with 3 days of fever and myalgias.

Additional history: This patient is on PrEP; he is MSM. He reports no new partners in the past two months. He denies dysuria, sore throat, GI symptoms, shortness of breath, chest pain, and cough. Last STI screening was 5 months prior and was notable for negative HIV and RPR and positive rectal chlamydia which was treated at that time.

Physical exam: video visit shows a well-appearing man

Diagnostics: COVID-19 PCR was ordered and returned negative the next day. Two weeks later the patient sends a message in the electronic patient portal stating that although his fever and myalgias have resolved, he has developed a non-pruritic rash on his trunk, arms, and thighs (photos included in his message show an erythematous, macular rash). The following tests were ordered:

CMP – normal

CBC with differential – normal EBV IgM negative, IgG positive Hepatitis B antigen – negative

3-site chlamydia and gonorrhea testing (patient self-collected) – negative

RPR positive (previously negative) with titer 1:64

HIV – negative

Urinalysis – normal

The diagnosis of secondary syphilis was made based on systemic illness and newly positive RPR. The patient was counseled regarding the need to contact partners. A nursing visit at his primary care clinic was arranged for the next day to administer penicillin G benzathine IM, and he was advised regarding the possibility of a Jarisch-Herxheimer reaction. Follow-up RPR titer ordered by his primary care physician showed appropriate downtrending.

IMPACT/DISCUSSION: The COVID-19 pandemic has led to rapid changes in care delivery, including expansion of virtual care and separation of clinical environments that care for patients with possible COVID-19 infection. This case highlights an example of a non-COVID-19 diagnosis (secondary syphilis) diagnosed through a virtual COVID-19 evaluation clinic. Providers tasked with evaluating patients for COVID-19 need to maintain a broad differential. The differential diagnosis for fever and a rash in an adult is broad, and, as this case demonstrates, can be worked-up virtually. In this patient who was fully vaccinated and from California without recent travel, the possible diagnoses are more circumscribed. Infectious possibilities for a diffuse macular rash associated with febrile illness in a well-appearing patient include measles, primary HIV, infectious mononucleosis, secondary syphilis, and Lyme disease. Non-infectious causes include drug rash, systemic lupus erythematosus, and adult Still's disease.

CONCLUSION: Because of its many possible manifestations, syphilis has been called “The Great Imitator.” Now in the era of COVID-19, syphilis has yet another disease to imitate.

THE HIDDEN VARIABLE: A CASE OF RECURRENT COPD EXACERBATIONS DUE TO COMMON VARIABLE IMMUNODEFICIENCY

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LEARNING OBJECTIVE #1: Recognize the association between recurrent Acute Exacerbations of Chronic Obstructive Pulmonary Disease (AECOPD) and primary immunodeficiency disorders in adults.

LEARNING OBJECTIVE #2: Diagnose and treat immunodeficiency disorders with prophylactic antibiotics and immunoglobulin (Ig) replacement therapy to prevent AECOPD.

CASE: A 63-year-old male who is a chronic smoker with a past medical history of asthma, chronic obstructive pulmonary disease (COPD) on 2L oxygen, ischemic cardiomyopathy and congestive heart failure presented with worsening shortness of breath, wheezing and productive cough. He was afebrile, hemodynamically stable at presentation and saturating at 92% on 6L of oxygen. Physical examination was notable for mild expiratory wheezing and occasional rhonchi. Initial blood work was negative for leukocytosis and chest x-ray did not demonstrate any new infiltrate suggestive of pneumonia. The patient was treated with intravenous steroids and nebulization for acute hypoxic respiratory failure (AHRF) secondary to AECOPD. However, due to lack of symptomatic response, antibiotic therapy was initiated. Of note, the patient had five admissions in the past year which were attributed to AECOPD, treated with steroid taper and antibiotics. Frequent exacerbations despite appropriate therapy led to a suspicion of immunodeficiency. Further workup revealed low immunoglobulin G (IgG) level at 358 mg/dL, low IgM level at 39 mg/dL, and normal IgA and IgE levels, thus a diagnosis of Common Variable Immunodeficiency (CVID) syndrome was established. Subsequently, after resolution of symptoms the patient was discharged on prophylactic antibiotic therapy with doxycycline until further consideration for immunoglobulin replacement therapy.

IMPACT/DISCUSSION: AECOPD is one of the most commonly encountered diagnoses in the hospitals which contributes significantly to the quality of life, mortality and morbidity of patients with COPD. In addition to active smoking, respiratory infections are a known culprit of recurrent AECOPD. Intact humoral immunity against encapsulated bacteria like streptococcus pneumoniae, which is a common offender, is pivotal in these patients. In addition to smoking cessation and avoidance of known triggering factors, adult primary immunodeficiency disorders including CVID should be taken into consideration in the workup of recurrent AECOPD.

CONCLUSION: Our case emphasizes the importance of maintaining a broad differential diagnosis even when dealing with common clinical presentations especially in the setting of recurrent admissions.

THE KETAMINE CONUNDRUM: ANESTHETIC OR CARDIAC ADVERSARY?

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LEARNING OBJECTIVE #1: Assess relationship between ketamine use and heart failure

LEARNING OBJECTIVE #2: Prioritize detailed substance use history in young adults with heart failure

CASE: A 35-year-old male with a history of hypertension and chronic alcohol use disorder presented to the ED after two weeks of worsening lower extremity and scrotal edema, abdominal distension, 25lb weight gain, and dyspnea on exertion. Review of systems was negative for chest pain, palpitations, syncope, viral illness, recent travel or immobility, and prior swelling. No family history of sudden cardiac death. The patient endorsed drinking about 5 drinks a day, five days a week for over 10 years without any withdrawal symptoms and a 15-pack year smoking history. His medications were losartan-HCTZ 100-25mg daily.

Physical exam was significant for sinus tachycardia to 110s, BP of 144/97, 98% SaO₂ on room air, JVD of 12cm, no crackles, moderate scrotal swelling, and 3+ pitting edema of bilateral lower extremities up to the thighs. Initial workup showed elevated Pro-BNP of 4136, troponin of 0.24, and creatinine of 1.4. Urine drug screen was negative. CTA chest ruled out pulmonary embolism. Initial ECHO found a 1.8cm apical LV thrombus, small pericardial effusion, and EF of 25-30%. The patient was started on a heparin drip with plans for bridge to coumadin, furosemide 40mg IV BID, and carvedilol 6.25mg BID. SPEP, TSH, and iron studies were normal with cardiac MRI confirming no infiltrative pathology but significant for four-chamber cardiomegaly and LVEF of 8%.

Hospital course was complicated by two cerebral vascular accidents with minimal hemorrhage with residual left facial droop and nystagmus. No cessation of heparin required. Further questioning revealed chronic ketamine use of 4-5 times per week. Subsequent ECHO showed no evidence of previously detected thrombi and troponin downtrended to <0.01. The patient completed treatment for acute systolic CHF exacerbation and discharged home with physical therapy on carvedilol, lisinopril, and furosemide. Outpatient follow-up with cardiology and primary care was arranged.

IMPACT/DISCUSSION: Ketamine is an effective anesthetic agent for those with reduced cardiac function, but its sympathomimetic increase in afterload is thought to lead to systolic heart failure (Mazzeffi et al. 2015). It also exerts a dose-dependent negative inotropic effect that reduces myocardial contractility (Suleiman et al. 2012). These effects compounded with heavy alcohol use may have caused the patient's acute systolic CHF. Moreover, obtaining the ketamine history late in the hospital course may have delayed helpful prevention counseling. Thus, as ketamine gains popularity as a recreational drug (Dillon et al. 2003), substance use history must be thoroughly investigated to recognize, prevent, and appropriately treat ketamine-induced heart failure in young adults.

CONCLUSION: Ketamine is a negative inotrope leading to systolic dysfunction.

Broaden substance use questioning to include ketamine use in young adults with acute heart failure.

THE "EYE"-CATCHING DIAGNOSIS YOU MIGHT JUST MISS

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LEARNING OBJECTIVE #1: Recognize the need for high clinical suspicion of Wernicke

Encephalopathy when evaluating a patient with active or recently treated malignancy.

LEARNING OBJECTIVE #2: Lower the threshold to work up and treat thiamine deficiency when a cancer patient presents with any symptom that deviates from their mental or physical baseline.

CASE: 57-year-old female with a history of oral squamous cell carcinoma status post cetuximab and radiation (completed 6/2020) presented to the Emergency Department with 2 months of failure to thrive. Symptoms included anorexia with >50 lb weight loss since beginning cancer treatment, nausea and vomiting, confusion, double vision, and unsteady gait with multiple falls.

Physical exam was notable for a cachectic woman with temporal wasting. Head and neck exam was negative for gross oropharyngeal lesions. No significant lymphadenopathy was appreciated. Cranial nerve function was grossly intact aside from bilateral resting and end gaze nystagmus on horizontal and vertical gaze. Further workup included MRI brain showing multiple hyperintensities suggesting Wernicke Encephalopathy. EGD was notable for candida esophagitis.

Patient was started on high dose IV thiamine repletion. Over the course of her hospital stay while receiving IV thiamine, patient endorsed significant improvement in mentation, vision, and balance. She was started on fluconazole for esophagitis and had significant improvement in oral intake. She was discharged with PO thiamine supplementation.

IMPACT/DISCUSSION: While most often associated with chronic alcohol use, Wernicke Encephalopathy should be considered in any patient population with severe malnutrition, including patients with active or recently treated malignancy. The diagnosis is often missed in the non-alcoholic population because of low clinical suspicion. Additionally, unlike this patient who

presented with the classical triad of encephalopathy, oculomotor dysfunction, and ataxia, most patients present with less specific symptoms. The difficulty of diagnosis in cancer patients is compounded by the fact that symptoms from their underlying malignancy and corresponding treatment may yield a similar or overlapping clinical picture with nutritional deficiencies.

As treatment with IV thiamine is relatively benign, laboratory thiamine levels often take days to return, and treatment can lead to a rapid resolution of symptoms, there should be a lower threshold for empiric treatment in patients with risk factors for nutritional deficiencies.

CONCLUSION: Wernicke Encephalopathy is a commonly overlooked diagnosis in patients presenting with failure to thrive and risk factors for nutritional deficiency.

As it often presents with non-specific symptoms that may overlap with other clinical manifestations, particularly in malignancy, practitioners must have a high suspicion for disease in this population.

Treatment is inexpensive and can lead to rapid resolution of symptoms, thus WE should be a “must- not-miss” diagnosis with low threshold for workup or empiric treatment.

THROMBECTOMY AND ANTICOAGULATION IN TREATMENT OF LEMIERRE SYNDROME

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LEARNING OBJECTIVE #1: Consider anticoagulation and/or endovascular intervention in the treatment of Lemierre syndrome refractory to empiric antibiotics.

LEARNING OBJECTIVE #2: Recognize the potential for the COVID-19 pandemic to exacerbate the recently rising incidence of Lemierre Syndrome.

CASE: A 55 year old woman with no PMHx presented after two weeks of sore throat, fever, fatigue, and night sweats. Notably, she had delayed seeking care due to fear of contracting COVID-19. Physical exam showed a dehydrated woman with throat pain and submandibular lymphadenopathy in no acute distress. Lab work was notable for leukocytosis to 33.1, electrolyte disturbances, acute kidney injury, and markedly abnormal liver function tests. A CT of the soft tissues of the neck revealed a C1-C2 prevertebral abscess measuring 3 x 1.5 cm, enlargement of the right tonsil, and thrombosis of bilateral internal jugular (IJ) veins. Blood cultures grew pan-sensitive *Streptococcus intermedius*. She was started on IV ampicillin/sulbactam and a heparin drip. However, she subsequently clinically deteriorated requiring intubation. A repeat CT showed the abscess had grown to 5.1 cm, concern for cervical spine osteomyelitis, and noted an occlusive thrombus of the right IJ as well as pulmonary septic emboli. Interventional radiology performed a right IJ thrombectomy after which the patient was extubated without complications. She was continued on IV ampicillin/sulbactam and metronidazole for a total of six weeks out of concern for osteomyelitis. She was transitioned from heparin to therapeutic enoxaparin and ultimately to apixaban to complete three months of anticoagulation.

IMPACT/DISCUSSION: Cases of Lemierre Syndrome (LS), a septicemia secondary to thrombophlebitis of the tonsillar and peritonsillar veins related to tonsillar/peritonsillar abscess, have been rising in recent decades. *Fusobacterium necrophorum* is the most commonly identified bacterial pathogen in the syndrome. Antibiotic therapy is the mainstay of treatment, focused on anaerobic coverage. Although LS is frequently characterized by thrombophlebitis and septic emboli, the role of anticoagulation remains controversial. Likewise, surgical or endovascular intervention is rare and limited to cases refractory to antibiotic therapy. There are currently no randomized controlled trials or adequately powered studies on the role of long-term anticoagulation in treatment. This case presents an instance of LS initially refractory to empiric antibiotics despite appropriate coverage in which the patient improved after thrombectomy and was continued on long-term anticoagulation.

CONCLUSION: Thrombectomy and anticoagulation should be considered in cases of Lemierre Syndrome refractory to antibiotics. Further research is needed to define the role of these therapies in treatment of LS. The recent rise in cases may be due to increasing antibiotic stewardship and exacerbated by the COVID pandemic as patients delay seeking care.

THROMBOCYTOPENIA AND HEMOLYTIC ANEMIA:

WHAT NEXT?

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LEARNING OBJECTIVE #1: Diagnose Thrombotic Microangiopathy (TMA)

LEARNING OBJECTIVE #2: Distinguish etiologies of TMA and treat appropriately based on etiology

CASE: A 44-year-old woman with Ulcerative Colitis presented with several weeks of fatigue and three days of abdominal pain and hematuria. She was treated with Fosfomycin for presumed UTI without improvement. She had no diarrhea and was not pregnant. Initial labs showed normocytic anemia (Hgb 5.9g/dL, MCV 85) and thrombocytopenia (29,000). D-Dimer and LDH were elevated, haptoglobin was undetectable. Antinuclear antibodies (ANA) was negative, C3 was low (59mg/dL), C4 normal (39mg/dL). She had proteinuria, microscopic hematuria, and acute kidney injury (AKI) (creatinine 4.4mg/dL (peaking at 10.8mg/dL)). Physical exam showed pallor, but no hepatosplenomegaly, purpura, abdominal tenderness, or neurologic deficits. Blood smear with trace schistocytes. Given her lack of diarrhea, fever, or neurologic symptoms, Shiga toxin hemolytic uremic syndrome (ST-HUS) and thrombotic thrombocytopenic purpura (TTP) were ruled out. She was started on methylprednisolone and eculizumab for complement-mediated TMA (C-TMA). ADAMSTS13 was normal (97%). She initially required dialysis, but 10 days after starting eculizumab, her hemolysis labs improved, anemia stabilized, and dialysis was stopped. Genetic analysis revealed homozygous deletions of CFHR1 and CFHR3 genes.

IMPACT/DISCUSSION: Presentation with hemolytic anemia and thrombocytopenia suggests a TMA. Discerning etiology is critical to treatment. We considered: TTP, ST-HUS, drug-induced TMA (DITMA), and C-TMA. TTP is a potentially lethal hematologic emergency, defined by a clinical pentad with neurologic sequelae, purpura, AKI, thrombocytopenia, and hemolytic anemia. Management involves plasmapheresis, steroids, and often rituximab. PLASMIC score can help risk stratify patients on first presentation, hers was intermediate. ADAMSTS13 levels can essentially function as a diagnostic test; her normal result made TTP unlikely. ST-HUS is similar to TTP but with more prominent AKI and normal ADAMSTS13 levels. Bloody diarrhea from Shiga toxin producing *E coli* is often present. Other infections, such as pneumococcus, also cause HUS. For infection-associated HUS, treatment is supportive. DITMA is associated with certain drugs (e.g. calcineurin inhibitors, cytotoxic chemotherapy agents, VEG-F inhibitors, and quinine). C-TMA is a diagnosis of exclusion, confirmed by genetic analysis of alternative complement pathway regulatory genes. The mainstay of treatment is eculizumab, a C5 inhibitor. Rapid identification of C-TMA and eculizumab dosed within 48 hours facilitated our patient's excellent clinical outcome.

CONCLUSION: • To accurately diagnose TMAs, thorough history, physical exam, medication review, and laboratory workup are necessary

• PLASMIC score and ADAMSTS13 level are helpful to diagnose or rule out TTP

• Complement mediated TMAs can be treated with terminal complement blockade using eculizumab to prevent renal failure and improve thrombotic outcomes

TICKING OFF THE BOXES: BABESIOSIS AS A CAUSE OF ATRAUMATIC SPLENIC INJURY

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LEARNING OBJECTIVE #1: Recognize the rising incidence of babesiosis.

LEARNING OBJECTIVE #2: Recognize a rare complication of babesiosis.

CASE: In August 2020, two patients presented to our ED within one week with left sided abdominal pain radiating to the shoulder. Both were middle aged men without significant comorbidities or recent trauma. They were found to have LUQ abdominal tenderness on exam and labs were notable for mild/moderate anemia and thrombocytopenia. CT abd/pelvis of both patients demonstrated acute splenic infarct with associated hemoperitoneum in the first patient. Both patients were admitted for close monitoring and further work-up. Workup for endocarditis and viral infections including HIV, EBV, and CMV was negative. Blood smears from both patients showed intracellular ring forms consistent with *Babesia* spp and a low parasitemia of <1%. The diagnoses were confirmed with a positive PCR for *Babesia microti*. They were both treated with 10 days of azithromycin and atovaquone. Testing for other tickborne diseases was negative in the first patient. The second patient was diagnosed with an acute co-infection with *Borrelia burgdorferi* and treated with 10 days of doxycycline. Their symptoms improved and several weeks after treatment, repeat blood smears in both patients did not reveal any parasitemia. Additionally, their anemia and thrombocytopenia had improved without requiring transfusion of blood products.

IMPACT/DISCUSSION: *Babesia microti* cases in the U.S. are steadily rising. The growing incidence may be due to increased testing/reporting, deer/tick populations, and human/tick interactions. Eighty percent of adult patients are asymptomatic; however, symptomatic patients normally present with flu-like symptoms. While the disease fatality rate is only 0.46%, hospitalization rate is nearly 50%. Immunocompromised, asplenic, and elderly individuals are at risk for severe disease, resulting in severe hemolytic anemia and multi-organ failure.

Splenic infarct and hemorrhage have been reported as rare complications of babesiosis but may become more frequent with rising cases of babesiosis. To date, there are 35 reported cases of *Babesia*-induced splenic complications. Interestingly, these patients, like ours, tended to be younger, healthier, and have lower levels of parasitemia compared to other patients with symptomatic babesiosis. Three proposed mechanisms of *Babesia*-induced splenic injury include 1) increased adhesion of infected RBCs to capillary walls causing mechanical obstruction, 2) RBC lysis causing tissue necrosis and endothelial damage, and 3) rapid splenic enlargement due to sequestration of *Babesia*-infected RBCs/platelets.

CONCLUSION: We presented two cases of *Babesia*-induced splenic injury within one week at a single institution. With rates of tick-borne illnesses rising, such rare complications will be more prevalent. Thus, clinicians should consider *Babesia* as a cause of atraumatic splenic injury.

TIMELY PHOTOGRAPHS UNVEIL VARICELLA ZOSTER BEHIND THE MASK OF TEMPORAL ARTERITIS

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LEARNING OBJECTIVE #1: • Recognize that Varicella Zoster can mimic other acutely painful conditions

LEARNING OBJECTIVE #2: • Employ telemedicine and secure patient message systems to follow serial changes in patient status

CASE: A 76-year-old woman presents to Geriatrics clinic with 3 days of new, left-sided temporal headache that is worse when her head lies on the affected side. She endorses left-sided jaw pain when eating. She denies fevers, sick contacts, similar prior episodes, vision changes, hearing changes, or upper respiratory symptoms. Ibuprofen and intranasal glucocorticoids have not provided relief. Left temporal and pre-auricular tenderness is present; beyond this, pertinent normal exam findings include lymphatic, eye, skin, ear, and oropharyngeal exams. Her team checks erythrocyte sedimentation rate (ESR), basic labs, and temporal artery biopsy for Giant Cell Arteritis (GCA). ESR is normal, and temporal artery biopsy is negative.

Her geriatrician closely follows her clinical course using telemedicine in the form of secure patient-provider messages including serial photographs. Following biopsy, the patient develops painful, pruritic papules and vesicles over the left temple, consistent with Varicella Zoster (shingles). She improves with valacyclovir and analgesics.

IMPACT/DISCUSSION: Subclinical Varicella Zoster infection is associated with and may precede Giant Cell Arteritis (GCA). Infection leads to an inflammatory cascade that causes stereotypic clinical features of GCA according to a review by Gilden et al. Our patient did not have GCA but had shingles. The pain of shingles typically precedes the rash; depending on the dermatome affected, shingles may mimic other acutely painful conditions like cholecystitis, angina, renal colic, or GCA.

Telemedicine via secure patient-provider message systems facilitated rapid diagnosis and treatment of what was ultimately shingles. The patient and family documented the patient's clinical course (with photographs) in brief, secure, serial messages to the geriatrician. Given the persistent importance of social distancing in the era of the COVID-19 pandemic, novel ways of using telemedicine and secure patient message systems are of great value. Outpatient clinicians should welcome and encourage patients and caregivers to direct clinical concerns, serial changes, and photographs of their illnesses to providers via secure technologies.

CONCLUSION: • Shingles may masquerade as another acutely painful condition until the rash appears

• Encourage patients and caregivers to document illnesses, serial changes, and photographs in secure patient message systems to facilitate both social distancing and enhanced care delivery

TIME MEANS KIDNEY: THE CLINICAL PRESENTATION OF GRANULOMATOUS INTERSTITIAL NEPHRITIS IN CROHN'S DISEASE

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LEARNING OBJECTIVE #1: Recognize granulomatous interstitial nephritis (GIN) as a rare but serious extraintestinal manifestation of Crohn's disease.

LEARNING OBJECTIVE #2: Recognize the importance of rapid diagnosis and treatment of Crohn's associated GIN.

CASE: A 25 year-old man with no significant past medical history presented to clinic with abdominal discomfort and chronic diarrhea for 1 year. He endorsed a 10lb weight loss, steatorrhea, fatigue, and bloating. Labs showed elevated creatinine to 2.87, pyuria, microcytic anemia, and a high CRP. The patient was directly admitted for work up of acute renal dysfunction.

On admission, the patient was tachycardic but otherwise well-appearing. He had mild periumbilical tenderness. Workup for ANA/Anti-Ds DNA, Hep B/C, HIV, Sjogren's, sarcoidosis, SPEP/UPEP, complement, TB/fungal, and other infectious etiologies were all negative. Renal biopsy revealed granulomatous interstitial nephritis (GIN) with severe interstitial fibrosis and tubular atrophy involving 75% of the cortex. The patient underwent EGD/colonoscopy revealing friable mucosa in the stomach and ileocecal valve, patchy areas of erythema pan-colon, and possible anal fistula suggestive of Crohn's disease. GIN as a rare extraintestinal manifestation of Crohn's disease was diagnosed. Patient was started on daily oral prednisone (60 mg/day) tapered over a 3-month period and transitioned to infliximab.

IMPACT/DISCUSSION: GIN is an uncommon pathological finding observed in <1% of native renal biopsies, of which drug hypersensitivities and sarcoidosis encompass the majority of cases. GIN is a rare extra-intestinal manifestation of IBD that appears to be more common in Crohn's disease than Ulcerative colitis. To the best of our knowledge, less than 20 cases of GIN in patients with Crohn's have been reported. In order to make the diagnosis of Crohn's related GIN, other common causes of GIN (e.g., hypersensitivities, sarcoidosis, TB/fungal infection) must first be excluded.

Reported cases of IBD associated GIN have shown an improvement in renal function with corticosteroid and immunosuppressant treatment. Delay in diagnosis or treatment may lead to increased renal impairment or treatment failure. Increased levels of initial kidney dysfunction correspond to worse outcomes. In patients with possible Crohn's disease and elevated creatinine, inpatient admission is indicated for prompt evaluation including renal biopsy, EGD, and

colonoscopy. All patients with Crohn's disease should have initial renal function evaluation and routine monitoring.

CONCLUSION: GIN is a rare but serious extraintestinal manifestation of Crohn's disease. In patients with suspected Crohn's disease and elevated creatinine, rapid workup and renal biopsy is necessary. Thus, all patients with IBD should have an initial renal function evaluation and routine monitoring.

TITLE: ATORVASTATIN INDUCED POLYMYOSITIS

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LEARNING OBJECTIVE #1: Recognize the clinical features of statin-induced polymyositis.

LEARNING OBJECTIVE #2: Treatment of statin-induced polymyositis.

CASE: A 61 year old male with a history of degenerative disc disease presented to the clinic with left arm weakness, decreased grip strength, and difficulty lifting his arm above his shoulder. He had previously been seen suffering from low back pain and weakness in both legs. Over three months, his lower extremities weakness progressed and now involved the upper extremities. He fell a few times and needed to use the hand rail to climb up stairs. He denied myalgia or arthralgia. He was on Atorvastatin 40mg for the past four years and tolerated it well. On exam, both proximal and distal muscles were affected, with more weakness in right arm and left leg. There were no sensory loss. There were no rash. Inflammatory labs showed elevated Aldolase (139.5 IU/L), elevated CK (15598 IU/L), elevated myoglobin (2646ng/mL), and elevated liver enzymes (AST 426 IU/L, ALT 519 IU/L). ANA, CRP, ESR, lactic acid, rheumatoid factors, hepatitis panel, and immunoglobulins were normal. EMG showed moderate active denervation, mild fasciculations, and membrane instability. Muscle biopsy of the right thigh showed fiber necrosis and inflammatory infiltration. Atorvastatin was discontinued without significant improvement after four weeks. He was then started on 60mg prednisone daily and 10mg methotrexate weekly. After two months, he was able to climb stairs without holding onto the rails, lift light weights, and carry light objects up the stairs.

IMPACT/DISCUSSION: His lower extremity weakness was initially presumed to be secondary to the progression of his degenerative disc disease. We did not initially consider statin-induced myopathy as he presented with lower extremity weakness prior and previously tolerated statin well.

Inflammatory myopathy was not considered until he presented with upper extremity involvement. He meets the criteria for Antibody-negative Immune-Mediated Necrotizing Myopathy as no myositis-specific antibody were identified. The diffuse membrane instability on EMG and inflammatory infiltration and necrosis on muscle biopsy suggested inflammatory polymyositis, with lack of a rash to suspect dermatomyositis. There were no other provoking factor besides from his Atorvastatin. Typically, statin induced polymyositis resolve spontaneously with statin discontinuation. However, the progression of the myopathy despite the drug cessation and requirement for immunosuppressive therapy suggested an immune-mediated mechanism.

CONCLUSION: Key Points

1. Statin induced polymyositis is rare and it is essential to exclude more common conditions.
2. It is more common for statin induced myopathy to occur within the first few month of onset. However, patient can still develop the myopathy after being on the medication for years.
3. It typically resolves spontaneously with discontinuation of statin but may need a course of immunosuppression to reach remission.

TO LP OR NOT TO LP? HEADACHE AND DELIRIUM IN THE ELDERLY

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LEARNING OBJECTIVE #1: Recognize how the clinical presentation of chronic meningitis differs from acute meningitis

LEARNING OBJECTIVE #2: Appreciate the regional variation in lumbar punctures in the United States

CASE: JK is an 87-year-old gentleman from the Northeast with heart failure, atrial fibrillation, and prior episode of temporal arteritis (at age 72) who presented with a one-day history of somnolence and confusion. Two weeks prior, JK awoke with sudden diplopia in the setting of one month of right parietal headache. At an outside hospital, his exam was notable for right eye esodeviation and right cranial nerve VI palsy. Labs were notable for WBC 6.2 k/uL, ESR 75 mm/hr, and CRP 4.1 mg/dL. Imaging was notable for a negative MRI/MRA head and orbits. Rheumatology diagnosed temporal arteritis with results of biopsy pending, and discharged JK on 60 mg of daily prednisone. Biopsy returned unremarkable.

On admission, his exam was notable for confusion and somnolence only (he complained of diplopia, but no eye abnormalities were noted on exam). Labs were notable for WBC 12.7 k/uL, Na 128 mEq/L, urine Na <20 mEq/L, and creatinine 1.5 mg/dL. Overnight, he had a fever of 100.6F for which work-up included a negative CXR, blood cultures, and UA. On day three, MRI brain showed "restricted diffusion in the occipital horns of the lateral ventricles" concerning for meningitis. Empiric antibiotics were started, but LP was delayed two days due to apixaban use. CSF studies revealed protein 194 mg/dL, glucose 37 mg/mL, and 957 total nucleated cells/uL (880 neutrophils), and he was diagnosed with meningitis. CSF cultures remained negative. JK's mental status never significantly improved, and he was discharged with potential need for hospice.

IMPACT/DISCUSSION: Acute meningitis (AM) presents overwhelmingly with a classic triad of fever, headache, and neck stiffness, often with inflammatory labs. By contrast, only 10% of patients with chronic meningitis (CM) present this way, and most have normal or mildly elevated inflammatory markers. Interestingly, 90% of CM patients have hyponatremia, and 24% have CN palsies. CSF studies typically show a 90%/10% neutrophil/lymphocyte split in AM, and the opposite in CM. Due to its atypical presentation and lack of the classic triad, CM remains a diagnostic challenge. Crucially, initial neuroimaging in this case was too early to detect meningitis changes. Hyponatremia and CN palsies can be important clues, and early LP may establish the diagnosis. An analysis of 2010 billing data by Vickers et al in PLoS One (2018) showed that—although over a quarter-million LPs were performed—patients in the Northeast were less than half or a third as likely to get an LP as patients in the West and South, respectively.

CONCLUSION: Unexplained sudden neurologic deficits in older adults without meningismus may still herald an infectious etiology. LP can establish the diagnosis of CM, but is underperformed in the Northeast. Greater clinical suspicion and use of LPs is crucial to preventing morbidity associated with CM.

TONGUE ULCER: AN ATYPICAL AND RARE MANIFESTATION AS THE FIRST SIGN OF GIANT-CELL ARTERITIS

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LEARNING OBJECTIVE #1: Recognize that giant-cell arteritis is one of the important differential diagnoses of etiology of tongue necrosis

LEARNING OBJECTIVE #2: Recognize that complication of tongue necrosis is a predictor of poor prognosis of giant-cell arteritis

CASE: A 78-year-old woman visited our hospital with fatigue, and pain and swelling of her tongue lasting 3 weeks, which had prevented her from eating anything. Physical examination revealed a deep ulceration with a whitish-yellow coating on the right side of the tongue and several shallow erosions

in the center. She had no other remarkable findings except bilateral palpable temporal arteries with mild tenderness. Ophthalmologic examinations were normal. Laboratory examination revealed a white blood cell count of 18,200/ μ L, hemoglobin: 13.4 g/dL, platelet count: $384 \times 10^3/\mu$ L, C-reactive protein: 27.87 mg/dL, erythrocyte sedimentation rate: 99 mm/hour, ferritin: 539 ng/mL, soluble interleukin-2 receptor: 1,553 IU/mL, and negative proteinase 3- and myeloperoxidase-antineutrophil cytoplasmic antibodies. Contrast-enhanced computed tomography showed wall thickening of the thoracoabdominal aorta and the proximal brachiocephalic, left common carotid, and left subclavian arteries. Biopsy of the temporal artery with histopathological examination confirmed the diagnosis of giant-cell arteritis. She was treated with glucocorticoids, which were markedly effective, healing the tongue lesions within 4 weeks.

IMPACT/DISCUSSION: Giant-cell arteritis typically presents with headache, scalp tenderness, jaw claudication, enlargement of the temporal artery, ocular symptoms, painful dysphagia, respiratory symptoms, limb claudication, or polymyalgia. Giant-cell arteritis causes chronic necrotizing vasculitis of large and medium-sized vessels. Although its onset is usually gradual, it could be sudden.

Tongue necrosis is rare and atypical initial manifestation of giant-cell arteritis, which could make diagnosis challenging especially without any other common ones. The presence of tongue necrosis means the severe and extensive involvement of large vessels by giant-cell arteritis, considering abundant vascular supply to the area, which could be a poor prognostic sign requiring urgent indication of appropriate treatments. Although biopsy of the temporal artery with histopathological examination is a gold standard of diagnosis, ultrasonography, computed tomography, or positron emission tomography could be useful and minimal-invasive modalities to detect abnormalities of the wall of large or medium-sized arteries.

CONCLUSION: When seeing a patient with tongue necrosis of unknown etiology and laboratory data indicating systemic inflammation, giant-cell arteritis should be suspected.

TORN BUT NOT BROKEN: SPONTANEOUS CORONARY ARTERY DISSECTION MASQUERADING AS TAKOTSUBO'S CARDIOMYOPATHY

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LEARNING OBJECTIVE #1: Describe the presentation and management of spontaneous coronary artery dissection.

LEARNING OBJECTIVE #2: Review non-ischemic causes of myocardial injury.

CASE: A 49 year old woman with hypertension and hyperlipidemia presented to the ED with left-sided chest pain radiating to the back and arms while cooking breakfast. She never had chest pain before and had no toxic habits. She previously felt well but endorsed profound emotional stress from being separated from her family due to the pandemic.

Exam was unremarkable. Labs showed troponin of 0.1, ESR 49, and CRP 0.04. EKG showed ST elevations in II, III, aVF, and V6. CTA was negative for aortic dissection.

She received aspirin, metoprolol, and lisinopril. Cardiac catheterization revealed normal coronary arteries and LV function, but showed apical akinesis suggestive of takotsubo cardiomyopathy (TC).

The patient continued to have chest pain. Repeat troponin was 32 and uptrended to 41 with unchanged EKGs. Given ongoing pain and troponinemia, cardiac MRI was obtained which revealed hypokinesis of the apex, distal anterior and lateral walls, and transmural myocardial scar of the same areas. Closer review of her angiogram showed narrowing of a diagonal branch supplying the infarcted area, consistent with spontaneous coronary artery dissection (SCAD). Clopidogrel was added. Her chest pain slowly improved and she was discharged with plan for fibromuscular dysplasia (FMD) screening.

IMPACT/DISCUSSION: SCAD is a non-traumatic separation of a coronary artery wall underlying 0.1-4% of acute myocardial infarctions (MI), especially in younger women. The pathophysiology is unclear, but risk factors include FMD, connective tissue disorders, and triggers that induce circulatory stress

such as labor/delivery, Valsalva, and emotional stress. Patients should be screened for FMD, as one study of 168 patients with SCAD found that 72% had undiagnosed FMD.

The differential diagnosis for non-ischemic myocardial injury includes TC, SCAD, myocarditis, and coronary vasospasm/aneurysm. Coronary angiogram reveals clean coronaries, and in SCAD, shows coronary artery narrowing. However, this finding is often missed. Cardiac MR can distinguish these and should be considered when the diagnosis is unclear. Despite findings suggestive of TC, our patient's ongoing chest pain and severe troponin rise raised concern for myocarditis/SCAD and prompted cardiac MR.

TC and SCAD can present similarly, but management of TC is primarily supportive. Evidence for SCAD management is limited, but aspirin, short-term clopidogrel, and a beta blocker are generally recommended to prevent recurrence. Percutaneous coronary intervention is reserved for severe cases, as it can worsen the dissection.

CONCLUSION: SCAD is a rare cause of MI that should be considered particularly in younger women presenting with MI without cardiovascular risk factors.

Ongoing chest pain and troponinemia despite clean coronaries should prompt evaluation for non-ischemic causes of myocardial injury, which include SCAD, TC, and myocarditis.

TOXIC SHOCK SYNDROME ASSOCIATED WITH MENSTRUAL CUP USE

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LEARNING OBJECTIVE #1: Recognize the symptoms of toxic shock syndrome in females using vaginal products including menstrual cups

LEARNING OBJECTIVE #2: Diagnose toxic shock syndrome based on CDC diagnostic criteria for the disease

CASE: A previously healthy 20-year-old woman was brought to the emergency department for fever, chills, vomiting and lower abdominal pain of 4 days duration. The patient was on her 6th day of menstruation for which she was using a single vaginal cup with no proper cleaning hygiene between the uses.

Upon presentation, the vitals were significant for blood pressure of 96/60 mmHg, heart rate of 156 beats/min and fever of 102.8 F. On physical examination, the lower abdomen was tender to palpation and an erythematous rash was noticed. Vaginal examination revealed swelling and erythema of the labia majora bilaterally with yellowish vaginal discharge. Blood tests were significant for leukocytosis with WBC of 15.7×10^3 /L, neutrophilia of 93.8 %, bandemia of 39, and elevated procalcitonin of 8.68. Vaginal, urine and blood cultures were obtained, and the patient was started on intravenous antibiotics including piperacillin-tazobactam, vancomycin and clindamycin. Despite aggressive fluid resuscitation and broad-spectrum antibiotics, the patient remained hypotensive for the next few hours. She was then started on vasopressors and was admitted to the intensive care unit. On day 2 of hospitalization, the genital culture grew *Staphylococcus aureus* (S. aureus) and antibiotics were then de-escalated to clindamycin and vancomycin. On day 3 of admission, the patient was off vasopressors. Follow up of the genital culture showed Methicillin-susceptible S. aureus clindamycin-resistant and antibiotics were then switched to cefazolin. Patient remained clinically stable and was subsequently discharged home with outpatient follow-up plan.

IMPACT/DISCUSSION: Toxic shock syndrome (TSS) is a rare but severe condition that can be life-threatening. It is usually caused by toxins produced by S. aureus bacteria and less frequently by Group A Streptococcus. This syndrome is usually related to the use of intravaginal tampons. Very few cases of TSS occurring in females using menstrual cups were previously reported in literature. Diagnosis is usually based on the CDC clinical criteria which include fever, hypotension, diffuse erythroderma, and involvement of at least three organ systems, in addition to negative cultures for alternative pathogens and negative serologic tests for other conditions. Management of TSS includes aggressive fluid resuscitation, vasopressors if needed, in addition to broad-spectrum antibiotics. Antibiotic therapy should include a toxin-suppressing

agent such as clindamycin or linezolid with the latter sometimes used as monotherapy for its *S. aureus* coverage and its ability to suppress the bacteria toxin production.

CONCLUSION: It is important to have high index of suspicion for toxic shock syndrome in females using any kind of vaginal products for early diagnosis and treatment.

TRANSIENT TEENAGE LYMPHADENOPATHY: A CASE REPORT OF KIKUCHI-FUJIMOTO DISEASE (KFD)

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LEARNING OBJECTIVE #1: Recognize clinical and histologic features of Kikuchi-Fujimoto Lymphadenitis

LEARNING OBJECTIVE #2: Explore causative agents and prognosis of Kikuchi-Fujimoto Lymphadenitis

CASE: An 18-year-old previously healthy male presented with nine days of high-grade fever, associated with headaches, night sweats, myalgias, and fatigue. The patient reported no sick contacts and no significant family history. On presentation he was febrile and tachycardic. Physical exam revealed palpable right and left inguinal lymphadenopathy. Laboratory evaluation demonstrated profound leukopenia (neutropenia and lymphopenia), with anemia and thrombocytopenia, transaminitis, positive Parvovirus IgM titers, and positive IgM EBV Capsid and EBV Nuclear Antibody titers. Extensive workup was otherwise unremarkable. Peripheral smear was unremarkable. Radiography revealed hilar lymphadenopathy, with multiple mildly enlarged intrathoracic, upper abdominal, retroperitoneal, and pelvic lymph nodes, along with splenomegaly. A right groin excisional lymph node biopsy was performed, demonstrating histiocytic necrotizing lymphadenitis morphologically consistent with KFD; no morphologic and immunophenotypic support for overt lymphoma. Immunohistochemical staining revealed MPO-positive and CD68-positive cells in the necrotic foci. The patient was discharged with no additional therapeutics, and subsequently became asymptomatic within ten days.

IMPACT/DISCUSSION: Kikuchi-Fujimoto disease (KFD) is a rare, self-limited disease associated with regionalized lymphadenopathy, fever, and leukopenia. Although there is no consensus etiology of KFD, a viral or autoimmune cause has been proposed. This case represents a typical presentation of KFD in an atypical patient. KFD commonly affects females, with a prodrome similar to the one described here including fevers, lymphadenopathy, and neutropenia. With pancytopenia, elevated LDH with transaminitis, and splenomegaly, associated with EBV capsid and nuclear antibody positivity, we suspect our patient was suffering from an acute infectious mononucleosis. Coincidentally, our patient also demonstrated Parvovirus B19 IgM positivity, however his symptoms remain more consistent with mononucleosis. These lab results have been previously reported in KFD, and the roles of Parvovirus B19 and EBV have been debated. One meta-analysis on causative agents from 2014 showed no statistical significance for EBV and Parvovirus, however this has been contested. It is important to distinguish KFD from systemic lupus erythematosus and lymphoma as all three entities share histologic similarity, however KFD alone is transient, self-limited, and requires no long-term treatment. Correlation with clinical and lab findings, and immunohistochemical staining, can prevent misdiagnosis, and aggressive and unnecessary treatments.

CONCLUSION: KFD should be considered as a differential diagnosis for patients presenting with viral prodrome and diffuse lymphadenopathy. Possible disease etiologies for KFD include Parvovirus B19 and EBV.

TREATMENT-REFRACTORY SYNCOPE FOR 10 YEARS ONLY AT NIGHT: AN UNDER- APPRECIATED ETIOLOGY WITH A SIMPLE SOLUTION

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LEARNING OBJECTIVE #1: Recognize tizanidine can cause hypotension, syncope and rebound hypertension.

LEARNING OBJECTIVE #2: Learn to prescribe tizanidine to avoid these side effects.

CASE: A 52-year-old female with hypertension presents to dysautonomia clinic with a 10-year history of recurrent syncope. She has passed out > 30 times — only at night (10 pm to 6 am), only after standing from a supine position. After syncope, her sitting BP is 77/33 and HR 54. She quickly regains consciousness after falling. Work up (tilt-table, cardiac stress/echocardiogram, 14-day event monitor, brain MRA) has been unrevealing. Midodrine was started which did not alleviate syncope and instead worsened her preexisting hypertension. A review of medications shows that tizanidine 4 mg twice daily was first prescribed 10 years ago for muscle spasms. On questioning she clarifies that she takes all 8 mg at night to help her sleep.

She is now diagnosed with tizanidine-induced hypotension. She does not wish to split the doses because the morning dose causes daytime drowsiness. She is instructed to take only 4 mg at night (none in the morning). She has no further syncope.

IMPACT/DISCUSSION: This case depicts serious, preventable hemodynamic consequences from an increasingly prescribed muscle relaxant, tizanidine, the 89th most commonly prescribed drug in the U.S. (8.9 million prescriptions in 2018). Side effects include syncope due to hypotension and rebound hypertension, as well as sedation. These side effects are often overlooked due to a lack of awareness that tizanidine is a central alpha-2-agonist, much like clonidine. The problem can be fixed by implementing an appropriate dosing schedule.

Hemodynamic toxicities often occur because of the schedule on which patients self-administer the drug. Tizanidine is typically prescribed as 4-8 mg every 8 hours. However, patients tend to take all the doses at once at night to avoid daytime drowsiness or to enhance sleep. As a result, blood pressure can drop for the next 8-10 hours causing orthostatic hypotension and syncope. Due to its short half-life, skipped morning doses can lead to rebound hypertension with hyperadrenergic symptoms in the late afternoon or early evening. In this patient, drug-induced hemodynamic lability led to 10 years of recurrent syncope and an expensive, unrevealing workup – as well as vicious cycles of unnecessary treatment, including using midodrine to prevent syncope which in turn worsened pre-existing hypertension.

This problem would have been avoided by (1) recognizing that tizanidine can cause severe blood pressure issues; (2) taking the drug as prescribed; (3) gradual titration up to a dose that does not cause orthostatic hypotension.

CONCLUSION: Tizanidine, a commonly prescribed muscle relaxant, has an unappreciated side effect of syncope and rebound hypertension. Appropriate dosing can prevent this problem.

TRIGEMINAL TROPHIC SYNDROME: AN UNCOMMON CAUSE OF PAINFUL FACIAL ULCERATIONS

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LEARNING OBJECTIVE #1: Review the diagnostic criteria for trigeminal trophic syndrome (TTS)

LEARNING OBJECTIVE #2: Recognize the use of the combination of pregabalin, doxycycline, and hydroxyzine as a treatment option for TTS

CASE: A healthy 46-year-old woman presented with a painful, erythematous nodule of the left brow, which demonstrated granulomatous inflammation on excisional biopsy. One year later, she presented with a new painful and erythematous left glabellar ulceration, adhesions of the left lower medial conjunctiva and epiphora. She was treated with broad-spectrum antibiotics. Wound cultures were negative for bacteria, fungi, and acid fast bacilli. She underwent left dacryocystorhinostomy with pathology revealing chronic dacryocystitis.

She required ongoing medical treatment of left brow lesions over the next two years with intralesional steroid injections and antibiotics. She then developed new lesions on her chin and submandibular region and

pruritus with associated excoriation, paresthesias and pain affecting the left side of her face.

Three years after her initial presentation, she was diagnosed with trigeminal trophic syndrome. Medication trials included amitriptyline, gabapentin, and duloxetine; the use of these agents was limited by side effects or lack of efficacy. She was eventually started on pregabalin, titrated to a dose of 300 mg every morning and 150 mg at night, doxycycline 100 mg twice daily and hydroxyzine 25 mg at night with 90% improvement in pain, pruritis and swelling. Attempts to discontinue doxycycline have resulted in recurrence of inflammation and pain.

IMPACT/DISCUSSION: Trigeminal trophic syndrome is a rare condition that develops from trigeminal nerve damage causing unilateral dysesthesias that trigger patients to pick their skin, typically in one's sleep. Early recognition of this condition is critical, as repetitive injury can lead to full thickness eyelid defects, canthal lesions and corneal ulcerations. The causes of TTS can include vascular insufficiency, acoustic neuroma, postencephalitis and post ablative therapy for trigeminal neuralgia. The differential diagnoses includes infection, malignancy, immune mediated, neurotic excoriation and dermatitis artefacta. There is no specific algorithm for the diagnosis of TTS; instead, diagnosis is based on a combination of clinical findings, previous medical history, and nonspecific histology. Similarly, there is no gold standard for treatment. The most commonly used medications are gabapentin and carbamazepine. Skin grafting, transcutaneous electrical nerve stimulation and negative pressure therapy have been investigated with varying degrees of success.

CONCLUSION: The diagnosis of TTS is often delayed and there is no consensus on a standard treatment. We present the first reported case of TTS that has been successfully treated with a combination of pregabalin, a gabapentinoid with analgesic properties, doxycycline for its anti-inflammatory effects, and nightly hydroxyzine, an oral antihistamine with anti-pruritic properties.

TTP OR NOT TTP? A CASE OF THROMBOTIC MICROANGIOPATHY

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LEARNING OBJECTIVE #1: Recognize the presenting features of TMAs such as HUS and TTP.

LEARNING OBJECTIVE #2: Recognize the need for prompt empiric treatment of TTP based on risk scores prior to confirmation of diagnosis.

CASE: A 42-year-old male with no significant medical history presented with 1 week of bloody diarrhea, fevers, and confusion. He sought care when he experienced darkening urine followed by oliguria. During hospitalization, his platelet count dropped from 179 k/uL (normal range is 150 – 400 k/uL) to 10 k/uL, creatinine increased from 0.69 mg/dL (normal is <1.30 mg/dL) to 2.0 mg/dL, and indirect bilirubin increased to 2.4 mg/dL (normal total bilirubin is <1.2 mg/dL). A preliminary diagnosis of hemolytic-uremic syndrome (HUS) was made, but due to an elevated PLASMIC score (a validated clinical tool for stratifying TTP risk) and a still-pending ADAMTS-13 assay, the patient underwent plasma exchange for possible TTP. Once that assay returned within the normal range, plasma exchange was discontinued. After two weeks, his creatinine (peaked at 8.45 mg/dL), mental status, and platelets had returned to baseline and he was discharged.

IMPACT/DISCUSSION: Thrombotic microangiopathies (TMAs), such as TTP and HUS, are uncommon but potentially morbid conditions. They share the key characteristics of microangiopathic hemolytic anemia, thrombocytopenia, and end-organ damage. Differentiating between the specific TMAs is important because it informs treatment; mortality in TTP without plasma exchange can be as high as 90%, as opposed to 22% with treatment. HUS, on the other hand, often responds well to supportive treatment alone. Decision tools such as the PLASMIC score have been described to help identify TTP early and initiate plasma exchange promptly. With a PLASMIC score of 5, this patient was considered at intermediate risk for TTP. Given the high mortality of untreated TTP, as well as his altered mental status (present in >60% of TTP cases and not part of the PLASMIC score), the decision was made to empirically begin plasma exchange while the ADAMTS-13 assay was pending.

As for which type of TMA the patient actually had, it is not completely clear. A normal ADAMTS-13 level argues against TTP, although it is not sensitive enough to be definitive. Additionally, this degree of renal dysfunction is unusual for TTP. The patient's stool was negative for Shiga toxin, which supports a diagnosis of complement-mediated TMA (formerly known as "atypical HUS" to distinguish it from "typical," Shiga toxin-mediated HUS). However, Shiga toxin is often only detectable during the acute diarrheal phase of the illness but not once that has resolved and TMA has begun.

CONCLUSION: This case illustrates a common diagnostic conundrum in situations where TMAs are being considered: TTP or not TTP? The use of validated tools such as the PLASMIC score assists in deciding which patients should urgently receive plasma exchange, an important clinical distinction, since untreated TTP can be rapidly fatal.

TWO B-CELL NEOPLASMS OR NOT TWO B-CELL NEOPLASMS? MANAGEMENT OF MALIGNANCY IN A PATIENT WITH HIV.

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LEARNING OBJECTIVE #1: Diagnose Diffuse Large B-cell Lymphoma (DLBCL) in the setting of pre-existing malignancy.

LEARNING OBJECTIVE #2: Treat malignancy and manage complications in patients with HIV.

CASE: A 59 year old male with HIV and plasmacytoma presented with one week of fevers, fatigue, and weight loss. Of note, the patient started taking antiretroviral therapy (ART) only one year prior to presentation when he was diagnosed with plasmacytoma by biopsy of a stomach lesion for which he was started on Bortezomib followed by Carfilzomib; EGD after treatment showed no further malignant lesions. On this admission, the patient was cachectic and febrile to 101F, nonetheless hemodynamically stable. Labs revealed microcytic anemia, transaminitis, and CD 4 absolute <20. CT Abdomen visualized right hepatic lesions with innumerable hypodensities suggestive of metastatic disease; biopsy later revealed CD30+, BCL6+ high grade DLBCL. Further workup showed CSF negative for malignant cells, normal echocardiogram, and EBV IgG+. The patient was started on Genvoya, Azithromycin, Bactrim, Nystatin, and dose-adjusted R-EPOCH. Over the course of 6 cycles of chemotherapy, the patient was hospitalized for complications such as neutropenic fever and septic shock requiring ICU admission; however after completion repeat imaging indicated marked improvement in the hepatic lesions with near complete resolution. Two months later the patient returned with new-onset seizures; brain imaging revealed parenchymal lesions suggestive of neoplasm, likely relapsed DLBCL, with midline shift. The patient was started on Dexamethasone, Keppra, and Methotrexate with Leucovorin. Nevertheless, after several days of treatment the patient's condition and mental status worsened and he succumbed to his disease.

IMPACT/DISCUSSION: We present a unique case of two separate mature B-cell neoplasms and the complexities of treating each in a patient with HIV. Factors such as immunosuppression and coinfection with oncogenic viruses make HIV patients prone to aggressive malignancies like DLBCL. Plasmacytoma can appear strikingly similar to a lymphoma with plasmacytic differentiation in clinical presentation, pathology, and cell marker analysis. This illustrates the importance of biopsy and immunohistochemistry to determine clonal origin and appropriately diagnose relapse versus new secondary malignancy. This analysis also guides chemotherapy regimen, which must be monitored for overlapping toxicities with ART including neuropathy, myelotoxicity, hepatotoxicity, and cardiotoxicity, along with risk of sepsis. Overall, continuous treatment with ART, monitoring CD4 counts and viral load, as well as infection prophylaxis have improved mortality in HIV patients with malignancy.

CONCLUSION: Recurrent or new malignancy in patients with HIV must be accurately diagnosed to tailor anti-tumor therapies.

Internists must work closely with oncologists and infectious disease specialists to monitor for disease recurrence, HIV progression, and complications such as sepsis and toxicity.

UNEXPECTED CAUSE OF NEW ONSET HOARSE VOICE: INNOMINATE ARTERY PSEUDOANEURYSM

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LEARNING OBJECTIVE #1: Recognize Innominate artery pseudoaneurysms can occur and carry significant burden of morbidity and mortality

LEARNING OBJECTIVE #2: Distinguish best use of resources and consultants in treatment of a patient with an innominate artery pseudoaneurysm

CASE: A 60 year old male with history of hypertension, chronic kidney disease stage III, hepatitis C who was three weeks out from a cardiac catheterization via a right radial approach without interventions presented to the emergency department with two weeks of generalized weakness as well as a hoarse voice. On exam, the patient was ill appearing but hemodynamically stable and afebrile. He was noted to have a non-pulsatile mass at the base of the right neck. As he had an acute kidney injury, a noncontrast CT of the chest was performed demonstrating a 6x8x8cm mediastinal paratracheal mass, fluid vs solid in character. A bronchoscopy demonstrated tracheal deviation and airway caliber reduced. The next day blood cultures were positive for MSSA. Ultrasound showed doppler signal within the mass. A CTA chest demonstrated an innominate artery pseudoaneurysm. Cardiothoracic surgery was consulted, and there was prohibitive risk for an open repair thus interventional radiology was consulted. Shortly after this the patient became profoundly hypotensive and had a cardiac arrest. Return of spontaneous circulation was obtained. A post arrest chest x-ray showed a new widened mediastinum, likely related to rupture of the pseudoaneurysm. The patient arrested again before he could go to interventional radiology and passed shortly after.

IMPACT/DISCUSSION: This case highlights several important features of pseudoaneurysm (PA). The innominate artery is an uncommon location for PA. PA should be in the differential for mediastinal mass. It is possible the PA in this case was a result of cardiac catheterization, a previously un-reported complication. PA is rarely reported in the literature; there is only one case report for idiopathic innominate artery PA (i.e. PA not associated with blunt trauma or surgery/procedure in the local region.)

This vignette also illustrates a diagnostic pitfall. When the fluid filled mass was discovered on CT, it was tempting to aspirate for diagnosis which would have had rapidly devastating results. Instead ultrasound was obtained which discovered it was vascular, changing direction of care.

Lastly, innominate artery PA is often described in the literature as a chronic finding which can be followed with serial imaging. This case clearly shows they can have a rapidly progressive course leading to fatal rupture.

CONCLUSION: Pseudoaneurysm, specifically of the innominate artery, should be in the differential diagnosis of a mass in the mediastinum. Strongly consider evaluation of doppler flow within a mass of the mediastinum prior to biopsy. Innominate artery pseudoaneurysm can rapidly progress to rupture. Once identified, prompt specialty consultation should be obtained to guide treatment.

UNILATERAL BREAST SWELLING SECONDARY TO CONGESTIVE HEART FAILURE.

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LEARNING OBJECTIVE #1: When encountering unilateral breast swelling in clinical practice, while it is important to consider and appropriately exclude critical causes such as inflammatory breast carcinoma and SVC syndrome, congestive heart failure must be considered as a differential.

LEARNING OBJECTIVE #2: Breast swelling in congestive heart failure results from an impairment of the cardiac venous return.

CASE: A 58-year-old female presented to the emergency department with bilateral pedal edema of one month duration, associated with dyspnea, worse on exertion. Of note, she had a medical history significant for coronary artery disease status post percutaneous coronary intervention and chronic diastolic heart failure with severe mitral and tricuspid regurgitation. Echocardiogram a

month ago showed ejection fraction of 50% and pulmonary hypertension with right ventricular systolic pressure 62mm Hg.

She was afebrile and hemodynamically stable. She was dyspneic, tachypneic at 24/min and hypoxic with 92% saturation. Physical exam was significant for engorged neck veins with elevated jugular venous pulsation, right breast swelling with mild pitting without tenderness or palpable mass, bilateral crepitations, S3 gallop and grade 5/6 pan-systolic mitral and tricuspid murmurs. Bilateral pitting pedal edema noted up to the mid-thigh level. Left breast and bilateral axillae were normal.

Patient endorsed right breast swelling for over a month, when ultrasound showed severe right breast edema. Patient had been previously treated with oral doxycycline and keflex for presumed mastitis with no clinical improvement.

On admission, she was aggressively diuresed with iv furosemide. Metolazone was added due to poor response to furosemide and the dose up titrated while patient's renal function was closely monitored. Amoxicillin-clavulanic acid was empirically commenced to treat the unilateral breast swelling presuming mastitis, but the swelling did not resolve.

Poor response to furosemide and metolazone, prompted addition of spironolactone with resultant brisk diuresis. There was significant improvement in her symptoms and oxygen requirement. Breast swelling resolved. She had a cumulative urine output of around 13 liters and was discharged well on metolazone and spironolactone.

IMPACT/DISCUSSION: When encountering unilateral breast swelling in clinical practice, while it is important to consider and appropriately exclude critical causes such as inflammatory breast carcinoma, SVC syndrome, mastitis, leukemia, lymphoma, post RT changes and progressive systemic sclerosis, congestive heart failure must be considered as a differential.

CONCLUSION: Processes that obstruct cardiac venous return like congestive cardiac failure can cause breast edema, but the pathophysiology of unilateral breast swelling is still unclear. Prior studies postulate that persistent postural dependence could explain an asymmetrical edema of breasts and presence of pitting edema could be a clue to congestive etiology.

UNILATERAL PTOSIS IN A PATIENT WITH A HISTORY OF SINUS SURGERY

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LEARNING OBJECTIVE #1: Recognize patients with unilateral ocular findings who would benefit from advanced imaging

LEARNING OBJECTIVE #2: Identify intra-orbital oculomotor nerve palsies and potential causes

CASE: A 71-year-old man presented to clinic with a one-year history of left ptosis and intermittent dull pain and pressure in his left eye. In the two weeks prior, his symptom progression had accelerated. His medical history was significant for remote bilateral ethmoidectomy. Exam showed left ptosis and mild proptosis without obvious ophthalmoplegia or pupillary defect. His right eye was normal. MRI of the orbits showed a frontal sinus mass suspicious for abscess with extension into the left orbit. Endoscopic evaluation showed extensive scarring along the ethmoid recesses consistent with his remote history of ethmoidectomy. Scar tissue partially occluded the left frontal sinus outflow tract, and after accessing this sinus, extensive purulent and loculated material was removed. The patient had immediate resolution of his ptosis and sensation of eye pressure. Cultures grew multiple Staphylococcus species. He was diagnosed with a mucopyocele and prescribed amoxicillin/clavulanate. However, he noted subtle diplopia with upward gaze, previously masked by his ptosis. He was trialed on prism glasses and later underwent ocular surgery.

IMPACT/DISCUSSION: Ptosis associated with unilateral oculomotor nerve findings should raise suspicion for an orbital mass, and MRI should be obtained. Intracranial or cavernous sinus lesions of the oculomotor nerve rarely cause proptosis. Additionally, this patient's symptoms of ptosis and diplopia with upward gaze can be classified as a superior divisional palsy of the oculomotor nerve, supporting an orbital localization. Bifurcation of the oculomotor nerve into superior and inferior divisions occurs in the posterior orbit, and divisional palsies are typically due to intra-orbital pathology, such as

masses, infiltration, or trauma. Orbital mass lesions are predominantly neoplastic, but other reported etiologies include dermoid cysts, fibrous dysplasia, and mucoceles. A mucocele, which develops due to chronic sinus obstruction and can expand into the orbit, has been reported as a cause of oculomotor nerve palsy in a single case report, with the mucocele in question arising from the sphenoid sinus. In our case, a frontal sinus mucocele caused a chronic oculomotor nerve palsy, with subsequent infection (mucopyocele) and subacute exacerbation. This case highlights mucopyocele as a potential cause of unilateral ocular symptoms, especially in patients with past sinus manipulation. It also emphasizes the need for orbital imaging in patients with proptosis and oculomotor nerve palsy.

CONCLUSION: Mucopyoceles can develop in patients with chronic sinus obstruction, and while typically benign, this case illustrates mucopyocele as an unusual cause of intra-orbital oculomotor nerve palsy.

UNIQUE PRESENTATION OF LEFT VENTRICULAR THROMBUS AND ITS MANAGEMENT.

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LEARNING OBJECTIVE #1: Manage Left Ventricular Thrombus (LVT) and distinguish utility of Warfarin versus Apixaban

LEARNING OBJECTIVE #2: Recognize increased embolic risk of Left Ventricular Thrombus

CASE: Our patient is a 69 year old male with chronic atrial fibrillation for 23 years not on anticoagulants, who presented with sudden aphasia, right facial droop, and unsteady gait after waking up. MRI Brain showed subacute non-hemorrhagic infarct of the left insula. Head CTA was done which showed a filling defect of the proximal M3 segment of the left middle cerebral artery with distal reconstitution. Transthoracic echo (TTE) showed hypertrophy in the mid-apical area consistent with the spade shaped variant of HCOM, ejection fraction 50-55%. There were 2 apical thrombus, HOCM with akinesis of apical myocardium. There was massive dilatation of both left and right atrium. No patent foramen ovale identified. He was out of the window for tPA and therefore was started on intravenous heparin.

Two days after hospital admission, he developed acute severe left flank pain associated with nausea and vomiting. CTA abdomen/pelvis revealed left renal infarct along with partial right renal infarct and sub capsular splenic infarct. Heparin induced thrombocytopenia was ruled out and different treatment options were discussed with the patient. We initially started patient on warfarin, but given patient dietary variability, it was difficult to maintain therapeutic INR. There was a question regarding appropriateness of NOAC for LVT treatment. Most studies for treatment of LVT were with warfarin, so it remains the only approved medication for treatment of LVT. But, given our patient's preferences, we opted for a trial with apixaban, and the patient was discharged. After a few months, TTE was repeated with the resolution of the LVT. The patient had no further neurologic deficits.

IMPACT/DISCUSSION: This case illustrates the variable presentation of Left Ventricular Thrombus and highlights management with appropriate anticoagulants. While the vast majority of data supports LV thrombus treatment with warfarin, our patient was unable to maintain a consistently therapeutic INR with this agent, so after a risk-benefit discussion, a decision was made to pursue treatment with a NOAC. As there are limited studies on this treatment, this is a potential area for further research.

CONCLUSION: In summary, we present a case of left ventricular thrombus resulting in several embolic events. We want to emphasize that there are some populations in whom maintaining therapeutic INR is difficult, and NOAC can be an option for them. More research is needed on this subject, but NOAC seemed to result in successful treatment for our patient.

UNUSAL PRESENTATION OF H PYLORI INFECTION

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LEARNING OBJECTIVE #1: The physician should keep H pylori as one of the potential factors contributing to recurrent aphthous stomatitis.

LEARNING OBJECTIVE #2: Treatment for H pylori has high success rate and it could potentially make a drastic difference in a patient's quality of life and potential detrimental consequences such as MALT or other gastric malignancies.

CASE: Our patient is a 49-year-old Hispanic female with a 24-year history of intermittent painful aphthous oral ulcers in the mouth, tongue, and throat along with nausea and odynophagia. Her sores last approximately one week at a time and can present with as many as thirteen at a single time. She had an extensive workup including antinuclear antibody, tissue transglutaminase IgA, HIV 1&2 Ab, and HSV-1 IgM, which were all negative. She was referred to gastroenterology for further workup. For her physical exam, oral cavity revealed two aphthous ulcers on the right buccal mucosa, approx 0.5 cm in size were seen. Other systems including skin, eye, lymphatics, cardiovascular, abdomen, thyroid, neurologic and respiratory systems were all normal. Esophagogastroduodenoscopy was done and the biopsy revealed positive for H. Pylori infection and mild active chronic gastritis. She was then prescribed quadruple therapy consisting of a proton pump inhibitor, tetracycline, metronidazole and a bismuth subsalicylate. Her symptoms simultaneously resolved after completion of the therapy. Repeated H. pylori stool antigen confirmed eradication. She denies recurrent symptoms in the 4 months follow-up.

IMPACT/DISCUSSION: The cause of aphthous ulcers can be multifactorial; these include but are not limited to hormonal changes, trauma, drugs, food hypersensitivity, nutritional deficiency, stress, and tobacco. A potential association between H. Pylori and recurrent aphthous stomatitis was previously reported; however, the presence of causative relationship between the two remained controversial. This could stem from the various inclusion and exclusion criteria, sample size, and detecting methods that differ among various studies which make it difficult to evaluate. In our case, the inability to identify other causes for the patient's 20+ year history of recurrent aphthous ulcers and the rapid and sustained resolution of all oral ulcers after completing H. pylori treatment support the degree of clinical correlation between recurrent aphthous stomatitis and H. pylori. Based on current literature, it was hypothesized that H. pylori could modify the immune response directly and release pro-inflammatory mediators, leading to the irritation of surface epithelial cells.

CONCLUSION: Even though the direct relationship between H pylori remains unclear, the physician should keep H pylori as one of the potential factors contributing to recurrent aphthous stomatitis as H pylori can be treated with various treatment options of high success rate and it could potentially make a drastic difference in a patient's quality of life and potential detrimental consequences such as gastric malignancies.

UNUSAL DERMATOLOGICAL FINDING IN A PATIENT AND IMMUNOCOMPROMISED COVID-19 PATIENT WITH RA

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LEARNING OBJECTIVE #1: SARS-CoV2 is associated with life threatening pneumonia, but with time it has become evident that this virus can affect more organ systems.

LEARNING OBJECTIVE #2: It is now known that affectations of the skin associated with this virus.

CASE: A 71-year-old African-American-female with history of Rheumatoid Arthritis who presented with cough, and fever. She was found to be COVID positive with pneumonia who was intubated. Methotrexate was held. She incurred complications of this atypical pneumonia including reintubation thrice due to tracheal edema and vocal cord paralysis. She had a tracheostomy and Peg-Tube placed and developed a generalized rash 23 days after admission, initially started on her arms/groin, quickly spread into a generalized macular erythematous desquamating pruritic rash, sparing the palms and soles; thought to be a viral exanthem. Labs showed absolute eosinophilia. Dermatology consult advised triamcinolone cream to be applied to the affected areas. Along with the cutaneous features, she did have fever spikes which started a day prior to

skin presentation. Biopsy was not taken. The patient went to a LTAC with noticeable resolution of cutaneous findings within 10 days of rash onset.

IMPACT/DISCUSSION: With time, more is being discovered about the SARS-CoV2 infection. Our patient had an increased propensity to develop this contagion given her comorbidities on prednisone- methotrexate. The rash appeared later in her course. As per an article which examined dermatological manifestations in COVID patients out of Italy, the timing of skin lesion development ranged from 3 days before COVID-19 diagnosis to 13 days after diagnosis. This study showed 6% reported lesions after 7 days. Most literature reports cutaneous manifestations as a presenting manifestation or soon after diagnosis. There is scarce information about dermatological manifestations more than 20 days after diagnosis. It can be postulated that this is a display of a cytokine surge that is seen with the Novel Coronavirus. Part of the premise of the systemic complications of this disease is associated with the upregulation of pro-inflammatory markers, which is similar to that of secondary hemophagocytic lymphohistiocytosis (sHLH), an under-recognized hyperinflammatory phenomenon. Clinical features of sHLH include continuous fevers, hyperferritinemia, cytopenia, and pulmonary involvement. HLH is commonly seen with patients with immunological deficiencies at baseline, such as our patient. The management of this cytokine release syndrome is a key unmet need of the COVID-19 infection. Although other differentials were considered, like drug rash or miliaria, given the situation, COVID related rash could not be ruled out.

CONCLUSION: This case serves to highlight the importance of extrapulmonary manifestations of SARS-CoV2 virus. Timing of these cutaneous manifestations widely varies in COVID positive patients. Physicians should be aware of these features, studies should be reported to better understand this condition and associations.

UNUSUAL PRESENTATIONS OF THORACIC AORTIC ANEURYSM: COUGH AND NECK PAIN

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LEARNING OBJECTIVE #1: Recognize the unusual presentations of thoracic aortic aneurysm

LEARNING OBJECTIVE #2: Assess high-risk patients with imaging studies

CASE: A 59-year-old Caucasian woman with a 90 pack-year history of smoking presented to the emergency room with a chief complaint of neck pain. Within the past three weeks, while brushing her teeth, she noted a left-sided throbbing neck pain associated with a non-productive cough. She was normotensive upon arrival. Surface electrocardiography and laboratory results were unremarkable. Physical exam was notable for decreased lung sounds on the left side. A chest x-ray demonstrated a large mass like density projecting over the left upper lobe obscuring the hilum, aortic arch, and superior mediastinum measuring 12.5x11.7 cm. This prompted a contrast-enhanced computed tomography scan which demonstrated massive aneurysmal dilatation of the aortic arch extending into the proximal descending aorta without evidence of dissection or root involvement and a shift of the trachea with narrowing of the tracheal lumen. The patient was scheduled for a thoracic aortic aneurysm repair surgery.

IMPACT/DISCUSSION: A thoracic aortic aneurysm (TAA) occurs due to weakness in the walls of a blood vessel, causing it to enlarge. Aneurysms can form in any blood vessel in the body, but they are most common in the aorta. Smoking and high blood pressure correlate with aneurysm development. We described a massive thoracic aortic aneurysm exhibiting unusual symptoms. Most people with TAA have no symptoms. TAAs are usually found accidentally when the patient is undergoing an imaging study for another reason. The most serious consequence of TAA is aortic dissection or aortic rupture. Ruptured TAAs are often fatal. As a result, assessing high-risk patients with imaging studies are necessary. Computed tomographic angiography and magnetic resonance angiography are the imaging tests of choice. Surgery is recommended for TAAs larger than 5.5 cm in most cases.

CONCLUSION: Considering the fatality of thoracic aortic aneurysm dissection or rupture, high-risk patients presenting with respiratory symptoms should receive imaging modalities.

URACHAL CANCER: A RARE CAUSE OF PERSISTENT UMBILICAL DRAINAGE

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LEARNING OBJECTIVE #1: Recognize urachal cancer based on clinical presentation and image findings.

LEARNING OBJECTIVE #2: Treat metastatic urachal adenocarcinoma.

CASE: A 71-year-old man presented with pus from the umbilicus. Past medical history was pertinent for persistent urinary tract infection for a month despite two rounds of antibiotics, and 20-lb weight loss. Lower abdomen was tender without rebound or guarding. Rectal exam was normal, without fistula visualized. CT scan revealed a large abscess extending from the umbilicus to the anterior urinary bladder with multiple locules of gas. There was also an accidental finding of low-density lesion of the right lobe of the liver, 5.4 X 6.6 X 7.2 cm. The patient underwent surgical incision of the intra-abdominal abscess and CT-guided liver lesion drainage and biopsy. Initial biopsy only revealed necrotic tissue. The purulent drainage from the umbilicus recurred 4 months after the operation. Repeat CT scan revealed extensive necrotic changes from the umbilicus to the urinary bladder, which was along the expected course of the urachus, and the right lobe liver mass similar to the prior study. The patient underwent repeat CT-guided liver mass drainage and biopsy. It showed adenocarcinoma in the background of marked necrosis. Immunohistochemical (IC) staining was positive for CDX2 and CK20, and negative for CK7, GATA-3, HepPar-1 and NKX3.1. This was consistent with urachal adenocarcinoma with liver metastasis. The patient was started on FOLFOX (Folinic acid, Fluorouracil, Oxaliplatin). Repeat CT scan 2 months after the initiation of the therapy demonstrated partial response.

IMPACT/DISCUSSION: The urachus is a remnant structure from the allantois. It connects the dome of the urinary bladder to the umbilicus without any physiological function. Urachal cancer is extremely rare and only accounts for less than 1% of all bladder cancers. The most common symptoms are urinary symptoms such as dysuria, hematuria, and abdominal pain. The diagnostic criteria are: (1) location of the tumor in the urinary bladder dome or anterior wall; (2) epicenter of carcinoma in the bladder wall; (3) absence of widespread cystitis cystica or cystitis glandularis beyond the dome and anterior wall; (4) absence of a known primary malignancy elsewhere. Our initial image study clearly met most of the aforementioned criteria. The repeat liver biopsy was necessary to confirm the origin of primary cancer. The IC staining of urachal adenocarcinoma is generally positive for CDX2 and CK20. In our case, besides characteristic IC findings, the negative HepPar-1 and NKX3.1 made liver and prostate origin malignancies less likely. Nonmetastatic diseases are usually managed with resection. There is no clear recommendation of chemotherapy choice. Previous metastatic cases showed variable success with colorectal cancer chemotherapy regimens.

CONCLUSION: Persistent umbilical drainage and urinary symptom→consider urachal cancer Image findings can help establishing the diagnosis Can use colorectal cancer regimen for urachal cancer

VAGINAL VARICES WITH MASSIVE HEMORRHAGE IN A CIRRHOTIC PATIENT WITH PORTAL HYPERTENSION

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LEARNING OBJECTIVE #1: Early recognition of vaginal varices allowing for surveillance and preemptive therapy before life-threatening hemorrhage.

LEARNING OBJECTIVE #2: Keeping vaginal varices as a diagnosis in cirrhotic patients with otherwise unexplained vaginal bleed and understanding

portal venous anatomy and its attenuation for successful treatment of pelvic or vaginal varices.

CASE: A 58-year-old white female, gravida 3, para 3, presented with sudden onset vaginal bleeding.

Her medical history included alcoholic cirrhosis and surgical history was notable for tubal ligation and hysterectomy done 5 years earlier for fibroids. Physical examination was significant for caput medusa, spider nevi and vaginal varices. On presentation, she was hypotensive with BP of 72/36. Labs were significant for Hb/Hct 6.2/18.4, Na 129, sCr 1.13, albumin 2.8, INR 2.5, T. Bili 8.18 with Direct 6.16, ALT 30, AST 67 and MELD-Na score of 30. She received massive protocol transfusion and underwent vaginal packing. CT abdomen/pelvis was significant for prominent pelvic varices/collaterals in the hysterectomy bed contiguous with portal vein. Transhepatic embolization of pelvic varices was done but still continued to bleed. She went into cardiac arrest requiring CPR and intubation. Her Hb dropped to 5.9 despite massive transfusion. She went into hemorrhagic shock requiring increased vasopressors. CT scan revealed ruptured varices with large volume hemoperitoneum. She received platelets, FFP and DDAVP, tranexa to control bleeding. A repeat angiogram with coiling of pelvic vessels along with 5 liter frank blood paracentesis was done. She developed abdominal compartment syndrome with decline in kidney function and became anuric. The family opted for palliative care and she died of hemorrhagic shock.

IMPACT/DISCUSSION: The postmenopausal vaginal hemorrhage is related to gynecological malignancies. Bleeding from vaginal varices rarely occurs in non-pregnant women. The portal hypertension in advanced cirrhosis causes collateral formation to decompress portal system and leads to formation of varices. Varices are enlarged or swollen veins commonly found in the esophagus. The vagina and uterus have extensive venous plexus making it an unusual site for varices. These plexus drain into the systemic circulation and provide numerous venues for decompression.

CONCLUSION: The vagina is a rare location for portal hypertensive varices causing hemorrhage with only 8 cases in the literature. The therapeutic approach focuses toward the control of bleeding using compression, suture ligation or banding. Temporary measures such as TIPS help in reducing portal pressure. Liver transplantation is the definitive treatment for severe portal hypertension resulting in bleeding varices and have excellent outcome. This case highlights the life-threatening risk of variceal hemorrhage in nonesophageal portosystemic anastomoses that can develop in posthysterectomy scars. It is advisable to consider a thorough gynecologic examination in patients with cirrhosis with a previous hysterectomy.

VAMPIRES OF THE NIGHT: A RARE CASE OF ANEMIA INDUCED BY BED BUG CONSUMPTION

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LEARNING OBJECTIVE #1: Recognize Bed Bug Consumption as a cause of iron deficiency anemia.

LEARNING OBJECTIVE #2: Describe the classic dermatologic appearance of Bed Bug bites.

CASE: 57-year-old woman with atrial fibrillation on anticoagulation presented with one-week history of severe dyspnea and fatigue. She denied melena, hematochezia or hematuria. On further history, she had an ongoing problem with bed bug infestation in her home including multiple failed exterminations. Examination revealed a temperature of 97.9 F, blood pressure 101/56 mmHg, heart rate 77 bpm, respiratory rate 22, and oxygen saturation 99% on room air. The patient had fresh clustered erythematous and intensely pruritic papules (largest 1 cm) and excoriations throughout her trunk and healed old bites located at her upper/lower extremities. Several bed bugs were also discovered on the patient's clothes and skin. Labs showed new onset iron deficiency anemia with a hemoglobin of 6.8 g/dL (previously 12.2 g/dL just three months prior).

On admission, the patient received 1 unit of packed red blood cells and was started on proton pump inhibitors for concern of a gastrointestinal bleed. An upper and lower endoscopy only demonstrated a non-bleeding 3 mm colonic polyp. Her hemoglobin stabilized to ~8 g/dl after blood transfusion. Given an unremarkable gastrointestinal workup and a history of extensive and prolonged

exposure to bed bugs, the etiology for her blood loss anemia was most likely secondary to bed bug consumption. The patient was discharged and advised to seek a professional exterminator to rid her house of bed bugs. On a follow-up PCP appointment, her hemoglobin nearly normalized to 11.3 g/dl.

IMPACT/DISCUSSION: Bed bugs that feed on human blood (*Cimex lectularis* and *Cimex hemipterus*) are typically oval and red/brown in color measuring 4-7 mm. Dermatologic manifestations can vary but generally consist of erythematous macules or papules, classically in a line or cluster, which can be intensely pruritic. Diagnosis of bed bugs is primarily clinical. While bed bugs are known to harbor pathogens, no documented transfer of disease has been recorded. Complications from bed bug bites can include psychological distress, although life threatening conditions such as angioedema and anaphylaxis have been described.

A very rare complication from bed bugs is iron deficiency anemia, as in our case. An adult bed bug has been described to consume up to 7 mm³ of blood in a single meal and can contain up to 0.73 mg of iron. Therefore, extensive and repeated feedings can lead to iron deficiency anemia. Treatment is primarily supportive with removal of the bedbugs from the patient's home. This is a rarely reported condition as our search of PubMed demonstrates only six published case reports describing *Cimex*-induced anemia.

CONCLUSION: Bed Bugs can be a rarely reported cause of iron deficiency anemia.

Classic dermatologic physical examination findings include a line or cluster of intensely pruritic erythematous macules or papules.

VENOUS THROMBOEMBOLISM AND STROKE AS PRESENTING FINDINGS IN A PATIENT WITH SARCOIDOSIS

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LEARNING OBJECTIVE #1: Recognize increasing evidence that systemic inflammatory disease causes hypercoagulability

LEARNING OBJECTIVE #2: Recognize neurosarcoidosis as a potential lymphoma mimic

CASE: A 48 year old male with a history of recurrent venous thromboembolism (VTE) treated with warfarin, and a newly identified mediastinal mass, presented with gait problems, altered mental status, and memory loss. On exam, he had an expressive aphasia, dysarthria, right facial weakness, and right upper/lower extremity weakness. His cardiac rhythm was regular. CT and MRI revealed an acute left thalamic stroke, and small ependymal and leptomeningeal nodular foci of enhancement concerning for lymphoma. However, lumbar puncture with flow cytometry ultimately showed no evidence of malignancy. Of note, a mediastinal mass with adjacent lymphadenopathy was identified three months prior. Multiple lymph node biopsies revealed no malignant cells or noncaseating granulomas and flow cytometry had shown no evidence of monoclonality, plasma cell dyscrasia, or non-Hodgkin lymphoma. A PET scan obtained during his present hospitalization, showed increased uptake in a paraesophageal node. Excisional biopsy revealed non-necrotizing granulomas consistent with sarcoidosis. He was started on high dose prednisone and eventually infliximab for neurosarcoidosis given his MRI findings. Four weeks later, he had improved strength and gait, but persistent expressive aphasia.

IMPACT/DISCUSSION: Systemic inflammatory diseases are increasingly recognized as risk factors for VTE, though risk appears to differ based on the underlying condition. In a small meta-analysis that included three observational studies, the risk of VTE among those with sarcoidosis was 40% higher than in randomly selected patients from the databases. Another meta-analysis found that risk among patients with lupus, Sjogren's syndrome, inflammatory myositis, or systemic sclerosis was more than three times higher than the general population. And, in a cohort study of patients with psoriasis, rheumatoid or psoriatic arthritis, VTE risk was 10-40% higher compared to matched populations. Interestingly, among patients with psoriasis or psoriatic arthritis, those treated with disease modifying agents did not have elevated risk. Hypercoagulability likely results from an imbalance of cytokines, leukocytes, and chemokines, which all play a distinct role in thrombus formation and break

down. It is currently unknown whether treatment of underlying disease lowers VTE risk. Research is needed to assess in what circumstances and disorders prophylactic anticoagulation is warranted.

CONCLUSION: In addition to the well-known risk factors for VTE, inflammatory diseases, such as sarcoidosis, should be considered when evaluating a patient with hypercoagulability. Further research is needed to determine whether treatment of underlying diseases lowers VTE risk and provide guidance on when prophylactic anticoagulation is beneficial.

VIDEO VISITS CAN IRON OUT GAPS IN CARE

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LEARNING OBJECTIVE #1: Assess mild elevation in liver function tests over video visits

LEARNING OBJECTIVE #2: Recognize strengths of video visits as a tool to gather more history

CASE: 60 year old male with a medical history of hypertension, previous strokes, depression, and idiopathic thrombocytopenia presented via video visit for refills of clopidogrel. Patient had no other complaints. His labs were reviewed and showed a persistent elevation of his AST (76) and ALT (80) since his last lab check 5 months ago. Prior workup included a negative HIV test and unremarkable hepatitis panel. He was previously ordered for a right upper quadrant ultrasound, which was delayed due to the start of the pandemic. Repeat liver function tests and basic labs were ordered and a follow up video visit was scheduled in 1 month to discuss new results. At this video visit, patient was still without a liver ultrasound due to pandemic related fears. Repeat labs showed stably elevated liver function tests and a new diagnosis of diabetes. At this point, his family history was reviewed again. In the electronic record, the patient's sister had hepatitis C and a liver transplant and the patient's father had a history of stroke. Upon repeat questioning, patient offered that his dad also had cirrhosis and died of ruptured esophageal varices. He had no recollection of his father abusing alcohol. Patient was ordered for iron studies, which showed an iron saturation of 64%, iron 176, and ferritin 718. A subsequent hemochromatosis mutation panel showed that the patient was heterozygous for both H63D and C282Y mutations. The patient was diagnosed with hereditary hemochromatosis.

IMPACT/DISCUSSION: Over the course of several months during the pandemic, this patient was able to follow up with a primary doctor and have his lab abnormalities investigated. Despite the perceived limitations of video visits, a thorough review of prior labs and re-examination of family history over this patient's video visits helped lead to a diagnosis of hereditary hemochromatosis.

Mild to moderate elevations of liver function tests (<15 times the upper limit of normal) are often seen with chronic liver disease. The top differential diagnoses include medication use, chronic viral hepatitis, alcoholic liver disease, NAFLD, and genetic disorders including hemochromatosis. The initial evaluation of patients with mild to moderate elevations in serum aminotransferases should include testing for chronic viral hepatitis, hemochromatosis, and NAFLD.

CONCLUSION: 1. In patients with a mild elevation in liver function tests, start the evaluation with the history and sending for a hepatitis panel, iron studies, and right upper quadrant ultrasound.

2. Video visits can be used to provide high value care to patients.

WARM AUTOIMMUNE HEMOLYTIC ANEMIA: A RARE COVID-19 COMPLICATION

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LEARNING OBJECTIVE #1: Diagnose warm autoimmune hemolytic anemia (AIHA) in COVID-19 patients.

LEARNING OBJECTIVE #2: Manage COVID-19 associated warm AIHA.

CASE: This is an 84-year-old Caucasian man with hypercholesterolemia who developed dry cough, mild shortness of breath, generalized weakness, and

fever 13 days prior to the presentation. Three days after onset, he was tested positive for SARS-CoV-2 virus. His shortness of breath continued to worsen, and the patient was hypoxic upon arrival to the hospital, requiring 4 liters/min of supplemental oxygen. Physical exam revealed scleral icterus. Laboratory work was significant for severe anemia (hemoglobin - 4.4 g/dL) and indirect bilirubinemia (2.3 mg/dL). CT scan of chest, abdomen and pelvis did not show any occult hemorrhage but revealed diffuse patchy bilateral ground-glass opacities within the lungs. The patient was found to have positive direct Coombs test with anti-K antibodies and IgG pan-agglutinins. He received packed RBCs that were type-specific, K-negative, and "least incompatible" based on cross-match. Further analysis showed lactate dehydrogenase of 1253 U/L, haptoglobin <10 mg/dL, and reticulocyte count of $120 \times 10^9/L$. Peripheral smear identified numerous nucleated RBCs and microspherocytes. Given the presence of warm antibody-mediated hemolytic anemia, he was diagnosed with warm AIHA secondary to COVID-19. The patient was started on convalescent plasma therapy, remdesivir, and dexamethasone. In the first 24 hours, he received 5 units of packed RBCs and remained stable, with hypoxia and dyspnea improving significantly on the second day.

IMPACT/DISCUSSION: Recognizing AIHA in the setting of COVID-19 is important to avoid delay in treatment. Warm autoimmune hemolytic anemia (AIHA) is a rare autoimmune disorder mediated by autoantibodies that are active at normal body temperature. In COVID-19 patients with warm AIHA, anemia-related symptoms are common. Physical exam may show jaundice. In addition to low hemoglobin, laboratory evaluation may be notable for increased reticulocyte count, elevated lactate dehydrogenase, low haptoglobin, indirect bilirubinemia, and spherocytosis/microspherocytosis. Diagnosis is made based on presence of hemolytic anemia mediated by warm antibodies. Due to the presence of pan-reacting autoantibodies, identifying cross-matched blood products may not be possible. If severe anemia is present, clinicians should contact blood bank immediately for type-specific, "least incompatible" blood products. Glucocorticoids have been shown to be effective for management of AIHA in addition to transfusion. Since glucocorticoids are also used in moderate to severe COVID-19 cases, it is reasonable to treat COVID-19 associated AIHA with glucocorticoids.

CONCLUSION: Warm AIHA is a potential complication of COVID-19. Recognize the necessity to initiate transfusion with "least incompatible" blood products is crucial. Glucocorticoids can be used to treat COVID-19 patients with warm AIHA.

WATCH OUT FOR CARDIAC PAPILLARY FIBROELASTOMA

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LEARNING OBJECTIVE #1: Identifying Cardiac Papillary Fibroelastoma(CPF) as one of the causes of Hollenhorst plaque.

LEARNING OBJECTIVE #2: Assessing diagnostic approach and management of asymptomatic CPF.

CASE: A 70-year-old female with a past medical history of type 2 diabetes, glaucoma, hypertension, hyperlipidemia presented to the hospital for an elective transesophageal echocardiogram (TEE). During her annual eye examination two weeks prior, she was found to have Hollenhorst plaque(HP). Evaluation for the source of HP was initiated. Carotid duplex ultrasound was unremarkable. Transthoracic echocardiogram (TTE) did not demonstrate any intra-arterial shunting on the agitated saline study. 14 day Holter monitor demonstrated normal sinus rhythm, with rare premature ventricular and atrial complexes. TEE showed a 2mm mobile, elongated, filamentous vegetation over the aortic valve leaflets. These morphologic findings warranted the diagnosis of CPF. Immediately following the procedure, the patient developed intermittent, moderate-intensity, midsternal, nonpleuritic chest pain. She subsequently underwent cardiac catheterization, which was negative for any significant obstructive coronary artery disease. Given the potential embolic risk either of the tumor itself or of associated thrombus, she underwent elective surgical removal of the fibroelastoma. The lesion

was histologically diagnosed as a papillary fibroelastoma. Postoperatively, she recovered well and was discharged to cardiac rehabilitation in stable condition.

IMPACT/DISCUSSION: Cardiac papillary fibroelastoma (CPF) is a primary benign cardiac tumor with predilection for heart valves. Predominantly asymptomatic on presentation, they are often incidentally discovered during routine echocardiography or cardiac surgery. These rare entities have the potential to cause serious complications such as embolic episodes, cardiac obstruction and valvular dysfunction. This case represents a highly unusual, incidental discovery of a rare cardiac tumor during the workup of HP. TEE and TTE remain the primary imaging modality for CPF identification. These avascular tumors are often described as 'sea anemone' for their papillary and pedunculated appearance.

Histopathological analysis following surgical resection is used to confirm the diagnosis. The tumors are primarily composed of hyaluronic acid, fine elastic fibrils and fibrin. Surgical excision is mandated for symptomatic CPF. In order to hinder future embolic and hemodynamic complications, surgery is now recommended even in asymptomatic patients more so if the lesion is present on the left side. There is currently no evidence available to support the use of systemic anticoagulation to avoid embolic complications.

CONCLUSION: The importance of cardiac papillary fibroelastoma lies in its essentially asymptomatic presentation, with the potential to cause severe embolic and hemodynamic complications. CPF is an uncommon cause of Hollenhorst plaque. Early recognition of these surgically resectable causes of embolism help improve health outcomes.

WHEN CAMPING LITERALLY TAKES YOUR BREATH AWAY:

A CASE OF CARBON MONOXIDE POISONING

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LEARNING OBJECTIVE #1: Recognize the clinical features of carbon monoxide (CO) poisoning

LEARNING OBJECTIVE #2: Diagnose and treat CO toxicity

CASE: A 78-year-old male with pertinent history of chronic obstructive pulmonary disease was admitted for severe shortness of breath (SOB) and disorientation. Three hours prior, he started having headache, dizziness, SOB and confusion. The patient was camping for 2 days when a rainstorm started overnight. He used his electric space and propane heaters inside the tent for warmth. Other histories include hypertension, diastolic heart failure, and remote smoking history. Pertinent exam findings are blood pressure 102/76, heart rate 96, respiratory rate 27, SpO₂ 92% on 15L nonrebreather face mask (NRFM), bilateral rales and wheezes, unremarkable heart sounds, oriented x2 and no focal neurological deficits. Labs revealed serum bicarbonate 12, anion gap 20, troponin 0.19 and arterial gas (ABG) showed pH 7.38, pCO₂ 39, PaO₂ 139. Subsequent ABG carboxyhemoglobin (COHb) level returned at 30.8%, consistent with CO poisoning. Electrocardiogram (EKG) and chest x-ray showed no acute cardiopulmonary issues. NRFM was continued with improvement of his symptoms and labs with repeated COHb level of 11.8%. Hyperbaric oxygen treatment (HBOT) was given for 90 minutes with final COHb level of 1.9%. Serial troponins peaked at 0.42; cardiac work up with echocardiography was consistent with troponin leak due to demand ischemia. The patient was discharged after 4 days on room air and all symptoms improved.

IMPACT/DISCUSSION: CO poisoning is a leading cause of poisoning death in the US with a mortality rate of about 1-3%. Given that its common symptoms such as headache, malaise, chest pain, nausea, dizziness are nonspecific, it is imperative for providers to obtain a thorough history and recognize high-risk patients. Cases occurring in cold seasons are often associated with poorly-ventilated heaters. Other year-round smoke inhalation causes are charcoal grilling, camp stoves, gas-powered motors and hookah smoking. Elders and individuals with pre-existing heart or cerebrovascular disease are more vulnerable to toxicity. False reassurance may occur with a normal SpO₂ and PaO₂ because pulse oximetry cannot differentiate COHb from oxyhemoglobin and dissolved

O₂ in blood gas remains unaffected. A venous or ABG COHb level of >3% in nonsmokers (>10% in smokers) confirms the diagnosis. Satran et al studied 230 patients with moderate to severe CO poisoning and 37% had evidence of myocardial ischemia. Therefore, a troponin and EKG are recommended for patients at risk for cardiac ischemia. For treatment, 100% O₂ via NRFM or HBOT increases CO clearance. The half-life of COHb at normal atmospheric pressure is 4-6 hours, 90 min with 100% normobaric O₂ and 30 min with HBOT.

CONCLUSION: •Signs and symptoms of CO toxicity are nonspecific so quality history taking is important

•Diagnosis requires a venous or ABG COHb level

•Cardiac ischemia is common in patients with CO poisoning, particularly those with pre-existing heart disease

WHEN THE FAMILIAR HAMPERS: A DELAYED DIAGNOSIS OF BILATERAL ARTERIAL OCCLUSION

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LEARNING OBJECTIVE #1: Develop an approach to evaluating lower extremity paresthesia in the outpatient setting

LEARNING OBJECTIVE #2: Build a framework for thinking about the differential diagnoses of lower extremity paresthesia

CASE: A 44-year-old man previously unconnected with care presented to urgent care with a 2-day history of sudden onset right (R) foot numbness and tingling associated with difficulty walking and pain radiating from the foot upwards, no claudication. He had significant history of alcohol and cigarette smoking but no known diabetes or hypertension (HTN). On physical examination (PE), his blood pressure (BP) was 160/80mmHg with intact sensation and normal capillary refill in both feet. BP from a prior visit within the last 2 weeks for complaints of reflux was also elevated. Lab findings showed elevated creatinine, low-density lipoprotein, and total cholesterol with an ASCVD risk score of 11.1%. Screening for diabetes was negative. An assessment of uncontrolled HTN with suspected peripheral neuropathy was made. He started losartan and gabapentin, was scheduled for follow-up in 2 weeks. However, he presented to the emergency room (ER) a day later with worsening symptoms. PE revealed bilateral cold lower extremities with absent distal pulses. Computed tomography angiography showed bilateral common iliac artery occlusion with complete occlusion of the R common femoral artery. He then had emergent vascular surgery with bilateral embolectomy and 4-compartment fasciotomy for critical limb ischemia.

IMPACT/DISCUSSION: The approach to proper diagnostics begins with a good history and PE. Given the paucity of time, the evaluation of LE paresthesia in the outpatient setting is usually a challenge. Given that diabetic neuropathy is the most common polyneuropathy in developed countries, it is easy to defer to this as the most likely cause thus, introducing availability bias. A better approach is to think through broad groups of differentials then narrow based on clinical findings.

Some categories into which differentials for lower extremity paresthesia fall include toxic, inflammatory, ischemic, metabolic, structural, idiopathic. Duration and progression of symptoms are key to separating acute etiologies like structural (nerve transection or compression), nerve ischemia from chronic etiologies like metabolic (diabetes, hypertension), toxins (lead, alcohol). Finally, a PE in this scenario must always include motor, sensory, extremity, and pulse examination. The approach described above will prevent missed diagnosis and prompt intervention for patients whose neuropathies are due to critical causes like the dreaded acute ischemic limb.

CONCLUSION: The course of an illness and a thorough PE can lead to outpatient diagnosis of critical conditions that require emergent intervention. Given the broad differential, a structured diagnostic approach to evaluating lower extremity paresthesia in the outpatient setting is key to avoid availability bias and missing etiologies that can lead to significant morbidity in affected patients.

WORKING WITH A FEVER OF UNKNOWN ORIGIN, A DIFFICULT DIAGNOSIS OF ADULT ONSET STILL'S DISEASE

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LEARNING OBJECTIVE #1: Recognize atypical presentations of adult onset Still's disease

LEARNING OBJECTIVE #2: Evaluate the utility of the current diagnostic criteria

CASE: A previously healthy 50-year-old man presented with three weeks of worsening fevers $>39^{\circ}\text{C}$, proximal thigh pain preventing ambulation, progressive fatigue, and new onset dry cough with dyspnea on exertion. He denied any history of rash, pharyngitis, or arthralgias. Physical exam was notable for tenderness in quadriceps, but normal strength and range of motion. An extensive hematologic, infectious, and rheumatologic workup was significant for markedly elevated inflammatory markers (ESR >120 , CRP 300s, ferritin >3700), neutrophilic leukocytosis, normocytic anemia, and mildly elevated transaminases. All infectious testing returned negative. Negative biomarkers tested included ANA, ANCA, anti-CP, anti-Jo, and ENA panel. RF was mildly elevated. Aldolase and CK were normal. Imaging included normal echocardiogram, normal abdominal CT, CT chest with small bilateral pleural effusions, and MRI of lower extremities showing inflammatory myositis in perivascular distribution. There was no evidence of myositis or vasculitis on muscle biopsy. He was ultimately started on high dose steroids for suspected AOSD with subsequent significant improvement in leukocytosis, fevers, and myalgia. After discharge, he was started on methotrexate as a maintenance therapy and a prednisone taper.

IMPACT/DISCUSSION: Adult-onset Still's disease (AOSD) is a rare multisystemic inflammatory disorder that typically presents with quotidian spiking fevers, an evanescent rash, polyarthritides, and pharyngitis. The etiology is still not known; although, genetic and infectious triggers are suspected. This case reinforces the difficulty in diagnosing AOSD given there is no definitive testing and its relative rarity prevents large population characterization. Findings in this case that are consistent with AOSD include severe quotidian fevers, markedly elevated acute phase reactants, granulocytic leukocytosis, pleural effusions, normocytic anemia, and elevated transaminase values. Notably, this patient did not meet diagnostic criteria (Yamaguchi) for AOSD and lacked evanescent rash, arthralgias, and pharyngitis. While anti-synthetase syndrome, macrophage activation syndrome, and hemophagocytic lymphohistiocytosis are all still included in the differential, AOSD remains the most likely etiology, especially given favorable response to corticosteroids. Early recognition and treatment of AOSD can help prevent serious complications such as macrophage activating syndrome, myocarditis, and liver failure.

CONCLUSION: AOSD is a clinical diagnosis and its presentation can be atypical

Due to the variability in AOSD presentations, further research is needed in regards to the sensitivity of the Yamaguchi criteria. Due to the morbidity associated with AOSD, prompt recognition and initiation of steroids is necessary.

"BUT I FEEL FINE!": SEARCHING FOR THE CAUSE OF ASYMPTOMATIC HYPERCALCEMIA WITH LOW PTH

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LEARNING OBJECTIVE #1: Develop a differential diagnosis for hypercalcemia with low PTH; recognize that the exclusion of malignancy is paramount and requires tissue sampling.

LEARNING OBJECTIVE #2: Review the laboratory, imaging, and histopathologic features of sarcoidosis, with emphasis on the less common presentation of hypercalcemia.

CASE: A 54-year-old female with a history of diabetes was admitted with asymptomatic hypercalcemia. Routine laboratory studies ordered by her primary care provider had revealed an elevated calcium level, which remained between 12.0 and 12.5 mg/dL on subsequent testing. Calcium had been normal

three months prior. She took no medications associated with hypercalcemia. Workup revealed elevated BUN and creatinine, elevated alkaline phosphatase and GGT, low parathyroid hormone (PTH) level, low 25-hydroxyvitamin D level and elevated 1,25-dihydroxyvitamin D level. Levels of LDH, PTH-related peptide, and serum angiotensin-converting enzyme (ACE) were normal. A CT of the chest, abdomen, and pelvis showed numerous hypodense lesions throughout the liver and spleen without lymphadenopathy. Liver biopsy yielded non-necrotizing granulomas surrounded by fibrosis. No malignant cells were identified on histology or flow cytometry. AFB staining was negative. Given laboratory, imaging, and histologic findings, a diagnosis of sarcoidosis was made. The patient was treated with prednisone as an outpatient, and her serum calcium had normalized one month later.

IMPACT/DISCUSSION: Hypercalcemia in the outpatient setting is most often caused by primary hyperparathyroidism. In contrast, hypercalcemia associated with a low serum PTH level is nearly always concerning for malignancy. Once malignancy is excluded, one may expand the differential diagnosis to include granulomatous processes, including fungal or mycobacterial infection, occupational exposures, vasculitides, and sarcoidosis. This stage of the workup should include an assessment of tuberculosis (TB) risk factors and diagnostic testing. Hypercalcemia due to sarcoidosis, the diagnosis in this case, is relatively uncommon and is observed in approximately 15 percent of cases. This case illustrates an approach to hypercalcemia in which history, laboratory and imaging studies narrowed the differential diagnosis and led to the appropriate selection of an invasive diagnostic test. We maintained a high index of suspicion for malignancy until biopsy results indicated an alternative diagnosis. This case highlights that disseminated sarcoidosis may present without pulmonary involvement, and that serum ACE has a low sensitivity for this diagnosis.

CONCLUSION: In the workup of hypercalcemia with low PTH, the first priority is to exclude malignancy, usually requiring both imaging and tissue sampling. One should subsequently consider systemic granulomatous diseases as hypercalcemia is occasionally the presenting sign of a granulomatous process such as sarcoidosis. Hypercalcemia due to sarcoidosis should respond promptly to immunosuppression.

Clinical Vignette - Geriatrics, Palliative Care, and End-of- Life

DELIRIUM AS A PRESENTATION OF CEREBRAL AMYLOID ANGIOPATHY MICROHEMORRHAGES

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LEARNING OBJECTIVE #1: Broadly evaluate delirium and its etiologies in older adults

LEARNING OBJECTIVE #2: Recognize cerebral amyloid angiopathy as an important cause of microhemorrhages in older adults

CASE: A 73-year-old man with a history of presumed vascular dementia, stroke, and metastatic rectal cancer complicated by pulmonary embolus presented with sudden onset altered mental status. At baseline, he was minimally verbal, only verbalizing his name and yes or no answers. He appeared more confused, only intermittently answering questions. He was also hypoxic to SpO₂ 80%, with rhoncorous respirations. He had no focal consolidation on chest X-ray, leukocytosis, or elevated procalcitonin. He was empirically treated for aspiration pneumonia. Despite stable vital signs, he deteriorated over several hours, developing tremulousness and bilateral clonus in the upper extremities. An EEG revealed encephalopathy without seizure. He subsequently developed dysarthria, inability to follow commands, and right-sided hemiplegia. MRI brain revealed extensive microhemorrhages and new scattered intracranial edema suggestive of recent hemorrhage. Lumbar puncture was significant for a protein level of 128 but negative for infectious pathogens. CAA microhemorrhages were determined have caused his presentation. Apixaban was discontinued, and he was managed conservatively with empiric Keppra and maintenance of normotension, normothermia, and normoglycemia. Over several weeks, the patient recovered neurologic function with increased responsiveness and verbalization.

IMPACT/DISCUSSION: Delirium is never normal. Altered mental status (AMS) confers a broad differential that includes stroke, seizure, metabolic disturbances, infection, and toxidromes, though we may anchor on a readily apparent etiology. In this case, microhemorrhages characteristic of cerebral amyloid angiopathy (CAA) were identified. CAA is characterized by vascular A β -amyloid deposition in the central nervous system leading to cerebrovascular dysfunction and classically lobar hemorrhage, which can most commonly be asymptomatic. In older adults, CAA is estimated to account for 10-34% of spontaneous hemorrhages.

Initiation of anticoagulation in this population remains controversial. Clinical decision tools may guide initiation of systemic anticoagulation, including HAS-BLED, particularly given intracranial bleeding risk per year with CAA approaches 9%. Experts suggest that following five microbleeds, the absolute risk of hemorrhage may outweigh that of stroke in patients with prior ischemic strokes.

CONCLUSION: 1. Systematically evaluate delirium in older adults, and re-evaluate the etiology as delirium evolves.

2. Consider cerebral amyloid angiopathy as a potential etiology for hemorrhage in elderly populations with dementia.

3. Initiation of systemic anticoagulation should carefully weigh patients' risk of thrombosis versus severe hemorrhage.

DISSEMINATED HERPES SIMPLEX VIRUS-1 (HSV-1) IN AN ELDERLY WOMAN PRESENTING WITH OLYNPHAGIA

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LEARNING OBJECTIVE #1: Recognize disease specific triggers for elder sexual abuse screening

LEARNING OBJECTIVE #2: Recognize and manage disseminated herpes simplex virus infection

CASE: A 90 year old female with atrial fibrillation, hypertension, and recent urinary tract infection treated with trimethoprim-sulfamethoxazole presented with 10 days of fever and dyspnea and 5 days of orylnophagia. She was hypoxic, tachycardic, and hypotensive on arrival, and she had ulcerative lesions on her hard and soft palate without other skin lesions or conjunctivitis. She had a leukocytosis of 11.4 x10(3)/uL, acute kidney injury with a creatinine of 3.7 mg/dL, and procalcitonin was 1.47 ng/mL. SARS-CoV-2 nasopharyngeal swab and respiratory viral panel were negative. Chest x-ray showed multifocal pneumonia. She was given empiric antimicrobials for aspiration pneumonia and nystatin for possible oropharyngeal candiditis. The oral lesions swabbed positive for HSV-1, and intravenous (IV) acyclovir was started. On hospital day 2, she underwent esophagogastroduodenoscopy (EGD) which identified multiple well circumscribed, non-bleeding esophageal ulcers in the distal and mid esophagus. Biopsies were consistent with HSV-1 esophagitis. An immunodeficiency workup, including human immunodeficiency virus (HIV) and serum protein electrophoresis, was unremarkable. She was screened for elder and sexual abuse. Gonorrhea, chlamydia, and syphilis were negative. Her hospital course was complicated by prolonged hypoxic respiratory failure; work-up for opportunistic infections was negative, and bronchoscopy was deferred due to risk of intubation. She was given steroids for potential cryptogenic organizing pneumonia or early acute respiratory distress syndrome (ARDS) with rapid improvement in oxygen requirement. Disseminated HSV was treated with IV acyclovir for 13 days and transitioned to oral acyclovir for suppressive therapy.

IMPACT/DISCUSSION: The differential for orylnophagia and oral ulcers in this case included Stevens-Johnson Syndrome (SJS) given the recent trimethoprim-sulfamethoxazole course and her symptoms. However, SJS is rapidly progressive and accompanied by other skin findings or conjunctivitis. HSV esophagitis is rare in immunocompetent individuals and occurs more frequently in men under 40 years old; thus, disseminated HSV prompts evaluation for immunodeficiency. When oropharyngeal mucosal ulcers are present, physical exam must include the genitalia. Older adults with newly diagnosed HSV should be screened for abuse and sexually transmitted infections including HIV. A recent meta-analysis found 1 in 6 older women worldwide faces abuse with the prevalence for overall abuse 14% and sexual

abuse 2%. As the aging population continues to grow, clinicians must increase surveillance of elder abuse.

CONCLUSION: Older adults newly diagnosed with HSV should be screened for abuse and sexually transmitted infections including HIV. Patients with disseminated HSV should be evaluated for immunodeficiency.

FROM DIARRHEA TO DELIRIUM; RISK OF SEVERE DELIRIUM WITH THE USE OF DICYCLOMINE IN A PATIENT WITH END STAGE RENAL DISEASE (ESRD)

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LEARNING OBJECTIVE #1: The kidneys may play a role in the metabolism of dicyclomine.

LEARNING OBJECTIVE #2: ESRD patients may be at increased risk of anticholinergic side effects.

CASE: A 76-year-old female with ESRD on hemodialysis, hypertension and rheumatoid arthritis, presented with intermittent abdominal pain and diarrhea for 3 weeks. Contrast tomography (CT) of the abdomen and pelvis was suggestive of pancolitis and the patient was started on ceftriaxone and metronidazole as well as dicyclomine, an antispasmodic. After receiving two doses, the patient underwent a significant change in behavior and became lethargic and unaware of her surroundings. The patient's symptoms persisted following her dialysis session. Overnight, the patient became completely disoriented. CT of the head and laboratory work-up was within normal limits. The patient began to have visual hallucinations the next morning.

The presence of inattention, visual hallucinations and acuteness of symptoms, was consistent with delirium. Her medications were explored for drug-induced delirium and although ceftriaxone is known to cause delirium, dicyclomine was identified as the most recent change in the patient's medications and was discontinued immediately. The patient had received a total of 5 doses. She significantly improved the following morning and was back at her baseline mentation after her dialysis session.

IMPACT/DISCUSSION: Delirium is a clinical syndrome characterized by a decrease in the level of awareness with inability to focus and is commonly encountered in the acute care setting. Drug-induced delirium accounts for 30% of all cases of delirium. Anticholinergic medications have been heavily discouraged in patients greater than 65 years due to the risk of delirium, falls and impaired cognition.

Anticholinergic risk scale (ARS) is a categorical tool that assigns anticholinergic drugs ascending scores of 1, 2 or 3 based on the extent of their anticholinergic activity. The higher the ARS score, the greater the risk of anticholinergic adverse effects in the elderly (8). A score equal to or greater than 3 is clinically significant (9). Dicyclomine, also known as dicycloverine hydrochloride, is frequently prescribed as an antispasmodic to reduce smooth muscle spasm in irritable bowel syndrome. It is assigned a score of 3 due to its significant anticholinergic activity as it is lipid soluble and absorbed through the gut, conjunctival sac and blood-brain barrier. However, pharmacokinetics and metabolism of anticholinergic medications, including dicyclomine, are unknown.

CONCLUSION: ARS scale is only meant to caution against overprescription of anticholinergics as they may be prescribed if benefits outweigh the risks. The predictive yield of the ARS scale may be increased if drug metabolism and clearance were incorporated in it. ESRD patients may be at increased risk of anticholinergic side effects from dicyclomine suggesting that kidneys may play a role in metabolism.

HOSPICE INITIATION AMONG 1ST GENERATION CHINESE-AMERICANS: EXPLORATION OF POTENTIAL CULTURAL BARRIERS

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LEARNING OBJECTIVE #1: Define Medicare criteria for hospice eligibility for dementia patients.

LEARNING OBJECTIVE #2: Identify possible cultural factors within the Chinese-American community that may impact openness to hospice.

CASE: Mr. L. is an 88-year-old Mandarin-speaking man and 1st generation Chinese-American immigrant with severe dementia who was admitted to the MICU with septic shock secondary to pneumonia. The patient at baseline is A&O to self only, bedbound, and fully dependent in his ADLs. The patient's family had not previously discussed advanced care planning and wished to proceed with all ICU-level interventions. The patient then became progressively hypotensive and acidotic. The primary team subsequently recommended comfort-oriented measures given the patient's underlying advanced dementia. The family worried that the team wanted them to "give up" on the patient. When the team re-framed comfort-oriented measures as a shift in care focus, rather than the abandonment of care measures, however, the family chose to palliatively transfer the patient out of the ICU and initiate comfort measures. Importantly, they felt that IV fluids and supplemental O₂, rather than any pain medications or anxiolytics, would provide the most comfort to the patient. The team and family chose to discontinue all other interventions besides fluids and O₂, and he passed away peacefully 1 day later.

IMPACT/DISCUSSION: The Functional Assessment Staging Test (FAST) scale guides prognostication of patients with dementia. Patients with FAST 7 dementia (with marked motor or speech impairments) and at least one medical complication in the past year qualify for hospice under Medicare. Hospice can provide patients with dementia and their caregivers intensive support at the end-of-life. Importantly however, Mr. L.'s case highlights relevant cultural considerations in broaching hospice care with 1st generation Chinese immigrants. Specifically, though hospice first developed in the 1960s in the US, hospice was first explored in China in the late 1980s; the fundamental concept of hospice is therefore newer in Chinese culture compared to American culture. Furthermore, direct translation of palliative care into Chinese becomes "do nothing" or "last minute" care and thus, to Chinese-monolingual immigrant families, this approach can feel unsettling. For Mr. L.'s family, the medicalized interventions of fluids and oxygen (rather than more nebulous pain control measures) became ways to more actively provide comfort to Mr. L. Exploration of these issues as potential barriers in Chinese-immigrant patients' acceptance of hospice-based care can guide culturally competent conversations about hospice.

CONCLUSION: 1. Patients with FAST stage 7 dementia with one significant medical complication in the prior year qualify for hospice by Medicare criteria. 2. Issues around hospice familiarity, language discordance, and culturally distinct understandings of comfort-based measures may underscore 1st generation Chinese immigrant families' hesitations with hospice care.

NOT SO FUN-GUS

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LEARNING OBJECTIVE #1: Differentiate fungal infection from other causes of bacterial soft tissue infection

LEARNING OBJECTIVE #2: Formulate an expanded illness-script for locally invasive fungal infections to include peripheral edema and frequent falls as major risk factors in elderly patients

CASE: 76F with heart failure, and frequent falls presented after being found down at home. She had a leukocytosis to 41 and was diagnosed with a Klebsiella UTI. She was also volume overloaded, with 4+ pitting edema of the bilateral lower extremities and elevated BNP. She walked with a rolling walker, but has had several falls which were complicated by fibular fracture, compression fracture, and multiple skin tears on the lower extremities.

During the first week of her hospital stay, she was treated with cephalexin for her UTI and also diuresed. During the second week, as her lower extremity edema improved, violaceous, tender nodules developed on the left foot and extended up the left lower extremity in a lymphangitic pattern. Punch biopsy revealed a necrotizing neutrophilic and granulomatous reaction involving the superficial and deep dermis with central nidus of *Scedosporium* – a pathogenic

fungus. The patient was started on voriconazole. Evaluation for immunocompromised state was unremarkable.

IMPACT/DISCUSSION: Fungal skin infection can be confused with other causes of nodular skin infections like bartonella and atypical mycobacterium. Bartonella presents with a painful vesicular lesion and progresses to a painful lymphadenitis but does not produce necrotic lesions.² Atypical mycobacterial infection is harder to distinguish because presentations can vary, it can be distinguished on pathology as it typically has a sarcoid-like granulomatous appearance.⁵

Scedosporium is an environmental fungal pathogen found in soil, polluted water, playground and urban soil.¹ Albeit much less common in immunocompetent persons, it can cause skin/soft tissue infections following trauma.^{1, 3} There are few studies quantifying the exact prevalence and risk factors associated with *Scedosporium* infection in the general immunocompetent adult population.^{1, 3}

For our patient, the most obvious pre-disposing factors were her profound lower extremity edema from poorly controlled heart failure and her frequent falls. Edema and venous stasis are risk factors for developing cellulitis, particularly recurrent cellulitis.⁴ In a patient with an intact immune system, venous incompetence, profound lower extremity edema, and recurrent falls were the main factors pre-disposing her to developing this infection.

CONCLUSION: Locally invasive *Scedosporium* infection can look similar to nontuberculous mycobacterium soft tissue infection requiring biopsy and culture to diagnose but can be differentiated from Bartonella on basis of clinical findings

An expanded illness-script for *Scedosporium* infection should include risk factors for development of cellulitis: lower extremity edema, venous incompetence, and frequent falls

THE STATIN TAKEAWAYS: DEPRESCRIBING AS HARM REDUCTION?

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LEARNING OBJECTIVE #1: • Describe the clinical syndrome of Statin-Associated Myopathy

LEARNING OBJECTIVE #2: • Recognize patient populations for whom deprescribing statins should be considered

CASE: A 93-year-old-female former community organizer with Vascular Dementia, Ischemic Cardiomyopathy (Ejection Fraction 30-35%), Hepatitis C Virus (HCV) infection, Chronic Kidney Disease (CKD) Stage IV, and Vitamin D Deficiency is evaluated in the hospital for progressive, proximal weakness over the past 4 months. At baseline she requires assistance with instrumental activities of daily living (IADLs). She was found to be seropositive for HCV 6 months prior to presentation. Four months prior, she was admitted for NSTEMI and was managed medically, including initiation of a high-intensity statin. She gradually develops progressive weakness. On presentation, her proximal weakness is associated with dark-colored urine, decreased urine output, elevated creatinine, and elevated CK levels. She is diagnosed with rhabdomyolysis and acute kidney injury due to Statin-Associated Myopathy. After discontinuation of her statin, supportive care, and several months of physical therapy, the patient's strength nearly returns to baseline.

IMPACT/DISCUSSION: Statin-Associated Myopathy (SAM) is muscle symptoms plus clinical rhabdomyolysis with resolution of symptoms and rhabdomyolysis following statin discontinuation; it occurs in 1 in 1000 patients. Most improve following discontinuation of the statin. Our patient had the following risk factors for SAM: HCV infection, poor functional status, CKD, high-intensity statin, and Vitamin D Deficiency.

For older patients with frailty, limited life expectancy, poor functional status, and multimorbidity, secondary prevention of cardiovascular events with statins may increase pill burden, polypharmacy, and harm. Data for efficacy of statins for secondary prevention in this population is limited, although a recent epidemiologic study has shown efficacy for primary prevention. The 2018 American Heart Association / American College of Cardiology Guidelines make a moderate recommendation (Grade IIa) on moderate quality evidence

(Class B) for the initiation of statins for secondary prevention of cardiovascular events in patients older than 75 only after having weighed life expectancy, prognosis, and risk of harms. Patients like the one described above may not survive long enough to benefit from statins while being exposed to the risks.

Engaging in shared decision-making with such a patient regarding statin discontinuation may lead to more meaningful care in the eyes of the patient, less harm, and no clear increase in the risk of cardiovascular events.

CONCLUSION: • Differentiate benign side effects of statins from myopathy and rhabdomyolysis

• Consider discontinuing statins in older patients with limited prognosis, frailty, and multimorbidity

Clinical Vignette - Healthcare Delivery and Redesign

FAULTY CONNECTION—WHAT ARE WE MISSING DURING TELEHEALTH VISITS?

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LEARNING OBJECTIVE #1: Explore the benefits that telehealth offers in expanding access to healthcare, particularly in the time of a global pandemic.

LEARNING OBJECTIVE #2: Recognize the limitations of telehealth as a triage point with particular attention to the lack of a comprehensive physical examination.

CASE: 53-year-old man with PMHx of *H. pylori* gastritis presented for a telehealth visit after 4 days of progressively worsening, diffuse abdominal pain and melena. The patient had been avoiding presenting to the ED due to fear of COVID-19 exposure. Further history revealed that he had been taking daily aspirin for primary prevention. On a limited physical examination, the patient was well/non-toxic appearing and was speaking in full sentences without distress. The patient was sent to the ED given inability to tolerate PO and multiple risk factors concerning for bleeding peptic ulcer. CT abdomen/pelvis demonstrated acute appendicitis with an obstructing 7-mm appendicolith. The patient underwent a laparoscopic appendectomy without complication.

IMPACT/DISCUSSION: Since the start of the COVID-19 crisis, medicine has found itself far from the bedside. According to the Centers for Disease Control and Prevention, healthcare systems have had to adjust the way they care for patients using methods that do not rely on in-person services in order to minimize COVID-19 transmission risks. Allowing us to connect more frequently and easily with patients, telehealth has helped to bridge the gap between provider and patient while preserving social distancing in the time of a global pandemic. For the patient in this case, telehealth was a life-saving measure that provided opportunities for triaging.

On the other hand, this modern platform for healthcare delivery has placed the traditional core bedside skills on the periphery, out of focus. In person exam of this patient in the ED would later reveal RLQ tenderness to palpation with guarding/rebound, which could have provided additional evidence to send this patient to the ED sooner. In fact, had this patient presented earlier in his disease course with less severe subjective symptoms, an abnormal physical exam may have been the only impetus to send him to the ED. The initial telehealth exam was falsely reassuring despite the likely presence of an acute abdomen.

As telemedicine replaces the comprehensive physical exam, the potential for near misses and medical errors with life-threatening consequences begin to emerge. By acknowledging this limitation, it allows healthcare providers to use telehealth more effectively as a triage point with a lower threshold for recommending emergent in-person evaluation.

CONCLUSION: 1. Providers are using telehealth to expand access to healthcare in order to care for patients while minimizing COVID-19 transmission risks.

2. In absence of the ability to perform a comprehensive physical exam to rule out potentially life threatening etiologies during telehealth visits, the threshold to recommend further emergent evaluation should be lowered.

WATCH THE HEART

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LEARNING OBJECTIVE #1: Recognize wearable devices as increasingly valid and cost-effective options for ambulatory ECG monitoring.

LEARNING OBJECTIVE #2: Recognize how widespread wearable devices can lead to more timely recognition of transient arrhythmias.

CASE: A 57-year-old woman presented with worsening palpitations of five months duration. 24-Hour Holter monitoring three months prior did not detect abnormal cardiac activity; her symptoms subsequently became more frequent. On the day of presentation, her HR at her doctor's office 180. On arrival to the ER, her HR was 90. EKG showed left atrial enlargement. Labs were normal. 24-hour telemetry monitoring was unremarkable. On further assessment, the patient was wearing an Apple Watch™ with an electrical heart sensor. Interrogation of her watch over the past 3 months revealed recurrent episodes of SVT. Given the pattern of short-RP tachycardia on her watch, she was suspected to have AVNRT. She underwent catheter ablation and her symptoms resolved.

IMPACT/DISCUSSION: AVNRT and other transient arrhythmias are readily treatable. The challenge is capturing these momentary phenomena for diagnosis. For most patients with palpitations, a diagnosis is sought with ambulatory electrocardiogram (ECG) monitoring.

The Holter monitor has long been the gold standard for such monitoring. However, its low diagnostic yield, cost, and inconvenience to patients has led to the development of more convenient and longer-term monitoring devices. Multiple studies indicate that most clinically significant arrhythmias are detected beyond the standard 24- to 48-hour Holter monitors. Alternate devices have since been created for longer-term monitoring, like loop recorders and patch monitors. However, these options involve the use of a device that is worn or implanted after a patient presents to a provider.

Inherently, this means multiple visits and associated health systems-related costs. A cost-saving approach may lead to earlier recognition of transient arrhythmias, in the form of widespread wearable devices.

As of 2016, 77% of Americans owned smartphones and 13% of Americans owned smartwatches.

Using plethysmography, these devices are equipped to detect abnormal rhythms with increasing accuracy. The Apple Watch study showed that a single tachogram suggesting atrial fibrillation (AF) had a positive predictive value (PPV) of 0.71, and that value increases to 0.84 with notifications (triggered by 5 tachograms). A study of the widely used Cardio Rhythm app showed a sensitivity of 92.9% and a specificity of 97.7% in the detection of AF. This degree of efficacy in cardiac monitoring in wearables is critical to their benefit.

CONCLUSION: - Plethysmography in wearable devices is an increasingly accurate, cost-effective, and convenient option for ambulatory ECG monitoring.

- Providers of patients being screened for arrhythmias may be well served to check a patient's wearable device prior to using traditional ECG monitoring devices.

Clinical Vignette - Health Equity and Social Determinants of Health

A DEADLY DISCHARGE

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LEARNING OBJECTIVE #1: To understand the factors leading to a safe patient discharge

LEARNING OBJECTIVE #2: To recognize the importance of the post-discharge visit

CASE: 45-year old Hispanic man with diabetes type 2 (on insulin) presented to the hospital following an outside cardiac arrest and intubation. On arrival he had a pH of 6.8, bicarbonate <10, glucose ~1200, and was diagnosed with severe diabetic ketoacidosis (DKA) requiring fluids and an insulin drip. On

exam, his pupils were fixed/dilated and he had no gag reflex. His CT head noted cerebral edema. His course was complicated by sepsis requiring vasopressors. Two days later, he had another cardiac arrest and died.

We later learned that the patient was hospitalized one month prior for COVID pneumonia. Since discharge, he had been progressively nauseated and weak. The outside hospital discharge summary was in English and indicated that the patient should stop taking his current dose of Lantus and start a lower dose. The Spanish-only speaking patient and his family had only understood that he was to stop taking Lantus. He had not taken any insulin for weeks. There also was no scheduled primary care provider (PCP) follow up made.

IMPACT/DISCUSSION: This patient died from complications of DKA, however, his death was caused largely by a lack of discharge communication and PCP follow up. A Canadian study of 144 patients and caregivers found that only 44% of participants had a complete understanding of their medications at discharge and 44% had an understanding of the follow up plan.¹

Several factors influence a safe discharge. Having a caregiver present at the time instructions are reviewed leads to more adherence to follow-up plans. Having an established PCP, access to transportation, and written instructions in the patient's native language also leads to better outcomes.¹ A prospective study of 809 patients showed that a structured patient-centered discharge interview, performed by residents, significantly increased patients' knowledge of discharge meds.²

Timely post-discharge visits are key in reducing hospital readmissions and poor outcomes. A study of 44,473 patients with multiple co-morbidities found that visits within 7 days are most beneficial in avoiding readmission.³ A prospective cohort study of 65 patients showed that those lacking PCP follow up were 10 times more likely to be readmitted.⁴ Black, Hispanic, Medicaid, or uninsured patients have significantly lower probabilities of timely PCP follow up.⁵ A recent retrospective cohort study of 20,918 patients showed that the use of a post-discharge scheduling assistance service substantially increased timely PCP follow-up visits.⁶

CONCLUSION: Studies suggest that only half of patients and caregivers have a clear understanding of hospital admissions and follow up plans. Our patient's outcome may have been different if the medication changes were clearly explained and if he had a post-discharge visit. Minority patients and those on Medicaid or without insurance are among the most affected and should be prioritized.

A THYROID STORM AND A PANDEMIC: COVID-19 RELATED EXACERBATIONS OF SOCIAL DETERMINANTS OF HEALTH

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LEARNING OBJECTIVE #1: Review the severe multisystem manifestations of thyroid storm

LEARNING OBJECTIVE #2: Reflect upon socioeconomic barriers to healthcare access in a pandemic setting

CASE: A 32 year old male with no known medical or family history presented with high fevers, diaphoresis, tremors, and encephalopathy after experiencing worsening symptoms for months. The patient lived in a rural area and had no primary care provider or insurance, causing him to delay seeking care. These recurrent symptoms contributed to missed work and eventual firing by his employer. The illness began at the onset of the COVID-19 pandemic, leading to closure of his local clinics and further resource limitation. Upon hospitalization, the patient was found to be in shock requiring intubation, high levels of sedation and multiple vasoactive medications. Initial studies were notable for undetectable TSH, free T3 14.4 and free T4 6.1. He developed atrial fibrillation with rapid ventricular response, biventricular heart failure with 14% ejection fraction, liver failure and kidney failure. Steroids, methimazole, cholestyramine and renal replacement therapy were started. The atrial fibrillation required beta blockers, amiodarone and digoxin. The patient endured a multi-week ICU stay with eventual improvement of thyroid studies, heart rate, ejection fraction, kidney function, and mental status. Graves Disease was diagnosed with thyroid stimulating immunoglobulin 23.2. The patient was eventually discharged home, and at follow up has experienced resolution of symptoms.

IMPACT/DISCUSSION: This case illustrates the severe complications that may arise in the setting of uncontrolled thyroid disease progressing to thyroid storm. Though hyperthyroidism may readily be managed in the outpatient setting, delays in care or other insults may precipitate multi-organ failure requiring ICU care, prolonged hospitalization, morbidity and mortality. More importantly, patients with socioeconomic difficulties struggle to achieve adequate healthcare access. The COVID-19 pandemic created unprecedented levels of resource limitation reaching far beyond challenges related to safe quarantine and management of a novel virus. The closure of non-emergent care clinics to conserve protective equipment and limit exposures affected the ability of patients to receive outpatient care for conditions that may be managed in these settings. Social determinants of health do not disappear during a pandemic; in fact, these barriers loom much larger, and we continue to witness underserved and resource-limited populations bear the largest weight. Increasing healthcare access across medical disciplines is a goal we strive for, and this case demonstrates the dire impact of a pandemic on an under-supported infrastructure.

CONCLUSION: Uncontrolled hyperthyroidism may progress to thyroid storm and multi-organ failure without early recognition and management. Risk of progression is higher in patients with socioeconomic barriers to care, especially in resource-limited settings such as a pandemic.

CALL ME MAYBE: THE ROLE OF TELEMEDICINE FOR DIABETIC PATIENTS WITH BARRIERS TO CARE

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LEARNING OBJECTIVE #1: Explore how social determinants of health can function as a barrier to diabetes care.

LEARNING OBJECTIVE #2: Discover how telemedicine can bridge the gap in the care of diabetes for patients with adverse social determinants of health.

CASE: Mrs. R is a 39 y/o Spanish speaking immigrant, with depression, illiteracy, history of sexual trauma, and low socioeconomic status, who was diagnosed with diabetes in 2016 with a random glucose of 357 and A1c 9.4%. She was started on metformin and educated on lifestyle modification. She was later prescribed an SGLT2 inhibitor, which was not covered by her limited insurance due to being an undocumented immigrant. For 8 months, despite many social barriers, she was adherent with medications, appointments, blood sugar monitoring, and dietary changes. Her A1c decreased to 6.5%.

Over the next two years she was in and out of care, with a no-show rate of 60%. When she attended appointments, she reported nonadherence with medications and blood sugar monitoring. On the surface, she could easily be labeled as "noncompliant", but there was more to her story.

Prior to this change in engagement, she had several cumulating stressors. Her husband lost his job making food and medications unaffordable. Her family's immigration status was in limbo and her daughter was sexually abused by a man sharing their home. Her ability to seek justice for her daughter was halted by fear of deportation. Her father died unexpectedly and her son was diagnosed with lead poisoning. With little reserve or resources to cope with these mounting adversities, competing priorities pushed her diabetes aside.

Within two years, her A1c trended up to 12.1%. She was started on insulin, but appointment non-adherence prevented titration. However, with the transition from office-based visits to telemedicine due to COVID19, many barriers were lifted. Her engagement in care was completely transformed. She became adherent with appointments and glucose monitoring enabling successful titration of her insulin. Telemedicine empowered her to care for her diabetes, which became manageable rather than an additional stressor. She presented for her first office visit since COVID19 with an A1c of 7.4%, the lowest in 3 years.

IMPACT/DISCUSSION: Social determinants of health are significantly associated with diabetes prevalence and severity. They also strongly influence appointment adherence, which has been shown to correlate with A1c. Telemedicine provides an avenue to bridge care gaps for patients whose adverse social determinants of health inhibit care. It can empower patients to manage their health by significantly lowering barriers to engagement.

CONCLUSION: For our patients with language and literacy barriers preventing health literacy; for those overwhelmed by legal, social, and financial stressors; for those burdened by multigenerational stress and trauma; patient engagement and optimizing health can feel like impossible goals. But with telemedicine in our tool kit, new opportunities for progress may be just a telephone call away.

CLOSE TO HOME: THE EFFECTS OF SYSTEMIC RACISM AND IMPLICIT BIAS ON OUR OWN PATIENTS

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LEARNING OBJECTIVE #1: Recognize indications for right heart catheterization and mitral valve surgery in patients with mitral valve regurgitation.

LEARNING OBJECTIVE #2: Identify implicit bias in provider documentation and its impact on healthcare disparities in minorities and patients of lower socioeconomic status.

CASE: A 54-year-old African American man presented with worsening shortness of breath, abdominal pain and coffee-ground emesis for two days. He had a history of severe mitral valve regurgitation diagnosed 8 years prior, HFrEF (40-45%), cocaine use, and pulmonary hypertension. He had had multiple ED visits and monthly hospital admissions for shortness of breath secondary to acute on chronic systolic heart failure. He had never had a right heart catheterization (RHC) or CT surgery evaluation for mitral valve surgery despite multiple echocardiograms documenting worsening mitral valve regurgitation and pulmonary hypertension.

CT abdomen/pelvis revealed a large amount of ascites likely contributing to his abdominal pain. A non-bleeding esophageal ulcer was identified on EGD.

After RHC showed elevated pulmonary artery pressures and poor pulmonary artery saturations indicating poor cardiac output, he was transferred to CCU for inotropic support and diuresis.

IMPACT/DISCUSSION: The effects of racial bias on healthcare disparities have been well-documented for decades. While there are multiple nationwide studies on this topic, few concrete examples are detailed in case reports. This patient did not receive timely RHC and evaluation for mitral valve surgery. RHC was indicated in this patient due to his pulmonary hypertension for which mixed etiologies were suspected, given his history of left heart disease and cocaine use. Mitral valve repair was indicated given the patient's persistent symptomatology with EF > 30%.

It was repeatedly documented that the patient was not a candidate for surgical intervention due to treatment noncompliance and drug use. However, there was no record of even discussing surgical options and cocaine cessation with the patient. Cardiothoracic surgery had also never been consulted. Therefore, the delay in the patient's care was likely a result of implicit bias due to the patient's socioeconomic status and social history.

The transmission of bias between healthcare providers through stigmatizing language, such as "noncompliance", also results in poorer care. This patient was frequently assumed to have poor health literacy. His abdominal pain was dismissed although he had an organic cause for his pain.

CONCLUSION: Healthcare providers' implicit bias against patients result in delays in medically indicated interventions, despite multiple admissions in inpatient and critical care settings.

HIDDEN IN NOT SO PLAIN SIGHT

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LEARNING OBJECTIVE #1: Recognize the presentation of erythema nodosum in pregnancy

LEARNING OBJECTIVE #2: Discuss how sociocultural barriers in healthcare jeopardize health outcomes

CASE: A 28-year-old Pashto-speaking female presents to a telehealth visit with a 1-month history of a rash on her left lower extremity (LLE). Using an interpreter, she describes a tender, non-pruritic red, swollen area on her left shin. She denies recent insect bites, trauma, or infectious symptoms. Past

medical history is notable for a prior pregnancy complicated by eclampsia and fetal demise in Afghanistan.

An in-person visit 2 days later reveals a young woman wearing a hijab and long draping dress. A focused LLE exam demonstrates a poorly demarcated 6x6 cm raised erythematous, tender nodule on the pretibial surface. HIV, HCV Ab, HBV sAg and sAb, and Quantiferon are negative. A clinical diagnosis of erythema nodosum (EN) of unclear etiology is made.

Finally, when asked if there is anything else new or different in her health, she replies she is 4 or 5 months pregnant but has not seen a doctor because of fear of coming to the hospital. Repeat exam reveals a gravid uterus. A urine pregnancy test is positive, and she is diagnosed with a pregnancy at 18 weeks. The rash resolves spontaneously in 1 month, and she goes on to have an uncomplicated pregnancy, delivering a healthy baby boy at 39 weeks.

IMPACT/DISCUSSION: EN is a panniculitis affecting 1-5/100,000 individuals. Although most cases are caused by infections, sarcoidosis, and medications, 2-5% of cases are associated with pregnancy. These cases typically present in the second trimester and resolve spontaneously within 1-2 months. It is hypothesized that a type IV delayed hypersensitivity reaction is related to elevated levels of estrogen and progesterone in pregnancy.

Although EN in pregnancy is rare, barriers accessing healthcare as a non-English-speaking immigrant are common and drive poor health outcomes. The ways healthcare providers address language barriers, implicit biases, and healthcare-related trauma have undeniable impacts on patient care. When using an interpreter, the subtleties of communication are compromised, necessitating straightforward language to elicit the patient's perspective, a strategy that ultimately led to this patient offering the underlying diagnosis of pregnancy. Moreover, implicit bias toward preserving modesty in patients wearing hijabs necessitates vigilance performing an appropriate physical exam, and, in this case, would have revealed the obvious pregnancy concealed beneath layers of her traditional garb. Finally, previous healthcare-related trauma, such as her previous fetal demise, produces fear of seeking care and leads to delayed diagnoses.

CONCLUSION: Although most cases are self-limited, a new diagnosis of EN should prompt an evaluation of potentially serious underlying etiologies and always consider pregnancy on the differential.

Sociocultural barriers in healthcare jeopardize patients' health and drives the need for cultural competency among providers.

IMPACTS OF SOCIAL DETERMINANTS OF HEALTH ON DUAL ANTIPLATELET THERAPY (DAPT) FOR ACUTE CORONARY SYNDROME (ACS)

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LEARNING OBJECTIVE #1: Review evidence-based DAPT treatment after percutaneous coronary intervention (PCI)

LEARNING OBJECTIVE #2: Assess the impact of social determinants of health when prescribing treatment options

CASE: A 69-year-old female with unknown past medical history was brought into the Emergency Department after being found unconscious. ECG showed ST elevations in leads II, III and avF, reflecting myocardial infarction (MI). After intubation for acute respiratory failure, she was loaded with ticagrelor and aspirin and rushed to emergent coronary angiogram and PCI of the RCA. Mechanical thrombectomy was performed, along with placement of a drug-eluting stent. After an extensive stay in the Cardiac Care Unit, she was discharged with prescriptions for aspirin, ticagrelor, lisinopril, Atorvastatin and Metoprolol, along with a limited supply of ticagrelor.

One week after discharge, the family contacted the hospital about medication costs. The patient was only taking ticagrelor. During a cardiology follow up, she was given medication coupons. At her primary care follow up, she reported being unable to afford ticagrelor despite the coupons that reduced the out-of-pocket monthly cost of \$1,200 to \$600. She had yet to start her other medications. After discussion with her cardiologist, the regimen was changed to clopidogrel, available at the local 340B pharmacy for \$30 per month.

IMPACT/DISCUSSION: This clinical vignette illustrates a complex but common example of MI requiring PCI and DAPT. In the inpatient setting,

evidence-based treatment was followed. According to the American Heart Association and American College of Cardiology, ticagrelor is a reasonably preferred antiplatelet agent to be administered with aspirin for ACS.

However, when transitioning to an outpatient setting, other factors need to be considered. This patient had limited insurance coverage of her medications. Although this was somewhat addressed with the coupons, her socioeconomic status was not taken into consideration. Coupons reduced the cost of ticagrelor by half, but as this medication is needed at least 12 months, this was not a solution. Additionally, the other medications could not be obtained. Like ticagrelor, clopidogrel is effective in improving outcomes and reducing cardiovascular events. Moreover, it is available as a generic formulation with a much cheaper price. Although one can argue preference for ticagrelor, in situations where the more expensive drug cannot be obtained, clopidogrel is a practical alternative.

CONCLUSION: For STEMI treated with stent, DAPT with aspirin and a P2Y12 inhibitor (eg, ticagrelor, clopidogrel) should be administered for at least 12 months.

While ticagrelor has been shown to result in fewer cardiovascular events and death, clopidogrel is an effective and cheaper option.

It is imperative to assess social determinants of health when prescribing treatment options.

ONE MISSED TEST, ONE LATE DIAGNOSIS

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LEARNING OBJECTIVE #1: Identify risk factors and work up for bladder cancer.

LEARNING OBJECTIVE #2: Recognize the negative impacts of COVID-19 on routine patient care.

CASE: A 58 year-old male smoker presents with acute decreased urination, lower abdominal pain, and back pain. He was seen in primary care clinic 8 months ago for complaints of fatigue, back pain, and intermittent pink tinged urine. Urinalysis at the time showed microscopic hematuria and his physician recommended follow up with CT urogram and cystoscopy. He was lost to follow up and unable to complete these due to recent homelessness and unemployment from COVID-19 pandemic.

Examination is notable for mild distress secondary to pain and tenderness to palpation of suprapubic region and paraspinal muscles of the lumbar spine.

Laboratory studies revealed AKI with creatinine of 1.9 mg/dL and urinalysis showed hematuria of 24 RBCs/hpf. CT scan of the abdomen and pelvis showed a poorly defined mass in the posterior bladder wall with extension into the retroperitoneal space and surrounding retroperitoneal lymphadenopathy. Diagnosis of urothelial carcinoma was made on biopsy.

IMPACT/DISCUSSION: Urothelial cancer (UC) arises from the epithelium that lines the urinary tract from the renal pelvis to the ureters, bladder, and urethra. It accounts for 90% of all bladder cancers. Roughly 25% of patients will have muscle invasive disease and present with later stage disease including metastasis on initial presentation. It is three times more common in men and presents in individuals after age 55. Risk factors include cigarette smoking, occupational chemical exposures, history of radiation and chemotherapy, and chronic or frequent bladder irritation or infections.

A key point in management of UC requires early diagnosis. Metastatic disease has a relative 5 year survival rate of 5%. It is important for primary care physicians to recognize signs and symptoms of bladder cancer as early disease is generally not detected on physical exam. Patients with significant risk factors and hematuria should have urgent urologic evaluation with cystoscopy and CT urogram to prevent delay in diagnosis and treatment.

The COVID-19 pandemic has impacted many aspects of health care including limited in-person PCP visits, difficulty accessing telehealth visits, delay or avoidance of care due to social distancing, and pause in routine services such as elective procedures and imaging. Other indirect impacts are loss of financial stability and disruption of public transportation. While patients may wish to pursue further testing, unemployment and insurance loss can delay routine care and have harmful impacts on a patient's health. This case illustrates how disparities in health care, impacts of COVID-19 pandemic, and lack of health equity lead to delay in diagnosis and the serious, adverse outcomes that follow.

CONCLUSION: A key point in managing patients at risk for UC is urgent urologic testing.

The COVID-19 Pandemic has caused disruptions and delays in routine patient care.

PREVENTING A FLOOD: A CASE OF A RUPTURED UMBILICAL HERNIA IN A PATIENT WITH CIRRHOSIS AND ASCITES AND RECOMMENDATIONS FOR PREVENTIVE TREATMENT

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LEARNING OBJECTIVE #1: Recognize complications of umbilical hernias in patients with cirrhosis and ascites

LEARNING OBJECTIVE #2: Recognize impact of social determinants of health on patients with alcohol use disorder who need follow up and surgery

CASE: A 41-year-old man with cirrhosis secondary to alcohol use disorder and hepatitis C was admitted for spontaneous bacterial peritonitis. He was treated and discharged on ciprofloxacin prophylaxis. He presented to the GI clinic two weeks later and was found to have increased ascites and a new umbilical hernia draining serous fluid. The patient was then readmitted. He was not taking the ciprofloxacin prophylaxis. He complained of increasing abdominal girth but denied fever, chills, or abdominal pain. The patient was alert and oriented with no signs of asterixis. Exam revealed abdominal distention with a large fluid wave and a protruding umbilicus with 10cm diameter with ulceration. A MELD-Na score of 16 and Child Pugh score of C were assigned. Abdominal CT demonstrated incarceration of bowel within the hernia. Surgery recommended transjugular intrahepatic portosystemic shunt (TIPS) to optimize ascites volume with subsequent surgical repair. While arranging for the procedure the patient developed large volume ascites leakage through the umbilical hernia. The patient was taken for urgent hernia repair. He tolerated surgery but required post-operative care in the ICU. The TIPS procedure was performed on post-op day 1 to reduce the ascitic burden on the repaired hernia. The patient was discharged 5 days post-TIPS but had recurrence of the hernia 3 days post-discharge requiring another urgent repair. He was discharged 4 days later without further complications.

IMPACT/DISCUSSION: The prevalence of umbilical hernia in patients with cirrhosis ascites is 10 times higher compared to the general population, with umbilical hernias occurring almost exclusively in patients with persistent ascites. Surgical repair of umbilical hernias in patients with ascites is associated with morbidity and mortality rates up to 40% and 13%, respectively. Conversely, a mortality rate of 60-88% is associated with nonsurgical treatment of a ruptured umbilical hernia in a patient with cirrhosis. Adequate control of ascitic volume is critical in reducing hernia recurrence and postoperative complications.

CONCLUSION: Urgent surgery may have been prevented in our patient by earlier recognition and decision for surgical intervention. Patients who receive emergent repair are more likely to require resection of the bowel, have longer operative and postoperative time, and have more post-operative complications. In the outpatient setting, it is important to analyze patient's social determinants of health in patients with alcohol use disorder and ensure elective surgery to prevent mortality. Patients with alcohol use disorder may have low-grade encephalopathy, leading to challenging management and treatment. Advocating for these patients may improve health care outcomes of this vulnerable patient populations.

THE IMPACT OF HEALTH LITERACY, SOCIOECONOMIC STATUS, AND RACIAL DISPARITY IN HEALTH OUTCOMES.

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LEARNING OBJECTIVE #1: Assess the impact of health literacy and socioeconomic status on health outcomes.

LEARNING OBJECTIVE #2: Evaluate the effect of racial disparities in health outcomes. **CASE:** A 55-year-old African American woman with past medical history significant for chronic intermittent hypomagnesemia, hyponatremia, and hypokalemia, alcoholic cirrhosis, hypertension, and depression presented to the emergency department with complaint of bilious vomiting, non-bloody diarrhea, and unintentional weight loss. Extensive chart review revealed that the patient has had symptoms for more than 5 years. She intermittently followed with a nephrology clinic. Extensive imaging revealed only one small hepatic nodule. Blood work which included renin and aldosterone levels were normal. However, for significant time periods, she was lost to follow up. Over the past year, this patient presented to the emergency department (ED) eight times with similar complaints. During these ED visits, the patient declined admission. Her symptoms continued to worsen and in November 2020, the patient was admitted to the hospital for severe electrolyte abnormalities related to ongoing diarrhea. She was started on oral Magnesium and Potassium supplements, without improvement of her symptoms. Her symptoms were associated with poor appetite, intermittent paresthesia of the fingers, lower extremity weakness, muscle cramps and palpitation. She denies changes in her diet, abdominal pain, constipation, headache, seizures, or loss of consciousness.

IMPACT/DISCUSSION: From extensive chart review, we discovered that the patient had been seen by multiple subspecialty providers in different hospital systems as well as numerous residents and attending physicians. As such, there was no individual who knew the full longitudinal history of the patient. Fragmentation of care and lack of shared decision making both compounded the delay in appropriate diagnosis for this patient. The impacts of care fragmentation include higher healthcare costs, lower quality of lives and worse outcomes. We hypothesized that low health literacy, low socioeconomic status and racial disparities in health care largely contributed to her delayed diagnosis and treatment, resulting in greater morbidity and mortality.

CONCLUSION: - It is important to recognize the impact of health literacy on the health outcomes of patients.

- We should recognize and address the socioeconomic barriers that might delay diagnosis and treatment resulting in poor health outcomes.

- It is important to put in check our implicit biases to be able to provide quality care to our patients.

THE ROLE OF RACE AND SOCIOECONOMIC STATUS ON HEPATOCELLULAR CARCINOMA

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LEARNING OBJECTIVE #1: Recognize the health care disparities which are prevalent in cancer care.

LEARNING OBJECTIVE #2: Manage patients with chronic liver disease with routine surveillance to detect hepatocellular carcinoma (HCC) early.

CASE: 60-year-old African American male with history of cirrhosis, hepatitis C, and alcohol abuse without a primary care provider (PCP) presented with 10-days of constant, non-radiating upper abdominal pain associated with anorexia and "orange-colored" urine. He had been admitted at our hospital two years prior for hematemesis, during which he was noted to have elevated alpha-fetoprotein (AFP) to 55 ng/mL with liver ultrasound revealing a mildly heterogeneous liver. He was provided an appointment for a PCP and asked to follow-up as an outpatient for further work-up. Despite multiple attempts to contact him by our social workers and hepatitis C clinic, he was lost to follow-up. During the current admission, he was noted to be jaundiced with diffuse abdominal tenderness. Laboratory work-up was notable for transaminitis, significantly elevated direct bilirubin (12.9 mg/dL), and AFP (153,691 ng/mL). Computed Tomography (CT) of the Chest/Abdomen/Pelvis revealed a large heterogeneous hepatic mass occupying the entire right hepatic lobe with direct invasion (tumor thrombosis) into the inferior vena cava, a portion of the right atrium, main portal vein, and superior mesenteric vein with 5-8 bilateral

pulmonary nodules. He underwent a liver biopsy, with pathology revealing poorly differentiated hepatocellular carcinoma (HCC) with tumor cells positive for cytokeratin 19 (CK19) and Hep-Par1. A detailed discussion involving our multidisciplinary tumor board committee, the patient, and his family led to the decision of transitioning to Hospice Care.

IMPACT/DISCUSSION: HCC is a primary tumor of the liver which usually arises in the setting of chronic liver disease, such as hepatitis B, C infection or cirrhosis. Although HCC is the sixth most commonly diagnosed cancer worldwide, it is the second most lethal, with a five-year survival of 18%. The mortality rate has increased by 0.6% between 2013 and 2017 while mortality rates for other cancers are decreasing. Health care disparities play a significant role in cancer survival with studies showing increased survival amongst Caucasians and those of higher socioeconomic status (SES) when compared to the African American population. Early diagnosis of HCC through surveillance programs with a liver ultrasound every 6 months in patients with hepatitis or cirrhosis can result in a better prognosis in the era of advanced cancer treatment. However, low adherence to HCC surveillance disproportionately affects non-Caucasian patients and those of lower SES, as seen in our case.

CONCLUSION: Healthcare providers should be more cognizant of how socioeconomic status and race play a role in cancer mortality. Measures should be taken to identify high-risk individuals in order to increase adherence to surveillance programs and improve mortality and morbidity in HCC patients

Clinical Vignette - Hospital-Based Medicine

AN ATYPICAL PRESENTATION OF RHEUMATOID ARTHRITIS IN A YOUNG AFRICAN AMERICAN MALE

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LEARNING OBJECTIVE #1: Recognize an atypical presentation in rheumatoid arthritis

LEARNING OBJECTIVE #2: Identify diagnostic criteria for seronegative rheumatoid arthritis

CASE: A 44 year old African American (AA) male with a history of heart failure, hypertension and chronic anemia presented with a bleeding sacral ulcer secondary to chronic debility due to "severe osteoarthritis." Patient was active as a young adult, but a year prior to presentation, he had worsening pain in his bilateral shoulders, elbows, ankles, back, right hip, and right knee. The patient noted to have "double jointed fingers" with stiffness and pain that progressed to a loss in function. Physical exam showed hyperextension of proximal interphalangeal (IP) joints and flexion of distal IP joints, ulnar deviation bilaterally, and fibular deviation of bilateral feet. Labs were notable for anemia with hemoglobin of 6. An autoimmune work up revealed a negative ANA, dsDNA, CCP and RF. Radiographs showed erosive changes of multiple joints with sparing at the distal IP joints, swan-neck deformities, and erosions at the bilateral shoulders, feet, and right hand. Ultimately, the patient was diagnosed with severe seronegative rheumatoid arthritis (RA), and started on prednisone with improvement in his symptoms. We present an atypical presentation of late presenting severe RA in a young AA male patient.

IMPACT/DISCUSSION: RA is an autoimmune, inflammatory, chronically debilitating condition affecting multiple small joints. It has a large predominance in women with an incidence rate two to three times higher than males. The prevalence of RA is notably higher in people descending from Northern European countries and the United States. Lifestyle factors include cigarette smoking, alcohol, poor diet, obesity and physical inactivity. Patients will typically present with gradual onset of multiple small joint pain, with systemic symptoms of prominent myalgia, fatigue, low-grade fever, weight loss, and depression. Extra-articular manifestations such as nodules or episcleritis may also be present. Cardiac involvement includes pericarditis, vasculitis, and myocarditis, with an increased risk for coronary artery disease and heart failure. Treatment involves an early aggressive approach with nonsteroidal anti-inflammatory drugs and/or glucocorticoids in conjunction with disease-modifying antirheumatic drugs.

CONCLUSION: The joint pain of our middle-aged AA male is consistent with RA, i.e. small joints, sparing distal IP joints, swan neck and boutonniere

deformities, ulnar deviation, and cardiac involvement with heart failure and positive risk factors of cigarette use, obesity, poor diet, and immobility. Even with these consistent findings for RA, our patient was never worked up, likely secondary to his atypical demographics, being a young, AA male. Early diagnosis and appropriate treatment of RA is necessary to improve functional outcome, limit extra-articular manifestations, improve quality of life, and reduce premature mortality.

A CASE OF ACUTE APPENDICITIS PRESENTING AS SMALL BOWEL OBSTRUCTION IN THE SETTING OF SUSPECTED INFLAMMATORY BOWEL DISEASE

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LEARNING OBJECTIVE #1: Diagnose acute appendicitis when imaging is consistent with small bowel obstruction

LEARNING OBJECTIVE #2: Recognize utility of antibiotic treatment for appendicitis in setting of diffuse bowel inflammation

CASE: A 56-year-old male without any significant past medical history presented to the emergency department at the Denver Health hospital with one day of severe abdominal pain, nausea and vomiting, and rising inflammatory markers. CT of the abdomen showed wall thickening, mesenteric stranding, and trace scattered free fluid concerning for small bowel obstruction versus bowel ischemia. CT enterogram confirmed small bowel dilatation with transition point suspicious for obstruction. GI PCR was negative; fecal calprotectin was elevated at 188. Concern for atypical inflammatory bowel disease (IBD) arose due to this being the patient's second episode of symptoms, as he had had a similar, milder episode two months ago that resolved without treatment, and due to a history of chronic intermittent diarrhea preceding this episode. The obstruction improved, and a repeat abdominal X-ray demonstrated a nonobstructive bowel gas pattern. Colonoscopy revealed purulent exudate at the appendiceal orifice, solitary cecal ulcer, and grossly normal appearance of the ileum. The case was discussed with General Surgery who felt that appendectomy was not indicated given risks present with potential underlying IBD; therefore, patient was managed with cephalosporin and metronidazole. Repeat CT demonstrated fluid collection in the right lower quadrant concerning for abscess secondary to perforated appendix; a percutaneous drain was placed by Interventional Radiology. Patient tolerated advancement of diet and was discharged with antibiotics and a plan to follow up in GI clinic to proceed with video capsule endoscopy for further work-up of extensive small bowel inflammation demonstrated on CT concerning for IBD.

IMPACT/DISCUSSION: Acute appendicitis rarely presents as small bowel obstruction and is often overlooked in such a setting leading to a diagnostic dilemma and delays in management. A conclusive diagnosis is often not possible until visualization during surgery. However, in some previously reported cases, CT has been used to establish the diagnosis. The present case is unique in that colonoscopy was performed due to concern for concurrent inflammatory bowel disease and demonstrated findings consistent with appendicitis, thereby eliciting the likely cause of the resolving obstruction. Additionally, this case adds to the literature by providing an instance of appendicitis causing obstruction in which antibiotics were used as treatment instead of appendectomy as in previous reported cases.

CONCLUSION: Appendicitis often goes overlooked in the setting of small bowel obstruction and should be kept on the differential diagnosis. Management with antibiotics may be a reasonable treatment option in place of appendectomy for appendicitis causing obstruction in the setting of diffuse bowel inflammation.

A CASE OF ACUTE URATE NEPHROPATHY SECONDARY TO POLYARTICULAR GOUT FLARE

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LEARNING OBJECTIVE #1: Recognize the clinical features of polyarticular gout and treatment options

LEARNING OBJECTIVE #2: Recognize gout as a cause of acute urate nephropathy

CASE: A 72-year-old male with history of gout, CKD stage II, and dementia presented with 3 days of right leg pain and fever to 101.9. Exam showed a right ankle exquisitely tender to passive ROM. There were effusions in both ankles, right 1st MCP, both elbows, and right knee. Labs were notable for WBC of 21, Cr of 1.3 (at baseline), ESR 68, CRP 44, and uric acid of 11. Fluid studies from an arthrocentesis of the right ankle showed 27K WBC (96% neutrophils) and urate crystals. Empiric antibiotics were stopped once blood and synovial fluid cultures stayed negative. He was diagnosed with a gout flare and treated with renally dosed colchicine and methylprednisolone. His joint symptoms improved, but he developed an AKI on hospital day 7, with Cr now at 2.7. Renal ultrasound showed no hydronephrosis. CT abdomen showed no obstructing stones. An UA showed pH of 5 and many uric acid crystals. Renal was consulted. Given the temporal correlation between the AKI's onset and the many uric acid crystals on UA, plus his persistent low urine pH, he was diagnosed with acute urate nephropathy (AUN). He was given rasburicase with IV fluids, which lowered his uric acid to 4.4 and Cr to 2. A week after his steroid taper, he had a recurrent polyarticular flare. Further steroids were avoided due to concerns about worsening mentation, thus he was treated with anakinra. His flare resolved and he was discharged on allopurinol, anakinra, and colchicine.

IMPACT/DISCUSSION: AUN is caused by uric acid crystal precipitation in the distal tubules and collecting ducts leading to acute renal failure. While AUN is more commonly associated with tumor lysis syndrome in high cell turnover diseases like leukemia, it has rarely been described with gout. Risk factors for AUN include acute elevation of serum uric acid levels and acidic urine pH which increases precipitation of uric acid, both present in our patient. Though not measured in our case, a uric acid-to-creatinine ratio > 1 has also been cited as a specific finding for AUN. Treatment includes IV fluids and rasburicase, which converts uric acid to soluble allantoin. Early nephrology consultation is recommended.

Gout flares can be difficult to treat due to common comorbidities which limit use of first-line therapies.

In a retrospective review of 538 patients with gout, NSAIDs were contraindicated in >90% of cases, colchicine in 40%, and steroids in 39%. For patients in whom these 1st line agents can't be used, IL-1 receptor antagonists are a 2nd line option. One such agent, anakinra, was found to be non-inferior when compared with usual treatment for acute gout flares.

CONCLUSION: Polyarticular gout can present with a systemic inflammatory response syndrome. IL-1 inhibitors can effectively treat gout flares in patients in whom first line therapies are contraindicated. Acute urate nephropathy is a rare, but potential complication of gout flares.

A CASE OF ANTI-NMDA ENCEPHALITIS WITH BILATERAL OVARIAN TERATOMAS

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LEARNING OBJECTIVE #1: Diagnose paraneoplastic encephalitis even with negative initial imaging if clinical suspicion is high.

LEARNING OBJECTIVE #2: Treat paraneoplastic encephalitis with IVIG early in the treatment course.

CASE: his case presents a 19-year-old African American female with a strong family history of epilepsy who was brought to the ED after having two weeks of headaches, multiple seizures over the course of the previous two days, and was described as having behavioral changes by her mother and sister. After admission, her symptoms progressed from postictal psychosis with hallucinations and somnolence to full loss of consciousness. An initial MRI of the brain was normal. A subsequent lumbar puncture revealed an elevated opening pressure of 55 cmH2O. The constellation of symptoms and elevated lumbar pressure raised the suspicion of a paraneoplastic syndrome, and a CT of the abdomen and pelvis revealed a 5 x 4.2 cm ovarian cyst. Further examination of the

features of the cyst with ultrasound revealed areas of calcification. IVIG treatment was started for treatment of the suspected paraneoplastic related encephalitis. After a discussion with neuroradiology about the differential diagnosis, repeat examination of the initial MRI and CT abdomen and pelvis revealed minimal hyperintensities within the temporal lobes bilaterally in the former and evidence of previously unidentified bilateral dermoid cysts in the latter. Testing for Anti-NMDAR IgG antibody in the CSF came back positive, and the patient underwent left salpingoophorectomy and right ovarian cystectomy for bilateral ovarian teratoma resection.

IMPACT/DISCUSSION: This case exemplifies the importance of treating a suspected paraneoplastic encephalitis with IVIG early in the treatment course. It also demonstrated the benefit of communication with radiology, as context of the differential diagnosis and clinical presentation can make uncertain radiological signs more decipherable. Also, after a thorough search of the literature, we are unaware of any other cases of NMDA-encephalitis with bilateral ovarian teratomas. This case stressed the importance of maintaining a wide differential diagnosis and not ruling out conditions too prematurely if the initial evidence doesn't immediately correlate. This case adds to the literature by presenting a rare presentation of an uncommon paraneoplastic syndrome with a unique diagnostic and treatment course.

CONCLUSION: - Early use of IVIG

- Communication with radiology

- Importance of maintaining a broad differential tailored to clinical suspicion and not rely solely on imaging findings

A CASE OF BILATERAL PAN-VEITIS AND ACUTE RETINAL NECROSIS SECONDARY TO OCULAR SYPHILIS

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LEARNING OBJECTIVE #1: Screen for syphilis when seeing a patient with HIV who presents with any eye symptoms

LEARNING OBJECTIVE #2: Recognize that ocular syphilis can be the only manifestation of neurosyphilis and involve any eye structure

CASE: A 73-year-old woman with a history of HIV on ART and active cocaine use presents to the ophthalmology clinic with progressively worsening bilateral painless vision loss over one month. On ophthalmologic exam, she was found to have bilateral pan-uveitis and acute retinal necrosis. Given concerns for CMV, HSV, VZV, and syphilis infections, she was given an intraocular injection of foscarnet and referred to our hospital for inpatient management of pan-uveitis and acute retinal necrosis. On exam, there was conjunctival and scleral redness, and pupils were not reactive to light. The visual acuity was less than 20/400 bilaterally. Syphilis serology testing revealed highly reactive RPR at 1:128 and reactive FTA. CSF analysis was negative for pleocytosis and VDRL. She was diagnosed with ocular syphilis. She was initiated on IV penicillin and ganciclovir, as well as cyclopentolate and prednisolone eye drops. CD4 count came back normal and HIV viral load was undetectable. Ganciclovir was then discontinued. Intravitreal cultures were negative for fungal, bacterial, HSV, and VZV infections. The patient was discharged to a skilled nursing facility to complete a 14-day course of IV penicillin.

IMPACT/DISCUSSION: This case illustrates the importance of screening for syphilis as the cause of loss of vision, especially in patients with HIV. Ocular syphilis is a form of early neurosyphilis, most frequently seen in patients with HIV infection. Ocular syphilis can involve any eye structure, but posterior uveitis and pan-uveitis are the most common manifestations. Ocular syphilis may not be accompanied by syphilitic meningitis. Therefore, it is important to note that negative CSF VDRL and pleocytosis do not preclude the diagnosis of ocular syphilis. In this case, empiric treatment for CMV/HSV/VZV was initiated for acute retinal necrosis given unclear CD4 count and HIV viral load. However, ocular syphilis is also known to rarely cause acute retinal necrosis.

CONCLUSION: Ocular syphilis can be the only manifestation of neurosyphilis and can involve any eye structure. Clinicians should have a high index of suspicion when seeing a patient at risk with any eye symptom.

A CASE OF LATE-ONSET HEMOPTYSIS IN A COVID19 PATIENT

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LEARNING OBJECTIVE #1: Recognize hemoptysis as a symptom of alveolar hemorrhage in COVID19

LEARNING OBJECTIVE #2: Recognize the complexity of managing simultaneous pulmonary embolism and hemoptysis in worsening COVID19 pneumonia

CASE: A 69-year-old man with hypertension, mild emphysema and gastritis presented for a week of fatigue, dyspnea and fever. On arrival to ED, T 100.4F, tachycardic, hypoxic to 86% on room air and improved to 94% on nasal cannula (NC). No cough, anosmia/ageusia or gastrointestinal (GI) symptoms. Nasopharyngeal swab detected SARS-CoV-2. Chest xray showed bilateral multifocal patchy airspace opacities and prominent interstitial markings. Ddimer was 470. 'Do not intubate (DNI)' status was affirmed.

The next day, he required 100% fraction of inspired oxygen with high-flow NC despite initiation of high-dose dexamethasone and remdesivir. Twice-daily proton pump inhibitor (PPI) was begun in tandem with steroid. Procalcitonin of 0.31 prompted addition of ceftriaxone and azithromycin. On day 4, Ddimer jump from 861 to 3099 raised suspicion for pulmonary embolism (PE). CT confirmed bilateral PE. Heparin drip was started and later changed to apixaban. On day 18, he had a large episode of hemoptysis. No hemoglobin (Hgb) drop. Repeat CT showed decreased clot burden but increased bilateral airspace opacity consistent with atypical pneumonia, ARDS and hemorrhage. Interventional Radiology (IR) did not intervene due to lack of target on CT. Once hemodynamically stable with no further bleed, heparin drip was restarted. On day 22, he had another episode of moderate hemoptysis with an isolated episode of melena. Repeat Hgb was again stable, but a unit of packed red blood cells was given preemptively.

IMPACT/DISCUSSION: COVID19 is associated with hypercoagulability and increased risk for thrombotic events such as PE. Hemoptysis occurs in 13% of PE cases but has so far rarely been reported in COVID19. There are a few case reports of COVID19 pneumonia, acute PE and underlying emphysema that developed hemoptysis and had worse outcomes. Our case is unique in that his hemoptyses were on hospital days 18 and 22 after starting therapeutic anticoagulation. So, his hemoptysis was unlikely to be caused by PE. Upper GI bleed (GIB) was also less likely; he was on a PPI, and Hgb was low but stable throughout. The most likely etiology was alveolar hemorrhage and ARDS secondary to COVID19.

Concurrence of venous thromboembolism and alveolar hemorrhage can create a therapeutic dilemma. Our patient's DNI status precluded procedures requiring general anesthesia, e.g. endoscopy to visualize GIB or bronchoscopy to identify vessels for IR embolization. Apixaban reversal with andexanet alfa was deferred given his known PE. IVC filter was considered in case he could not tolerate anticoagulation. Heparin drip was restarted for easier anticoagulant reversal.

CONCLUSION: Hemoptysis can present as a late-onset complication of COVID19 in the hospitalized patient.

Heparin drip for pulmonary embolism in COVID19 can be easily discontinued if hemoptysis develops.

A CASE OF MEDIASTINAL MASS PRESENTING WITH SIGNS AND SYMPTOMS OF VENOUS THORACIC OUTLET SYNDROME

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LEARNING OBJECTIVE #1: Distinguish the various etiologies of VTOS

LEARNING OBJECTIVE #2: Recognize clinical features that prompt further imaging in a patient with subclavian vein thrombus

CASE: A 39 year old, overweight, Caucasian female, active smoker, with no significant past medical history was sent to the ED by her outpatient vascular surgeon after she was found to have a left subclavian vein thrombus on bedside sonogram. On presentation to the ED, she reported two months of bruising in the left axilla and left chest, which has been stable in size. Concurrently, she noticed that her left upper extremity (LUE) fingers had been turning blue when

her arm was lowered and during showers. She reported that the cyanosis improved once she raised her arm overhead. She also noticed some intermittent swelling in her LUE, as well as heaviness as if 'she had been lifting weights.' She denied pain, paresthesias, numbness, or prior trauma. She also denied chest pain, SOB, cough, or history of blood clots. On physical exam, patient was found to have fullness in the left supraclavicular and axillary areas. Bluish ecchymoses were observed on the left side of her chest, axilla, and also on the left side of the upper back. Labs revealed a mildly elevated platelet count of 428,000 k/uL. A CT of the chest with contrast revealed a large left/anterior mediastinal mass with adjacent lymphadenopathy. There was severe compression with likely occlusion of the left brachiocephalic vein, likely occlusion of the left internal jugular vein, and known occlusion of the left subclavian vein. Biopsy of the mediastinal lymph nodes revealed a diagnosis of Hodgkin Lymphoma.

IMPACT/DISCUSSION: This case demonstrates a young female with a subclavian thrombus occurring from no obvious cause, thus, highlighting the importance of a thorough work up in such cases. Her initial symptoms suggest a picture of venous thoracic outlet syndrome (VTOS). VTOS presents with swelling, cyanosis, heaviness, and aching in the affected arm, which occurs as a result of subclavian vein compression within the thoracic outlet, leading to subclavian vein thrombus. Common etiologies include obstruction of the subclavian vein in the costoclavicular space, which can be due to strenuous or repetitive activity, trauma, indwelling catheters, or as in this case, from a mass. Had the work up stopped at the bedside sonogram that revealed the subclavian thrombus, the patient's treatment would've terminated with anticoagulation. However, her constellation of symptoms raised further suspicion and hence CT scan was done which revealed the mass to be the root cause of the thrombus. Recognition of the underlying cause led to prompt alertness of the oncology team and allowed for timely diagnosis and management.

CONCLUSION: Clinical signs and symptoms of VTOS from no obvious cause may indicate underlying malignancy.

Further imaging should be pursued in a patient with subclavian thrombus for optimal diagnosis and management.

A CASE OF MENINGOCOCCEMIA WITH UNUSUAL ABDOMINAL SYMPTOMS.

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LEARNING OBJECTIVE #1: Recognize that patients with meningococemia can present with abdominal symptoms.

LEARNING OBJECTIVE #2: Include non abdominal sources of infection in the differential diagnosis of septic patients with abdominal symptoms.

CASE: A 44-year-old male with no past medical history presented to the hospital with progressively worsening myalgias, fever, chills, abdominal pain, loose stools, nausea and vomiting, over about 2 to 3 days. Patient denied a headache or skin rash. No tick bites or sick contacts. Sexually monogamous. Unknown vaccination status. Laboratory-WBC-2000/uL, platelet count-66,000/uL, peripheral smear-20% bands, toxic granulations and Dohle bodies. Lactic acid-9 mmol/L, total bilirubin-4 mg/dl, AST-940 U/L, ALT-535 U/L, blood urea nitrogen/serum creatinine-48/2.0, prothrombin time-18.2 seconds, INR-1.5, fibrinogen-761mg/dl and D-dimer-20 mg/mlFEU. Vitals-Temperature-39.8°C, blood pressure-120/53 mmHg, oxygen saturation-97% on room air, respiratory rate-22/min, heart rate- 129/bpm. Physical exam-diffuse abdominal tenderness, no rebound, guarding or rigidity. No petechiae or meningismus. Imaging of abdomen/pelvis-mild wall thickening of the ascending colon. Within 3 hours of presentation, blood pressure-72/46 mmHg and oxygen saturation- 81% on room air requiring intravenous vasopressors and oxygen supplementation via intranasal cannula respectively. Patient was started on vancomycin and zosyn. Patient was weaned from IV vasopressor support within 24 hours. Patient continued to have 3-4 non loose bowel movements per day. Blood culture turned positive for Neisseria Meningitidis. Stools studies, complement levels- unremarkable. After 7 days in the hospital, the patient was discharged home on a total 14 day course of intravenous antibiotic therapy.

IMPACT/DISCUSSION: Blood stream invasion with Neisseria Meningitidis has a wide spectrum of presentation ranging from self limiting flu like

symptoms to invasive meningococcal disease with meningococemia and meningitis. Meningitis is the most common presentation of invasive infection, but 5-20% of patients can present with meningococemia and septic shock without meningitis. Meningococemia presents with flu-like fever, headache, severe myalgias and asthenia. About 1% of patients can present with abdominal pain and diarrhoea resembling gastroenteritis early in the disease. Also, the petechiae rash in meningococemia may be absent in about 25% of the patients (like our patient). Abdominal symptoms and the absence of petechiae in a rapidly deteriorating patient can make the physician anchor to a gastrointestinal source for the sepsis confounding the diagnosis. This together with only about 50% sensitivity for blood cultures even in untreated patients, can lead to a delay in diagnosis with resulting loss of limbs, CNS damage or death.

CONCLUSION: Given the rarity of meningococcal disease in the United States with widespread vaccination, awareness of atypical presentations would help clinicians consider Neisseria Meningitidis early in a patient's disease course.

A CASE OF PEMBROLIZUMAB INDUCED DISTAL RENAL TUBULAR ACIDOSIS

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LEARNING OBJECTIVE #1: Recognize the features of distal renal tubular acidosis

LEARNING OBJECTIVE #2: Diagnose and promptly treat a potentially fatal immune-related adverse event

CASE: A 74-year-old man with a history of hypothyroidism and recurrent melanoma with dermal lymphatic spread (s/p excision, five cycles of pembrolizumab, last cycle 21 days prior) presented to clinic. He reported mental slowing, fatigue, slurred speech, dyspnea, hypotension and poor appetite following his fifth cycle of pembrolizumab. He was sent to the ED where workup included an unremarkable CT head, ABG with pH of 7.05, PCO₂ of 23, PO₂ of 58 with serum bicarbonate of 6. Other labs showed serum potassium of 3.2, serum chloride of 124, BUN of 47, Cr of 2.0 (baseline of 1.4), urine pH of 6, positive urine anion gap of 49, serum anion gap of 10 and urine protein-to-creatinine ratio of 1.11. UA showed 1+ protein, trace blood, 1 white blood cell/hpf. CBC demonstrated absolute eosinophil count of 700 (9.2%). He received IV and oral sodium bicarbonate with improvement in pH to 7.26 and Cr to 1.5 but minimal change in serum bicarbonate. Given the urine pH of 6 with positive urine anion gap, low serum potassium and hyperchloremic non-anion gap metabolic acidosis in the absence of diarrhea, he was diagnosed with distal type I renal tubular acidosis (RTA). Without autoimmune disease, hyperparathyroidism or inciting medication, RTA was felt to be secondary to pembrolizumab. He was started on prednisone as well as oral and IV bicarbonate and discharged on sodium bicarbonate tablets to maintain his serum levels as well as a prednisone taper.

IMPACT/DISCUSSION: Kidney toxicity of checkpoint inhibitors occurs in ~2% of patients. Literature has focused on AKI with AIN as the most prominent kidney-specific pathophysiology. ATN, glomerulonephropathies and proximal tubule toxicity have also been described. Diagnosis of distal RTA is made with history and labs, first identifying non-anion gap metabolic acidosis and then excluding other known causes of this type of acidosis as mentioned above. A urine pH of greater than 5.5 along with a positive urine anion gap and/or a urine osmolal gap less than 150 will confirm the diagnosis. RTAs have been identified in five cases including this case as an adverse effect of PD-1 inhibitor treatment and precursor to AIN. Each patient improved receiving bicarbonate, potassium supplementation and steroids. Notably, three of the five patients were on a PPI, and four presented with AKI. The fifth patient demonstrated only marginal elevation in Cr suggesting distal

RTA may be an early sign of checkpoint inhibitor kidney toxicity even in the absence of AKI. This would only be the second reported distal RTA secondary to treatment with pembrolizumab, unique in that it is the only described case of a pembrolizumab-induced RTA in the absence of a PPI.

CONCLUSION: Consider this irAE when evaluating patients undergoing treatment with immunotherapy

Prompt treatment with steroids, potassium, bicarbonate and withdrawal of offending agent may be warranted

A CASE OF PRIMARY BILIARY CHOLANGITIS WITH LATE DIAGNOSIS LEADING TO FAILURE TO THRIVE

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LEARNING OBJECTIVE #1: Assess the severity of illness and arrive at goals of care by balancing patient's wishes and objective evidence-based evaluation

LEARNING OBJECTIVE #2: Recognize unspecific abnormal labs and symptoms and ensure continuity of care for early intervention

CASE: Patient was a 77 year old female with recently diagnosed non-alcoholic cirrhosis due to primary biliary cholangitis who presented with encephalopathy. Patient's prior workup from two months prior showed positive IgG, and anti-mitochondrial antibody as well as cirrhosis on imaging. She was scheduled to be evaluated for transplant at an out-of-state tertiary medical center. However, her functional status declined rapidly over the course of two weeks, leading to readmission. Alkaline phosphatase and total bilirubin were markedly elevated. Thrombocytopenia, hypoalbuminemia and coagulopathy were also noted. While ambulatory at baseline, patient became bedbound from debility and encephalopathy. Endoscopic ultrasound showed cirrhosis with mild ascites, and dilated CBD at 9mm without filling defects. Portal hypertension without esophageal varices was noted on endoscopy.

Despite attempts to medically optimize patient for transferring to a tertiary medical center for further hepatology workup, patient remained debilitated with minimal improvement in her symptoms. On hospital day 10, she displayed signs of acute hypoxic respiratory failure with increasing oxygen requirement. She tested positive for COVID-19, although she tested negative on pre-admission screening with PCR assay. Patient was not a candidate for Remdesivir due to comorbidities and was treated with Dexamethasone. Given her poor prognosis, patient was categorized to DNR/DNI per family's wishes. Patient continued to decline and passed away on hospital day 15.

IMPACT/DISCUSSION: On further chart review, laboratory data from 2 years ago showed elevated alkaline phosphatase (>2x upper limit of normal), hyperbilirubinemia (>1x upper limit of normal), and no evidence of cirrhosis, intrahepatic or extrahepatic obstruction, or dilatation on imaging. At that time, only fatigue and generalized weakness were suggestive of PBC. It has been shown in literature that over half of PBC patients are initially asymptomatic or display non-specific symptoms. The onset of symptoms is highly variable among patients. While ursodeoxycholic acid is not curative, initiation can slow the progression of disease and arrangements for liver transplant can be started sooner. This case highlights that it is crucial for clinicians to remain vigilant of abnormal lab values, even if it is unrelated to presenting complaint, and to have proper follow up with monitoring if it does not warrant immediate investigation.

CONCLUSION: - Recognize abnormal laboratory data and correlate with risk factors and clinical symptoms for early intervention.

- Maintain objectivity and evidence-based medicine while involving patients in the care process with utmost empathy, honesty, and professionalism.

A CASE OF RHABDOMYOLYSIS FOLLOWING RECOVERY FROM SEVERE COVID-19 INFECTION

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LEARNING OBJECTIVE #1: Evaluate rhabdomyolysis of unclear etiology
LEARNING OBJECTIVE #2: Recognize rhabdomyolysis as a potential late complication of Covid-19 infection

CASE: We present a case of a 67 year old woman with generalized weakness one week following discharge from the hospital after a month long admission for severe Covid-19 infection. Her exam was notable for mild anterior thigh tenderness, symmetric weakness greatest in the proximal muscles of her lower extremities and normal sensation and reflexes. Labs showed an elevated CK (1775) and acute kidney injury (Creatinine 8.1 from 1.59 a week prior) secondary to rhabdomyolysis. There was no history of trauma or of a non-traumatic exertional etiology of her rhabdomyolysis. Home medications including her statin were held, but her CK continued to rise and she developed renal failure necessitating renal replacement therapy. She was treated empirically for autoimmune myositis with 60 mg of prednisone followed by 1,000 mg IV methylprednisolone but CK remained elevated, peaking at 15,085. An autoimmune myositis panel was obtained and was negative. HMGR antibody was also negative, ruling out statin associated necrotizing autoimmune myositis. MRI of her bilateral thighs showed diffuse myositis, and muscle biopsy demonstrated non-specific, pauci-immune muscle necrosis. Ultimately, her rhabdomyolysis was determined to likely be secondary to a post viral myopathy from Covid-19. A toxic myopathy from medication use, or a delayed critical illness myopathy from her recent prolonged hospitalization could have also contributed.

IMPACT/DISCUSSION: This case highlights the wide differential diagnosis of rhabdomyolysis and the work up of rhabdomyolysis of unclear etiology. It raises the possibility that rhabdomyolysis may be associated with severe Covid-19 infection and could potentially represent a late complication of infection that has not yet been fully described in the literature. Case reports and one retrospective study suggest Covid-19 may cause an acute viral myositis, but data on the long term effects of Covid-19 on the musculoskeletal system is lacking. This case supports and adds to current data that severe Covid-19 infection may be associated with both an acute muscle injury and a post viral myopathy and should therefore be part of the clinician's differential diagnoses of these presentations.

CONCLUSION: -There is little data on how Covid-19 affects the musculoskeletal system, but case reports suggest it has the potential to cause muscle injury

-Our case of rhabdomyolysis following recovery from severe Covid-19 infection suggests that not only may Covid-19 infection have the potential to cause an acute viral myositis, but it may also cause a delayed viral myopathy that can lead to rhabdomyolysis

-Clinicians should be aware of this possible association and include both current and recent Covid-19 infection on their differential for causes of rhabdomyolysis of unknown etiology

A CASE OF SYMPTOMATIC RIGHT VENTRICULAR OUTFLOW TRACT VENTRICULAR TACHYCARDIA

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LEARNING OBJECTIVE #1: Recognize the electrocardiogram pattern of right ventricular outflow tract ventricular tachycardia.

LEARNING OBJECTIVE #2: Management of right ventricular outflow tract ventricular tachycardia resistant to pharmacotherapy.

CASE: A 61-year-old avid bike rider male, with no significant past medical history presented with couple of syncopal episodes and palpitations for a week duration. He did not report any associated chest pain, shortness of breath,

nausea, vomiting, headache, numbness, tingling, or seizure like activity. Family history was significant for cardiac arrhythmia in his father and uncle without reported sudden cardiac death. Physical exam findings including orthostatic vitals were unremarkable except for tachycardia. Laboratory work-up including troponin-I, complete blood count, complete metabolic panel, and electrolytes were within normal limits. Twelve-lead electrocardiogram (EKG) showed non-sustained wide-complex ventricular tachycardia (VT) with rightward axis and left bundle branch block (LBBB) morphology. Echocardiogram findings showed a normal left ventricular ejection fraction without any structural heart abnormalities. Various pharmacotherapies were tried including amiodarone, diltiazem, metoprolol, procainamide, verapamil, and flecainide, however, all of them failed to control his symptoms and recurrent monomorphic VT. Subsequently, a decision was made to proceed with Radiofrequency ablation (RFA). The first attempt of cardiac mapping failed to reveal any premature ventricular complexes (PVCs) or inducible VT despite achieving increased baseline heart rate >20% after infusing isoproterenol. The patient was then discharged on oral verapamil. However, he experienced three syncope episodes soon after discharge which prompted to consider repeat mapping. The findings were significant for septal right ventricular outflow tract (RVOT) VT focus which was successfully eliminated with RFA. Afterwards, he remains symptom free and VT has resolved.

IMPACT/DISCUSSION: Idiopathic VT comprises 10% of all VTs. Of those with idiopathic VT, 70 to 80%, originate from an excitation focus in the RVOT. RVOT-VT can be triggered by a state of catecholamine excess including strenuous physical activity or stress. Classic EKG findings consist of heart rate >100 beats per minute, QRS duration \geq 120 milliseconds, LBBB morphology with Rightward or inferior axis. In this case, our patient demonstrated all of these EKG findings. RVOT-VT generally has a good prognosis often managed with antiarrhythmic, nodal blocker, or RFA therapy.

Occasionally, RVOT-VT does not respond to medical management alone and requires cardiac mapping followed by RFA. It should be taken into consideration that mapping with RFA may be unsuccessful on the first attempt and may require multiple attempts in a symptomatic patient until successful.

CONCLUSION: Early identification of RVOT-VT from characteristic EKG patterns and appropriate management are essential to prevent fatal outcomes such as sudden cardiac death.

A CASE OF SYPHILITIC PROCTITIS MIMICKING INFLAMMATORY BOWEL DISEASE

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LEARNING OBJECTIVE #1: Distinguish differential diagnoses with similar presentations and use appropriate tests to arrive at proper diagnosis

LEARNING OBJECTIVE #2: Recognize laboratory data and correlate with scientific evidence and overall clinical picture to deliver appropriate treatment

CASE: Patient is a 36 year old male with history of unprotected anal intercourse with both men and women who presented with constipation and left lower quadrant abdominal pain for four days. Proctitis was noted on imaging. Patient has no known family medical history of inflammatory bowel disease. Patient was also noted to have leukocytosis, fever, and elevated ESR and CRP. Fecal calprotectin was negative. While awaiting culture results, given history, patient was empirically treated with Ceftriaxone and Doxycycline. Screening for HIV, Neisseria gonorrhoeae, Chlamydia trachomatis, stool culture, and stool ova/parasites were negative. Serology screening with rapid plasma reagin test for syphilis was also negative. Patient's leukocytosis and fever resolved with antibiotics. Constipation also resolved with supportive treatment. However, patient reported painful defecation and we proceeded with colonoscopy. Distal proctitis, with two clean-based shallow ulcers, 8mm and 4mm respectively, was noted with otherwise unremarkable colonoscopy. Ulcer biopsy showed benign colonic mucosa with inflammatory changes, without evidence of IBD, dysplasia or malignancy. Immunoreactive tests for CMV and HSV were negative as well. Based on history, symptoms, and the characteristics of

the ulcers, it was concluded that the rectal ulcers were sequelae of infectious etiology – most likely due to Syphilis and that the screening tests were likely false negative. Patient was given a one time dose of intramuscular Penicillin and was discharged to complete the 7 day course of Doxycycline.

IMPACT/DISCUSSION: While patient's initial presenting symptoms were suggestive of IBD, infectious etiology was more likely given history and acuity despite the negative screening tests. It is important to note that up to 20-30% of Syphilis patients can have nonreactive serology screening test. Furthermore, because syphilitic proctitis is more commonly associated with primary syphilis, it is possible that the acuity could have yielded a negative screening test. Moreover, syphilitic proctitis can present similarly to IBD. Colonoscopy, while warranted in this case, can have nonspecific findings. Therefore, making medical decisions based on overall clinical picture ensured that the patient received appropriate diagnosis and treatment.

CONCLUSION: - Consider the overall clinical picture as laboratory data can sometimes be falsely positive or negative.

- Appreciate differential diagnoses that can present similarly as well as the benefits and limitations of diagnostic tests.

- Obtain sensitive but pertinent information in a respectful manner to aid in diagnosis and educate patients on preventative measures

A CASE REPORT OF RARE EXTRA-HEMATOLOGICAL MANIFESTATIONS OF ACUTE PARVOVIRUS B19 INFECTION

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LEARNING OBJECTIVE #1: Recognize the wide clinical presentations of acute Parvovirus B19 infection including PPGSS

LEARNING OBJECTIVE #2: Distinguish causes of arterial thrombi, including Parvovirus as a possible etiology

CASE: A 49-year-old woman with a past medical history of Raynaud syndrome presented to the Emergency Department (ED) with complaints of a papular and purpuric rash on her upper and lower extremities that had spread to her palms and the soles. She had associated arthralgia, fatigue, and left flank pain. Computed tomography (CT) of the abdomen and pelvis showed left renal infarction. She was admitted and started on intravenous heparin, then transitioned to apixaban upon discharge.

Despite appropriate apixaban use, she presented again to the ED with recurrent left flank pain. CT angiography showed new right-sided renal infarction and multiple left renal infarctions. She was admitted for further workup. An echocardiogram did not support the diagnosis of paradoxical embolism. Her laboratory tests were significant only for a mild normocytic anemia. An extensive rheumatological workup was negative. Hypercoagulable and infectious workup was also unremarkable except for a positive anti-parvovirus IgM with a negative IgG antibodies, indicating acute infection.

Her flank pain resolved with supportive care and she was discharged with enoxaparin.

IMPACT/DISCUSSION: Acute parvovirus B19 infection is often asymptomatic but can present with constitutional symptoms. It typically presents with a "slapped cheek" rash in children; however, it can present with papulo-purpuric gloves and socks syndrome (PPGSS) in adolescents and adults. PPGSS is an unusual finding, but it typically presents as erythematous papular skin lesions and edema of the hands and feet. Other atypical parvovirus B19 related extra-hematological manifestations can include glomerulonephritis, myocarditis, and vasculitis. Rare cases of arterial thromboses, such as splenic infarction and myocardial infarction, have been reported, which does broaden the spectrum of parvovirus B19 presentations. The treatment of parvovirus B19 infection is usually supportive, but in severe cases, steroid and/or intravenous immune globulin may be warranted.

CONCLUSION: Our patient presented with concurrent PPGSS and bilateral renal infarction, two uncommon extra-hematological manifestations correlated with parvovirus B19 infection. This case expands the differential diagnosis of arterial thrombosis to include parvovirus as a possible etiology. It is also important to recognize that acute parvovirus infection can present as rashes in adults in the form of PPGSS.

ACINETOBACTER PERITONITIS COMPLICATED BY SEVERE ILEUS AND CATHETER REMOVAL IN A PATIENT ON CONTINUOUS CYCLING PERITONEAL DIALYSIS

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LEARNING OBJECTIVE #1: Identify the key clinical features and the treatment of Acinetobacter peritonitis (AP)

LEARNING OBJECTIVE #2: Recognize and manage ileus as a rare complication of AP

CASE: A 72-year-old African American female with a history of end-stage renal disease on peritoneal dialysis (PD), Type 2 diabetes mellitus and hypertension presented to the dialysis clinic with severe, diffuse abdominal pain of one-day duration. The PD fluid was noted to be purulent and labs for peritoneal fluid analysis were collected. The patient received intraperitoneal vancomycin and gentamicin and was sent to the Emergency Department. Vital signs were significant for a heart rate of 102 beats per minute.

Laboratory studies were notable for a WBC count of 14,000 mm³. Abdominopelvic contrast-enhanced computed tomography (CECT) scan demonstrated no bowel obstruction or inflammation. Patient was kept NPO and started on broad spectrum intraperitoneal antibiotics. The PD catheter became clotted and attempts to de-clot were unsuccessful. A temporary hemodialysis line was inserted. Peritoneal fluid culture resulted with pan-sensitive Acinetobacter nosocomialis. Ampicillin-sulbactam was initiated but the patient developed abdominal distension and continued to have abdominal pain and leukocytosis. Repeat abdominopelvic CECT scan revealed severely dilated bowel loops concerning for small bowel ileus. The patient's course was further complicated by septic shock requiring vasopressors. The PD catheter was removed for source control and a nasogastric (NG) tube was placed after which the patient improved. A permanent hemodialysis catheter was placed and the patient was discharged home with ciprofloxacin to complete a two-week antibiotic course.

IMPACT/DISCUSSION: Acinetobacter species are aerobic, gram-negative organisms which represent less than 5% of peritonitis episodes in patients on PD. The most common symptoms are abdominal pain, nausea, vomiting and cloudy dialysate. The possible causes of Acinetobacter peritonitis (AP) include the translocation of gut microflora and a break in exchange sterility. Diagnosis is made with peritoneal fluid culture and analysis. AP typically responds to aminoglycosides, fluoroquinolones, sulbactam combinations and ceftazidime. There have been no reports to date of AP associated with ileus. Initial treatment is supportive with NG tube decompression.

Prompt surgical evaluation must be obtained if there is concern for bowel compromise, lack of clinical improvement or a surgically correctable etiology. Our case highlights that AP can rapidly evolve and lead to complications. Prompt recognition of ileus as a complication of AP may prevent further morbidity and mortality. Source control and antibiotics are key to a successful outcome.

CONCLUSION: AP is a rare yet important cause of infection in patients on peritoneal dialysis. It is paramount to recognize ileus as a complication of AP. Early efforts must be made to diagnose and manage these conditions effectively.

ACUTE CHEST SYNDROME AS A COMPLICATION OF COVID-19 PNEUMONIA

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LEARNING OBJECTIVE #1: Recognize acute chest syndrome as a severe complication of COVID-19 infection.

LEARNING OBJECTIVE #2: Recognize the importance of early interdisciplinary management of acute chest syndrome in COVID-19 infection.

CASE: A 42-year-old male with Hb SS sickle cell disease, iron overload on deferoxime, end stage renal disease on peritoneal dialysis presented to ER with 3 days of sudden onset and progressively worsening pleuritic chest pain associated with nonproductive cough, shortness of breath, chills, malaise. Patient was febrile to 101.1 F, tachycardic and hypertensive. He was hypoxic saturating 90% on room air and required 2L oxygen via nasal cannula. Labs were significant for a BNP of 4000, serial troponins of 200s, elevated CRP of 56, procalcitonin 1.24, hemoglobin 7, BUN 77, and creatinine 9.2. CT angiography of the chest did not show pulmonary embolism but did show a multifocal pneumonia. EKG showed sinus rhythm without diffuse PR depression or ST elevation. He was initially given broad spectrum antibiotics cefepime and vancomycin which were then narrowed to ceftriaxone and azithromycin for treatment of community acquired pneumonia. SARS-CoV-2 resulted positive and he was started on dexamethasone as well as remdesivir. Hematology was consulted and he was diagnosed with acute chest syndrome. Per hematology recommendations he was transfused a total of 3 units packed red blood cells, started on hydromorphone PCA and continued on his home medications; folic acid and hydroxyurea. Consent for exchange infusion was obtained but was not required due to his rapid improvement.

IMPACT/DISCUSSION: Acute chest syndrome is emerging as a severe complication of COVID-19 infections in sickle cell patients. It can be difficult to diagnose acute chest syndrome since pneumonias and acute chest syndrome have nearly identical clinical presentations. Early specialist consultation and empiric treatment should be considered. Treatment of acute chest syndrome from COVID-19 does not deviate from standard acute chest syndrome and consists of fluid resuscitation, pain control, and either packed red blood cell transfusions or exchange transfusion for severe episodes. Our case is unique in that our patient had end stage renal disease and dialysis dependent which prevented the use of maintenance IV fluids. He improved with supplemental oxygen, pain control and packed red blood cell transfusions, alongside treatment of COVID-19 pneumonia with dexamethasone and remdesivir.

CONCLUSION: Acute chest syndrome is being recognized as a complication of COVID-19 infection. Since acute chest syndrome can mimic the symptoms of COVID-19 infection and since early interdisciplinary is essential, physicians should maintain vigilance in high-risk populations.

ACUTE CORONARY SYNDROME SECONDARY TO CORONARY ARTERY ANEURYSMS IN AN HIV PATIENT

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LEARNING OBJECTIVE #1: Consider uncommon causes of MI in lower risk patients with chest pain

LEARNING OBJECTIVE #2: Recognize patients with coronary artery aneurysms are at high risk for MI

CASE: A 43-year-old male with a past medical history of well controlled HIV on ART and hyperlipidemia presented to the ED with a chief complaint of typical chest pain. Of note, the patient is a track coach who exercises daily.

In the ED, his initial vital signs and exam were unremarkable. First EKG demonstrated normal sinus rhythm with no ST changes and troponin was <0.02 ng/mL. Repeat EKG 6 hours later demonstrated inferior T-wave inversions with a troponin of 0.65 ng/mL. Bedside transthoracic echo demonstrated an ejection fraction of 45-50% with inferolateral hypokinesia, so the patient was subsequently admitted for an NSTEMI. Overnight the patient's troponin increased to 50.65 ng/mL. He was taken for urgent cardiac catheterization which demonstrated a proximal LAD coronary artery aneurysm (CAA) and a proximal RCA CAA with a distal embolus. Aspiration thrombectomy of the distal RCA was attempted but failed. Medical therapy was initiated with Clopidogrel, aspirin, and metoprolol. Further investigation revealed a CD4 count of 500, a positive Treponema pallidum Ab with RPR of 1:8, and an unremarkable autoimmune panel. The remainder of his hospital course was uneventful, and he was discharged chest pain free.

IMPACT/DISCUSSION: Although the pathogenesis of CAA is unknown, there are numerous risk factors for its formation. Kawasaki's disease is the most well-known association, followed by other vasculitides, connective tissue diseases, auto-immune diseases such as lupus, and iatrogenic causes.

HIV is a rare cause of CAA, but typically presents in patients with poorly controlled HIV. HIV associated aneurysms typically affect men (86%) with a median age of 44, demographics not dissimilar to our patient. Tertiary syphilis can also affect the coronary arteries, particularly the coronary ostium. However, this typically causes ostial stenosis and is associated with aortitis, neither of which were observed in this patient.

CAAs are a rare cause of ACS carrying a 5-year survival rate of only 71%. Turbulent flow in the aneurysm leads to hemostasis resulting in thrombus formation. Distal embolization leads to an ischemic event, as seen in this patient. Medical management, surgical excision, CABG, and PCI have been attempted with variable success. However, no randomized trials or societal recommendations exist to guide clinicians. Given that CAAs have a high risk of perforation, surgical intervention and PCI should be avoided if possible in favor of medical management.

CONCLUSION: This case illustrates the importance of recognizing rare causes of MI, such as CAA, in younger patients with HIV. It is prudent to consider the whole clinical picture with biomarkers of myocardial injury and expedite LHC, especially when ACS is suspected.

ACUTE EXACERBATION OF HYPERCARBIC RESPIRATORY FAILURE IN THE SETTING OF OBSTIPATION AND COLONIC ILEUS

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LEARNING OBJECTIVE #1: Recognize constipation and colonic ileus as an etiology of worsening hypercarbic respiratory failure.

LEARNING OBJECTIVE #2: Manage obstipation in the inpatient setting.

CASE: A 73 year old male with history of episode of weakness on 9/2019, hypertension, obstructive sleep apnea on BiPAP nightly and chronic hypoxic respiratory failure on 2L NC presented with generalized weakness. One month prior to admission, the patient had one week of fatigue with slowing of speech that self-resolved. On day prior to admission, he developed bilateral upper and lower extremity weakness resulting in multiple falls as well as worsened recurrence of slowing of speech. No shortness of breath or recent diarrheal illness. Patient's medications include Lasix, KCl and Xarelto. Admission physical exam was significant for slight dysarthria, bilateral drooping eyelids, inability to hold objects for longer than 1 second without dropping, inability to raise his lower extremities bilaterally and inability to follow finger with eyes. ABG showed acute on chronic respiratory acidosis likely complicated by metabolic acidosis. We initially suspected myasthenia gravis but the patient was unresponsive to pyridostigmine trial and acetylcholine binding antibodies were negative. His respiratory status worsened so he was advanced to BiPAP and was transferred to the ICU due to concerns he would eventually require intubation. At this point the patient's abdomen felt swollen with some diffuse crampy pain. Abdominal x-ray for distention demonstrated a generalized colonic ileus pattern concerning for obstipation. He received repeated enemas and milk of magnesia for two days. After soap enema and neostigmine, he produced a large bowel movement and was subsequently weaned off BiPAP to 40L HFNC at 40% FiO₂. He was transferred out of the ICU with improvement in abdominal distention and was sitting well on 5L O₂ by the end of the hospital course. He was discharged to SNF for continued PT/OT in setting of weakness.

IMPACT/DISCUSSION: This patient's obstipation was thought to be causing ileus with increased abdominal distention leading to decreased functional residual capacity, resulting in his worsening restrictive respiratory failure and worsening hypercarbia with worsening acidosis. To our knowledge, this is the first case of constipation-associated respiratory failure in the literature that is non-pediatric. Our patient did not have profound signs of an acute abdomen on initial presentation which contrasts from other pediatric cases of constipation-associated respiratory failure. Additionally, no causative agent was identified for the constipation, whereas in other cases it was often a result of medication.

CONCLUSION: -Consider constipation as an etiology in a patient with worsening hypoxic respiratory failure

-Address obstipation with aggressive bowel regimen in critically ill patients

ACUTE ISOPROPYL ALCOHOL INTOXICATION: AN INTERESTING CAUSE OF ALTERED MENTAL STATUS

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LEARNING OBJECTIVE #1: Diagnose isopropyl intoxication and learn its management

LEARNING OBJECTIVE #2: Identify how to distinguish between acute ingestion of various toxic alcohols

CASE: A 69 year old woman with a history of substance use presented with altered mental status and depressed mood. On presentation, she was tachypneic and her Glasgow Coma Scale was 15. Lab studies revealed acute kidney injury (AKI), elevated osmolality of 340 units, increased osmolar gap of 42, and normal anion gap. Her venous blood gas demonstrated a respiratory alkalosis without metabolic compensation. Her urinalysis showed ketonuria. She was given one dose of fomepizole due to concerns for methanol or ethylene glycol intoxication. Her toxicology screen later showed elevated levels of acetone (138.6 units) and propylene glycol (5.6 units). Upon further investigation, she admitted to rubbing alcohol ingestion after not having access to alcohol at home. The patient was treated conservatively for isopropyl alcohol ingestion with intravenous fluids. Her mental status improved significantly after her osmolar gap decreased, and AKI resolved.

IMPACT/DISCUSSION: Isopropyl alcohol is a secondary alcohol found in many household products such as rubbing alcohol and hand sanitizer. It is imperative to rule out methanol and ethylene glycol intoxication in patients suspected of isopropyl alcohol poisoning. The clinical presentation of various toxic alcohols is similar and their treatment differs. Normal anion gap metabolic acidosis 4 to 6 hours post ingestion helps distinguish ingestion of isopropyl alcohol from methanol and ethylene glycol. When oxidized via alcohol dehydrogenase, methanol and ethylene glycol result in aldehydes and carboxylic acids, leading to metabolic acidosis. In comparison, isopropyl alcohol's metabolite is acetone, which cannot be further oxidized, leading to lack of metabolic acidosis. In methanol and ethylene glycol toxicity, administration of ethanol or fomepizole can delay the finding of high anion gap metabolic acidosis.

Presence of metabolic acidosis in starvation, diabetic, and alcoholic ketosis, differentiates them from isopropyl alcohol overdose. Early symptoms of isopropyl alcohol are usually gastrointestinal but patients can present with early central nervous system depression due to rapid absorption. Elevated creatinine isopropyl alcohol ingestion could be a result of acetone interference in creatinine assays, leading to "pseudo-AKI." Treatment of isopropyl alcohol intoxication is typically conservative. Inhibitors, such as fomepizole, can prolong isopropyl alcohol half-life. Hemodialysis can be considered in comatose patients as isopropyl alcohol and acetone are removable via dialysis.

CONCLUSION: We present a case of altered mental status due to isopropyl intoxication. It is important to differentiate isopropyl intoxication from methanol and ethylene glycol ingestion as they have similar presentations but different management. Correct and timely diagnosis is essential, as untreated isopropyl alcohol poisoning can be fatal.

ADULT DIAGNOSIS OF DIGEORGE SYNDROME

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LEARNING OBJECTIVE #1: Develop an understanding of adult DiGeorge syndrome including presentation and symptoms

LEARNING OBJECTIVE #2: Management of chronic hypocalcemia in the setting of adult DiGeorge syndrome

CASE: A 56 year old male with intellectual delay presented due to worsening lower extremity weakness and bowel incontinence was found to be in acute renal failure with severe hypocalcemia (iCal of 0.7) and otherwise normal parathyroid hormone level. His childhood medical history was pertinent for a

cleft palate repair, seizures, and calcium supplementation, which had all resolved after infancy. The patient denied any medication use, thyroid surgery, or radiation of his neck, and no family history of hypocalcemia. His hospital course was notable for temporary hemodialysis. In light of the patient's significant childhood history and presentation, a chromosome microarray test was completed, which demonstrated a 1.4 megabase deletion at 22q11.21 consistent with DiGeorge syndrome. The patient was ultimately discharged on calcitriol therapy with close outpatient follow up.

IMPACT/DISCUSSION: DiGeorge syndrome is typically considered a diagnosis seen in childhood, but given the variability in phenotype it should also be considered in adults with non-familial mutations. The symptoms of hypocalcemia span from neuromuscular irritability (i.e. tetany, seizures) to hypotension and psychiatric manifestations. However, this patient presented with severe hypocalcemia with a serum calcium 6.7 and iCal 0.73, but no neuromuscular symptoms which was highly suggestive of a chronic process. DiGeorge syndrome is generally considered a diagnosis in adults if there is a positive family history, but non-familial mutations should be considered given that further evaluation would have a potential effect on their offsprings and long term planning for the patients.

CONCLUSION: DiGeorge syndrome can present in adulthood with non-familial mutations and should be considered if there is a high index of suspicion in the setting of primary hypoparathyroidism. Hypocalcemia may present without neuromuscular symptoms depending on the chronicity. Management of adult DiGeorge syndrome is largely based on supportive measures

AFOP'S FABLE: A LESSON IN DIAGNOSIS

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LEARNING OBJECTIVE #1: Identify an unusual type of organizing pneumonia.

LEARNING OBJECTIVE #2: Illustrate a diagnostic approach and treatment plan for organizing pneumonia.

CASE: A 67-year-old man with hypertension and myelodysplastic syndrome presented with two weeks of fever and no identified source. Diagnostic studies included CT imaging of the chest and abdomen showed bilateral diffuse airspace disease along with worsening abdominal aortic aneurysm (AAA). Bronchoscopy had normal results and cultures were negative. He was discharged with antibiotic treatment for presumed community-acquired pneumonia. He was later re-admitted due to concern of mycotic aneurysm and underwent AAA repair. Surgical pathology showed aortitis with no growth on tissue culture. He was treated with 6 weeks of empiric antibiotics. Outpatient follow-up 4 months later showed resolution of airspace disease. Despite resolution, he continued to have fevers and cough and was re-admitted. CT of the chest demonstrated patchy airspace consolidations in multiple lobes similar to prior imaging. He underwent repeat bronchoscopy with cryobiopsy. The pathology showed acute fibrinous and organizing pneumonia (AFOP). He was started on long-term steroid therapy. Six weeks after initiation of steroids, CT chest showed marked improvement. During subsequent follow-ups in clinic there were no further complications from the disease, nor from therapy.

IMPACT/DISCUSSION: Acute fibrinous and organizing pneumonia (AFOP) is a relatively recent description of acute lung injury findings. It composes of histologic findings of fibrin "balls" in alveolar space and bilateral patchy airspace disease seen on imaging. Presentation of AFOP can vary with dyspnea, cough, and fever being common complaints.

Without unique clinical or radiologic findings in AFOP, definitive diagnosis can only be made with tissue biopsy. AFOP's distinctive feature of intra-alveolar fibrin deposition distinguishes it from similar presentations of other causes of interstitial pneumonia. Previously, surgical lung biopsy was required to yield AFOP as the diagnosis, but cryobiopsy was used to reveal the pathology for our patient. Benefits of cryobiopsy compared to surgical biopsy have been observed. In one study comparing post-biopsy complication, mortality rate was significantly less with cryobiopsy (0.41%) compared to surgical biopsy (3.9%).

Importance of early recognition of AFOP lies in its treatment. Medical therapy commonly includes corticosteroids, although no treatment guidelines have been established. Most cases are idiopathic as in this case. Because of the

scarcity of studies related to AFOP, there are no specific steroid dosage recommendations although 1 mg/kg/day has been previously reported in case studies. For our patient, the dosage used was less than this.

CONCLUSION: Given the elusive presentation of this disease, clinical recognition of this disease with early biopsy is needed to initiate the indicated treatment. Further investigation is required to identify the proper management of AFOP.

AGGRESSIVE PROGRESSION OF A FACIAL SUPER GIANT BASAL CELL CARCINOMA

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LEARNING OBJECTIVE #1: Skin cancers have the potential to be caught early with routine surveillance, follow-up, and early treatment.

LEARNING OBJECTIVE #2: Although basal cell carcinoma is known to have a great prognosis, the prognosis can be dismal if left untreated.

CASE: A 52-year-old homeless man with no past medical history was transferred to our emergency department seeking an evaluation of a left upper facial lesion. He reported that the facial lesion began 11 years ago as small, upper facial lesions, but it has since grown to the current size. He frequented other institutions where he was treated with antibiotics. Eight months before this presentation, in another hospital, he underwent Mohs micrographic surgery, but he did not follow-up with the surgeons. He denied pain, numbness, tingling in and around the lesion, and vision problems. He reported an unintentional 60lb weight loss in the eight year period. He has a history of smoking 1 pack per day for more than 12 years and moderate use of alcohol every few days. His family history was not relevant. Vitals were normal at admission. Cardiopulmonary examination was unremarkable. Upon inspection of the face, there was an ulcer about 22x16 cm in diameter, involving the left upper lid and fronto-temporo-parietal area, with crusting but no discharge. The lesion was associated with exposure of bone and muscle, exposure of the left ocular globe because of lack of left upper lid, and edema in the right lids. There were no neurological deficits.

IMPACT/DISCUSSION: GBCCs greater than 20cm, are extremely rare and aggressive oncological entity and the studies regarding this tumor is scarce. In the largest series of GBCCs including 115 cases, the disease was more common in male, progression over a long period of time, and located in the head and neck, however, the average tumor size was 6.6± 2.2. Our case, a super GBCC with the largest diameter of 22 cm, is probably one of the largest tumors to be described. In a review of the literature, Desmond et al. found only 9 previous cases of super GBCCs.

The super GBCCs attain their size due to neglect, poor follow-up, and location at sites covered by clothes such as the abdomen and back. Optimal treatment of GBCC consists of wide local excision with tumor free margins, chemotherapy, radiation therapy and the combination of them. Our patient underwent the Mohs procedure, but he failed to follow-up for further medical treatment. The extension of his disease is related with a lack of insurance, neglect, inadequate treatment of previous tumors, and poor socioeconomic status.

CONCLUSION: Giant basal cell carcinoma is a rare oncological entity. CT and MRI of the face and brain of our patient demonstrated persistent dehiscence of the left lateral orbital roof and outer table of the left frontal sinus. The biopsy that followed confirmed advanced basal cell carcinoma. The patient refused all treatment, with the exception of antibiotics. He was discharged against medical advice and lost to follow-up.

A HORSE WITH ZEBRA STRIPES: TOXOPLASMA ENCEPHALITIS PRESENTING AS A SOLITARY RING-ENHANCING LESION IN HIV POSITIVE PATIENT

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LEARNING OBJECTIVE #1: Identify approach to diagnosing ring-enhancing lesions in HIV positive patient

LEARNING OBJECTIVE #2: Describe the importance of using laboratory tests and imaging to alter pre-test probability before subjecting a patient to high-risk invasive procedures

CASE: A 57-year-old man with past medical history of newly diagnosed HIV (1 week prior to presentation), hypertension and type 2 diabetes presented to the emergency department with syncope. He was noted to have cachexia, progressive weakness, falls and worsening confusion for 2 weeks. Laboratory workup was unremarkable except for leukopenia with CD4 count of 15. CT head revealed vasogenic edema in the left frontotemporal area. An MRI characterized it as a ring enhancing lesion measuring 2.8 x 2.6 x 1.9 cm with mass effect. Patient was admitted to the neurosurgical ICU and scheduled for a brain biopsy, given concern for primary CNS lymphoma (PCNSL) for which tissue diagnosis was deemed necessary. A preliminary biopsy and antibody testing indicated toxoplasmosis and patient was started on treatment for toxoplasma encephalitis (TE). EBV PCR was subsequently negative. The patient had improvement in encephalopathy after several days of treatment with sulfadiazine and pyrimethamine. Repeat CT on Day#14 demonstrated interval decrease in the size of the lesion.

IMPACT/DISCUSSION: Key differentials for a CNS lesion with mass effect in an HIV/AIDS positive patient are TE and PCNSL. TE typically presents as multiple ring-enhancing lesions in parietal, frontal lobes, basal ganglia or corticomedullary junction. PCNSL presents as either solitary or multiple lesions that are often >4cm. However, these characteristics do not reliably differentiate between the two. The optimal approach is to test for EBV PCR, toxoplasmosis and consider advanced imaging modalities. TE is significantly more prevalent than PCNSL, hence, it is reasonable to trial the patient on anti-toxoplasma therapy for 14 days and monitor for improvement prior to obtaining a brain biopsy. A brain biopsy is only indicated if herniation is imminent. In our case, the rapid improvement with treatment, with a negative EBV PCR and positive toxoplasma antibody made PCNSL unlikely. The timely institution of these measures could have saved the patient from an invasive, and potentially dangerous procedure despite the presence of a solitary lesion. This case demonstrates the importance of using non-invasive laboratory and imaging studies to consider the mostly likely differential diagnosis before invasive diagnostic modalities.

CONCLUSION: Atypical presentations of common conditions occur more than typical presentations of uncommon conditions. Realizing this can help avoid cognitive bias and premature closure. Additionally, a full evaluation of prevalence data, labs, imaging, and guidelines should be utilized early to avoid unnecessary invasive testing and decrease the risk of potential complications.

AIRWAY EMERGENCY: ASTHMA, ANAPHYLAXIS, OR ANGIOEDEMA?

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LEARNING OBJECTIVE #1: Recognize anaphylaxis in a patient with asthma.

LEARNING OBJECTIVE #2: Identify the role of confirmation bias in differentiating conflicting diagnoses.

CASE: A 44-year-old woman with asthma and hypertension on lisinopril presented with acute-onset respiratory distress, stridor, and agitation. She noted her tongue, throat, and lips felt swollen and endorsed a new itchy rash on her legs for 3 days. She could not identify any inciting triggers but reported many allergies.

She was afebrile and hypertensive to 136/100, with a heart rate of 94 and oxygen saturation of 60%. Her face, tongue, and lips appeared edematous. A diffuse, palpable, non-blanching rash was noted on her bilateral lower extremities. Minimal, tight breath sounds were appreciated. ENT completed bedside laryngoscopy with a non-edematous upper airway.

White blood cell count was 11.2 per uL without eosinophilia, lactic acid was 3.9 mmol/L, and ABG returned with pH of 7.349, pCO₂ of 46.3 mmHg, pO₂ of 437 mmHg, and HCO₃ of 25.5 mmol/L on noninvasive positive pressure ventilation and 60% FiO₂.

She was given 5 injections of intramuscular epinephrine and intravenous magnesium with minimal improvement in her respiratory status. She was subsequently started on an epinephrine drip and additionally treated for acute asthma exacerbation with steroids, and nebulized albuterol and ipratropium. Shortly after this treatment, the patient's oxygen requirement decreased to 3 L oxygen by nasal cannula.

IMPACT/DISCUSSION: Anaphylaxis and acute asthma exacerbations are life-threatening and potentially fatal conditions if not triaged appropriately. Asthmatics are at increased risk of fatal outcomes in anaphylaxis due to severe bronchospasm. Both conditions can present with acute-onset shortness of breath, tightened airways, and wheezing that can be difficult to distinguish. This case was further complicated by the patient's angioedema in the setting of chronic lisinopril use. However, ACEi-induced angioedema is typically associated with urticaria.

Confirmation bias is the tendency to interpret evidence in a way that confirms a pre-existing belief. In this case, the team was initially led by confirmation bias to believe anaphylaxis was less likely as the patient did not respond to multiple doses of epinephrine. However, patients with refractory anaphylaxis, or unresponsiveness to two doses of epinephrine, often have coexisting asthma in their medical history and typically do not have a dose-response to intramuscular epinephrine. Nonetheless, the treatment of the presumed acute asthma exacerbation with steroids, along with the intravenous epinephrine for anaphylaxis, overall contributed to improvement in the patient's respiratory status. Current management in refractory anaphylaxis is to dose epinephrine and corticosteroids intravenously.

CONCLUSION: Anaphylaxis and acute asthma exacerbation share similar presentations that are life-threatening and fatal if not triaged appropriately. Dose-response to IM epinephrine should not be confirmatory in ruling out anaphylaxis.

ALCOHOL-INDUCED PELLAGRA: A DEVIATION FROM THE CLASSIC TRIAD

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LEARNING OBJECTIVE #1: Diagnose pellagra in the absence of dementia and diarrhea

LEARNING OBJECTIVE #2: Recognize precipitants of photosensitivity dermatitis

CASE: A 62-year-old female with a history of alcohol abuse and rheumatoid arthritis presented with a one-month history of a pruritic rash that began on her arms and spread to her neck, abdomen, and back. The rash was progressively worsening and felt like "someone was pulling on her skin." An erythematous, confluent rash with superimposed hyperkeratosis appeared in a collar-like distribution around the neck, resembling Casal's necklace. A course of oral antibiotics and tapered prednisone showed no improvement. She reported continued alcohol use but no changes in medications, soaps, detergents, or recent travel. She had no previous history of a rash or family history of autoimmune conditions. She lived in multiple shelters with no knowledge of other residents with similar rashes. Although nausea and vomiting were present, there was no associated diarrhea, fevers, or chills. The patient was hemodynamically stable, alert and oriented, but also in visible distress. Blood culture and CBC were negative for any growth or leukocytosis, respectively. Our differential diagnosis consisted of pellagra, bullous pemphigoid, porphyria, and actinic dermatitis. Actinic dermatitis and porphyria were ruled out due to acuity of the rash and absence of porphyrins on urinalysis, respectively. Direct immunofluorescence was negative for complement, fibrinogen, and immunoglobulin. Punch biopsy showed evidence of epidermal necrosis. A clinical diagnosis of pellagra was strongly favored based on the characteristics of the rash in photodistributed areas and the patient's history of alcohol use. The patient was counselled on sun-protective measures and discharged with 500 mg niacinamide and triamcinolone ointment with instructions to follow up with primary care.

IMPACT/DISCUSSION: Pellagra is commonly associated with the classic triad of diarrhea, dementia, and dermatitis and is seen in areas harboring niacin

deficiencies. In countries with balanced diets, this dermatologic manifestation can be commonly mistaken for a self-resolving dermatitis due to the low index of suspicion that pellagra holds. Pellagra is a predominantly clinical diagnosis, since niacin assays are not cost effective and also not routinely performed. Obtaining a thorough history and considering substance use as a precipitant of nutritional deficiencies can guide clinicians to narrow down an initially broad differential diagnosis. Although patients may present in high acuity settings, it is important to review a wide array of causative agents, such as nutritional deficiencies, that may have a more protracted course.

CONCLUSION: 1. Collecting a comprehensive patient history is essential, since pellagra can present similarly to a myriad of other dermatologic disorders.

2. A multidisciplinary approach involving internal medicine, dermatology, and pathology can offer diverse perspectives through mediums such as histopathology.

ALL DRESSED UP WITH NO PLACE TO GO

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LEARNING OBJECTIVE #1: Understand the typical clinical and laboratory features of Drug Reaction with Eosinophilia and Systemic Symptoms (DRESS).

LEARNING OBJECTIVE #2: Recognize two scoring systems commonly used to aid in diagnosis of DRESS.

CASE: A 58-year-old man with a history of NASH cirrhosis status-post remote liver transplant, complicated by recurrent cholangitis status-post stents, presented with a ten-day history of progressively worsening rash and fevers. Rash initially appeared after several days on intravenous piperacillin/tazobactam. After development of rash, patient's antibiotic was changed from piperacillin/tazobactam to cefepime; however, over the following week the rash worsened. Associated symptoms included increased itching, diarrhea, marked peripheral and periorbital edema, and oral burning.

On initial examination patient was found to be hypotensive, in moderate distress. Head and neck exam revealed periorbital edema and blanchable erythema of the scalp and face. Bilateral upper and lower extremities were edematous, without appreciable pitting. The rash was morbilliform to confluent and covered bilateral posterior and anterior upper and lower extremities, anterior and posterior trunks, head, and scalp. Murphy's sign was negative, and patient was alert and oriented.

A complete blood count with differential revealed an absolute eosinophil count of 1.19k/uL. Patient had mild transaminitis as well as elevated alkaline phosphatase and creatinine on admission. Urinalysis was significant for proteinuria and blood cultures were negative. A peripheral smear revealed atypical lymphocytes. Antinuclear antibody and hepatitis panel were negative. Cefepime was discontinued, and patient was admitted for management of DRESS with subsequent improvement over the following week.

IMPACT/DISCUSSION: The most clinically evident feature of DRESS is a diffuse morbilliform to confluent skin eruption, covering greater than 50% of the body surface area. Other clinical features may include fever, enlarged lymph nodes, facial edema, eosinophilia, liver impairment, renal impairment, lung or heart involvement. Due to this high variability in clinical presentation, determining standardized diagnostic criteria of DRESS has been a challenge in the field. Using two frequently cited scoring systems—adaptations from Peyreire et al. and the Registry of Severe Cutaneous Adverse Reaction (RegiSCAR) derived by Kardaun et al.—our patient presented with a score of 6, correlating to “definite” DRESS.

CONCLUSION: This case represents an instance of DRESS syndrome caused by a penicillin/beta-lactamase inhibitor and further worsened by a cephalosporin. DRESS may not have been the most probable diagnosis due to the patient's complex medical history, a short onset latency and drugs less commonly reported in relation to DRESS. DRESS is a challenging adverse drug reaction that may be mistaken for a drug-induced rash. A high level of suspicion and a careful review of patient's history, physical exam and basic lab values should be performed to identify DRESS.

ALLERGIC REACTION OR MYCOSIS FUNGOIDES?

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LEARNING OBJECTIVE #1: Diagnose the most common subtype of cutaneous T cell lymphoma

LEARNING OBJECTIVE #2: Treatment of Mycosis Fungoides

CASE: A 69 yo M with PMHx of HTN and prostate cancer presents with diffuse rash and pruritus over a 6 month period. The patient could not identify any exposures and had never experienced anything similar in the past. He denied fevers/chills, weight loss, or night sweats. On exam, an erythematous maculopapular rash was noted over his upper and lower extremities. CBC, RFP, and IgE were WNL. His presentation was thought to be secondary to an allergic reaction; however, his symptoms were refractory to hydrocortisone cream, Medrol dose packs and cessation of OTC meds. Allergy testing was noncontributory. Over time, the rash progressed over his entire body with associated facial swelling, LE edema, and nodular lesions around his neck and abdomen. As part of an evaluation for possible recurring prostate cancer, PET scan was performed which showed multiple enlarged cervical, axillary, and inguinal lymph nodes. Oncology was consulted and lymph node biopsy revealed atypical lymph node disorder, but nondiagnostic of T cell lymphoma; however, skin biopsy was consistent with mycoses fungoides. Additionally, repeat CBC demonstrated a WBC over 150k. The diagnosis of mycoses fungoides was made. Patient was started on methotrexate and extracorporeal photopheresis and showed significant improvement in white count, rash and nodular lesions after two therapy sessions.

IMPACT/DISCUSSION: Mycosis Fungoides (MF) is one of the most common subtypes of cutaneous T cell lymphoma. MF usually involves the skin in the early stages and later involves lymph nodes, blood and viscera as illustrated in this case. The rash can include patches, papules, plaques, and symptoms can include pruritus, swollen lymph nodes, and fever/chills. This presentation is commonly seen in allergic reactions and autoimmune disorders, making it important to put MF in the differential for common rashes, as the earlier you diagnose and start treatment, the better the prognosis. MF is diagnosed via skin biopsy looking at histology, immunophenotyping and molecular testing. MF test positive for CD2, CD3, CD4, CD5 and lack CD7, CD261. Once diagnosis is made, it is important to stage the disease, taking into account the percentage of skin affected by lymphoma and lesion types, level of lymphoma in lymph nodes, organ involvement, and number of lymphoma cells in the blood. Treatment of MF depends on the cancer staging. It can include watch and wait for early stage disease or skin directed therapy including topical corticosteroids, topical chemotherapy, topical retinoids and systemic chemo.

CONCLUSION: -Although Mycosis Fungoides can usually present similar to a benign cutaneous condition, it is important to think of this when forming a differential as the sooner the disease is diagnosed and treatment is started the better the prognosis

-If Mycosis Fungoides is suspected, obtain skin biopsy and refer to Oncology for staging and initiation of treatment

ALL THAT SWELLS IS NOT VENOUS STASIS

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LEARNING OBJECTIVE #1: Assess the cause of lower extremity edema

LEARNING OBJECTIVE #2: Recognize pelvic outflow obstruction as a cause of lower extremity edema

CASE: A 53 year old woman with a history of uterine fibroids was transferred from a nursing home for progressive lower extremity edema. Several months prior she had been healthy and high-functioning, until her family noted gradual confusion and difficulty walking. Her initial inpatient evaluation was unrevealing and she was transferred to a nursing home, where staff then newly observed swelling to her bilateral lower extremities.

Her admission exam was notable for poor short-term memory and limited understanding of her situation. She had moderate pitting edema of her bilateral lower extremities, in addition to symmetric areflexia and severe weakness of

her legs. Her upper extremities were unaffected. On abdominal exam she had irregular fullness in the middle lower quadrant suggestive of an enlarged uterus.

Her initial workup for lower extremity edema, including basic labs, urinalysis, echocardiogram, venous Doppler ultrasound, and medication review was unremarkable. Venous stasis edema was considered as a likely explanation given recent immobility, but her unusual abdominal exam prompted further imaging. CT of the abdomen and pelvis noted a large complex solid and cystic left adnexal mass partially compressing the IVC and bilateral iliac veins, concerning for ovarian malignancy with pelvic outflow obstruction. The patient underwent bilateral salpingo-oophorectomy with ovarian pathology revealing a high-grade serous carcinoma. Serum paraneoplastic panel was positive for voltage-gated potassium channel antibody, concerning for ovarian paraneoplastic syndrome contributing to pseudo-dementia.

IMPACT/DISCUSSION: Bilateral lower extremity edema is a common condition and is often attributed to venous insufficiency without further evaluation. Underdiagnosed but frequently considered causes of lower extremity edema include heart failure and pulmonary hypertension, in addition to renal, hepatic, and thyroid disease. Patients should undergo evaluation of these conditions prior to a presumptive diagnosis of chronic venous disease, which typically also includes pigmentary changes of the lower extremities and skin findings including induration and ulceration.

In the absence of skin findings of chronic venous disease, clinicians should consider pelvic imaging to exclude mass effect leading to venous pelvic outflow obstruction. Lower extremity edema due to pelvic outflow obstruction can present as both unilateral or bilateral edema, and depending on the rate of growth of the mass can be acute or chronic.

CONCLUSION: Pelvic outflow obstruction is an uncommon and under-considered cause of lower extremity edema with potentially critical implications. In patients with an unclear clinical presentation of lower extremity edema, the workup should be thorough and include assessment for pelvic mass as a contributing cause.

ANABOLIC STEROID-INDUCED PANCREATITIS

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LEARNING OBJECTIVE #1: Recognize the importance of a thorough evaluation of all medications and supplements in cases of suspected pancreatitis.

LEARNING OBJECTIVE #2: Identify populations at high risk of anabolic steroid use.

CASE: A 38-year-old male with a history of bodybuilding and cholelithiasis status-post cholecystectomy presented with progressively worsening epigastric pain for the past few weeks, with radiation to the back and associated nausea. He recently started anabolic steroids including trenbolone, drostanolone propionate, oxandrolone, and stanozolol, one month prior to onset of symptoms, but denied taking any other medications. The patient was hemodynamically stable with epigastric tenderness on exam. Labs showed lipase of 355, AST 53, ALT 57, creatinine 1.37, triglycerides 228, and a negative ethanol level and urine drug screen. Ultrasound of the abdomen showed a normal liver without biliary ductal dilatation, a surgically absent gallbladder, and an ill-defined and edematous pancreas, consistent with pancreatitis. The patient was given IV fluids and pain medication, clinically improved, and was discharged three days after presentation. He was advised to discontinue his androgenic anabolic steroids (AAS).

IMPACT/DISCUSSION: Acute pancreatitis is the leading cause of gastrointestinal hospitalizations in the United States (1) and has a 5% mortality rate (2). The most common causes of acute pancreatitis are gallstones, alcohol, and hypertriglyceridemia. Drug-induced pancreatitis (DIP) is a less frequent cause but accounts for 2-5% of cases nationwide (4,5). Drugs commonly associated with DIP include steroids such as prednisone, dexamethasone, and ACTH. However AAS are not included in this list (3, 6). Our patient developed acute pancreatitis after recently starting AAS. Given the time course of his AAS use and symptom onset, the most likely reason for the patient's pancreatitis was his AAS use. There is one other documented case of AAS-induced pancreatitis,

linked to trenbolone (7). It is estimated that 54% of male bodybuilders use AAS (10), as well as 5% of adolescent males and 1.4% of adolescent females (8). Up to 85% of users obtain AAS illegally, so use may not be identified when obtaining a history (8). The most common side effects of AAS use are gynecomastia, acne, and infertility (9). More serious side effects, such as DIP, should be considered as well. Timely recognition of all medication and supplement use is crucial in diagnosing DIP, especially in the setting of AAS use, in order to prevent recurrence with resumption of the drug.

CONCLUSION: Acute pancreatitis due to AAS use, although rare, can account for some cases of DIP. The importance of asking patients not only about prescription medications but also about over the counter supplements is key in elucidating the etiology of DIP. Anabolic steroid-induced pancreatitis should be considered in a patient who endorses use and presents with epigastric abdominal pain, as further episodes of pancreatitis can potentially be avoided if the patient stops steroid use.

AN ATYPICAL PRESENTATION OF A RARE DISEASE: METASTATIC DERMATOFIBROSARCOMA PROTUBERANS PRESENTING AS EXERTIONAL DYSPNEA.

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LEARNING OBJECTIVE #1: Recognize a rare clinical presentation of metastatic

Dermatofibrosarcoma Protuberans.

LEARNING OBJECTIVE #2: Manage follow up on patients diagnosed w/ metastatic

Dermatofibrosarcoma Protuberans to assess for recurrence.

CASE: A 48-y.o. AA M smoker presented w/ 2 wk h/o progressive DOE which was slightly improved when laying on his right side and got worse on other side. Pt. was in good health prior. He denied any allergies, fevers, wt. loss, cough, congestion, chest pain, leg swelling, or recent travel. Pt had h/o inguinal metastatic Dermatofibrosarcoma Protuberans (DFSP) which was treated w/ imatinib and surgical resection 2 yrs prior. Pt. had SOB, however, VS were stable. Lung exam showed left tracheal deviation, no tenderness, dullness to percussion and absent breath sounds over the right lung. Nail clubbing of b/l UEs and right inguinal scar from prior resection was noted. Labs were unremarkable. CXR showed a large right pleural effusion w/ compressive changes and mediastinal shift toward the left hemithorax. CT chest w/ IV contrast showed a large mass in right lung of 20 x 16.7 x 13.2 cm associated w/ a large pleural effusion, atelectasis of the right lung, compression w/ a leftward shift of mediastinal structures. There are non-enhancing low-density areas in the mass which may represent necrosis. Pleural fluid analysis was consistent w/ an exudate and cell cytology was negative for malignancy. Finally, a lung bx confirmed low-grade spindle cell neoplasm consistent w/ met from previous DFSP. CT abdomen w/ IV contrast and a CT head w/o contrast were unremarkable for met. Surgical resection was not a treatment option because of the large pulmonary lesion compressing the mediastinal structures and main vessels. Systemic therapy w/ imatinib was started. Pt. experienced a subjective improvement in symptoms and was referred to a tertiary treatment facility.

IMPACT/DISCUSSION: DFSP is a rare cutaneous sarcoma that most commonly presents as an asymptomatic, slowly enlarging, indurated plaque on the trunk or extremities, with an indolent growth pattern. DFSP has a high propensity for local recurrence. Distant mets are rare and typically found in lungs, and less frequently in brain, bone, and other soft tissue. Met rate is closer to 1 percent for low- grade DFSP. In our case, within a period of 2 yrs, the Pt. had developed pulmonary met w/o local recurrence, which is quite rare. The gold standard to confirm the diagnosis is fine needle bx as the pleural fluid analysis is not sensitive. Histology appears as uniform fibroblasts arranged in a storiform pattern around a vasculature. Fibro sarcomatous variant has a heringbone pattern. Localized masses are surgically resected, while Imatinib is indicated for advanced and recurrent DFSP.

CONCLUSION: A low-grade DFSP can metastasize distally w/o local recurrence and the mortality increases exponentially. Therefore Pt. needs close follow-up for recurrence or met. Due to ever-evolving protocols, referral to a facility specializing in sarcomas is recommended.

AN ATYPICAL PRESENTATION OF A RARE MALIGNANCY: PLASMABLASTIC LYMPHOMA MASQUERADING AS HEPATOCELLULAR CARCINOMA

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LEARNING OBJECTIVE #1: Recognize that lymphoma in the liver can have a similar radiologic appearance to Hepatocellular Carcinoma

LEARNING OBJECTIVE #2: Identify the association between Plasmablastic Lymphoma and Human

Immunodeficiency Virus

CASE: A 45 year old male with a history of Human Immunodeficiency Virus (HIV) on antiretroviral therapy, chronic hepatitis B, Crohn's disease, and recently identified liver lesions consistent with Hepatocellular Carcinoma (HCC) on imaging presented with months of worsening back pain, bilateral lower extremity (LE) weakness leading to inability to ambulate, and new onset urinary incontinence. On presentation, he had weakness of both LE, 2/5 on right and 3/5 on left. The rest of the physical exam was unremarkable. Dexamethasone was started due to concern for spinal cord compression. Magnetic resonance imaging (MRI) of the spine revealed an epidural soft tissue mass within the spinal canal extending from T8-L1 causing cord compression. Debulking and decompressive surgery were performed, and pathology from specimen later revealed Epstein Barr Virus (EBV) positive Plasmablastic Lymphoma (PBL). A bone scan and full body computed tomography (CT) scan revealed multiple bone lesions and redemonstrated lesions of the liver. The hepatic lesions (largest being 1.5 cm) demonstrated findings consistent with HCC including hypervascularity in the late arterial phase with washout on the portal venous phase images. Liver biopsy revealed EBV positive PBL.

IMPACT/DISCUSSION: As per the American College of Radiology guidelines, multiphase CT/MRI can be used for lesions at least 1 cm in size to diagnose HCC with high specificity and reasonable sensitivity. Unnecessary liver biopsy should be avoided in patients with liver disease due to increased risk of post-procedural bleeding and risk of neoplastic seeding along the biopsy tract. With this patient's history of chronic hepatitis B infection, mild cirrhosis on imaging, hypervascularity in late arterial phase and washout in the venous phase images, HCC was the most likely diagnosis. Consideration of the patient's entire history is also necessary, as his history of HIV put him at risk of HIV-related neoplasms. PBL accounts for approximately 2% of HIV-related neoplasms, with the most common area of involvement being the oral cavity. Although most patients present with B symptoms (fever, weight loss, night sweats), our patient demonstrated a unique presentation. There is a strong association of EBV positive PBL in HIV patients. Due to PBL being a very rare diagnosis, there is no established standard to treat.

CONCLUSION: Though there are imaging criteria that can be used to diagnose HCC, it is important to recognize that other neoplasms may have a similar appearance on imaging and the definitive diagnosis can only be made with biopsy and histology. PBL is a rare, highly aggressive lymphoma associated with HIV infected patients with a mortality rate of 60% at one year, so an early diagnosis is imperative.

AN ATYPICAL PRESENTATION OF NOCARDIOSIS PRESENTING AS INTRACRANIAL MASS LESIONS

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LEARNING OBJECTIVE #1: Recognize atypical presentations of nocardiosis

LEARNING OBJECTIVE #2: Manage nocardiosis involving the central nervous system

CASE: A 73 year old female with history of rheumatoid arthritis (RA), hypertension, breast cancer post treatment in remission, and diabetes mellitus presented to the emergency department with one day history of dizziness, blurry vision and nausea. Medications included methotrexate, losartan, hydralazine, diltiazem, glimepiride, and a recent prednisone taper for RA flare completed 6 days prior to admission. She also reported associated mild headache but no fever, focal weakness, neck stiffness, rash, or seizure. On physical examination, she had markedly elevated blood pressure, normal pupils reactive to light, intact cranial nerves, and no deficits in strength, sensation or coordination.

Computed tomography (CT) scan of brain was negative, but magnetic resonance imaging (MRI) with contrast showed two ring-enhancing lesions (largest being 1.3 cm) and surrounding edema. Due to concern for possible metastatic disease, CT chest, abdomen, and pelvis were performed and notable for a focal nodule in the lung. Transbronchial biopsy of the nodule was negative for malignancy. The patient's mentation became more altered and repeat MRI brain showed an increase in size of the intracranial lesions as well as four new lesions. Neurosurgery was consulted for biopsy. Pathology revealed brain abscess, Gram positive filamentous organisms, and culture grew *Nocardia farcinica*. *N. farcinica* was also recovered from blood cultures collected in the emergency department. Culture of the lung biopsy was negative.

The patient was started on intravenous imipenem/cilastatin and trimethoprim/sulfamethoxazole (TMP/SMX). Susceptibilities returned and antibiotics were adjusted accordingly. The patient was discharged to a long term care facility to continue TMP/SMX and moxifloxacin for one year.

IMPACT/DISCUSSION: In this case, an immunocompromised patient on methotrexate and intermittent steroids presented with nocardiosis isolated to the central nervous system (CNS). No obvious pulmonary or cutaneous involvement was noted, although the patient had a pulmonary nodule with non-diagnostic biopsy. Nocardiosis typically presents with isolated pulmonary disease in 39% of cases and with multiorgan involvement in 32% of cases. Isolated CNS involvement is only seen in 9% of cases.

Early consideration of *Nocardia* is crucial due to its high mortality, particularly in immunocompromised patients with multiple brain abscesses. Empirical coverage should include TMP-SMX, imipenem, and amikacin if multiorgan involvement. After obtaining culture results, susceptibilities must be obtained due to the high rate of resistance, especially to TMP-SMX.

CONCLUSION: Nocardiosis may present with isolated CNS disease in immunocompetent or immunocompromised patients and should be included in the differential diagnosis. Early treatment of CNS nocardiosis is crucial due to historically high rates of mortality.

ANTI-MDA-5 DERMATOMYOSITIS WITH INTERSTITIAL LUNG DISEASE: A CASE REPORT AND LITERATURE REVIEW

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LEARNING OBJECTIVE #1: Recognize and understand the consequences of the anti-MDA5 subtype of dermatomyositis.

LEARNING OBJECTIVE #2: Recognize ILD as a common complication of DM that is more severe in the anti-MDA5 subtype and understand treatment of this complication.

CASE: A 38-year-old previously healthy male of Japanese descent presented with two months of recurrent fevers, polyarthritis, rash, dyspnea, and weakness. Exam revealed a heliotrope rash, Gottron's papules, Chilblains-like lesions, diffuse joint tenderness, and proximal muscle weakness, consistent with dermatomyositis. He presented with a 2L oxygen requirement and had repeated negative inspiratory force measurements that remained stable between -40 and -50 cmH₂O.

Laboratory findings were significant for high-titer ANA, MDA-5 antibodies, and elevated CK and inflammatory markers. Imaging revealed interstitial lung disease (ILD). A malignancy workup was negative. He was treated with

methylprednisolone, cyclophosphamide, tacrolimus, and plasma exchange transfusion with fresh frozen plasma.

IMPACT/DISCUSSION: Dermatomyositis (DM) is an idiopathic inflammatory myopathy with an annual incidence of 1 in 100,000 (1). DM is characterized by distinctive cutaneous findings, symmetric, proximal muscle weakness, and association with underlying malignancy. Pathognomonic features include the heliotrope rash and Gottron's papules.

Amyopathic dermatomyositis have less muscle involvement and make up about 20% of the cases of DM (2). Of these, about half are attributed to the anti-melanoma differentiation-associated gene 5 (MDA-5) antibody, which has higher incidence in Asian populations (3). This subtype is characterized by lower risk of malignancy and characteristic cutaneous findings separate from other subtypes of DM, including ulcerations, painful palmar macules, painful oral mucosal ulcers, and diffuse, nonscarring alopecia (4,5). Notably, it is associated with higher rates of ILD, including a rapidly progressive form that carries up to a 40% 6-month mortality rate (6). 35-40% of all patients with DM will be affected by ILD during the disease course (7), though this rises to 93% with a positive MDA-5 antibody (8). Plasma exchange and IVIG have been used for the treatment of ILD in DM, however, plasma exchange may be best for severe acute forms (9,10).

Determining the cause of hypoxemia in DM requires distinguishing myositis-related respiratory muscle weakness from progression of ILD. Bedside measurement of negative inspiratory force and pulmonary function testing can help determine the primary cause. In addition, respiratory muscle weakness may be associated with bulbar dysfunction and ventilation insufficiency.

CONCLUSION: Pathognomonic features of dermatomyositis include the heliotrope rash and Gottron's papules. The anti-MDA-5 subtype is important to recognize as it is associated with rapidly progressive ILD and poor prognosis; it should be suspected when there is early lung involvement and characteristic skin findings and be treated aggressively with plasma exchange.

AN UNEXPECTED DIAGNOSIS ON VENTILATION/PERFUSION IMAGING

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LEARNING OBJECTIVE #1: Evaluate hypoxemia in patients with cirrhosis

LEARNING OBJECTIVE #2: Use ventilation-perfusion imaging in detecting conditions other than pulmonary emboli

CASE: We present a case of a 64-year-old female with a history of NASH cirrhosis complicated by esophageal varices and type 2 diabetes mellitus presented with dyspnea. The patient was in her usual state of health without needing supplemental oxygen until 3 weeks ago, when she developed progressive fatigue and dyspnea at rest and on exertion. She reported mild epigastric and substernal chest pain that she attributes to acid-reflux and a chronic cough for several years.

In the ED, her vitals were normal except a peripheral oxygen saturation of 87% on room air. Her physical exam was normal except for mild hepatomegaly, spider angiomas and caput medusa. She had no jugular venous distension or lower extremity edema. Her labs were normal except arterial blood gas showed pH 7.47, PaO₂ 61 mmHg, PaCO₂ 28.8 mmHg on room air. Chest radiograph, chest CT angiography, and lower extremity doppler ultrasonography were all negative. A ventilation/perfusion (V/Q) scan was done to assess pulmonary embolism, which was absent per the modified PLOPED criteria. However, her V/Q scan revealed radiotracer uptake in the brain, spleen and kidneys indicating a right to left shunt. Her TTE showed grade 1 diastolic dysfunction, EF 60%, was unable to estimate the RV systolic pressure and bubble study was positive after 3 cardiac cycles. The patient was diagnosed with hepatopulmonary syndrome (HPS) and discharged home with supplemental oxygen.

IMPACT/DISCUSSION: HPS is a triad of advanced chronic liver disease, arterial oxygenation defect, and widespread pulmonary vascular dilations. The diagnostic criteria are liver disease, A-a gradient > 15 mmHg, and right-to-left shunt on contrast-enhanced echocardiography or perfusion lung scan. The

pathogenesis is unknown, and the only effective treatment is liver transplantation.

Given the patient's history of NASH cirrhosis with esophageal varices, the differential diagnosis of hypoxemia includes HPS and portopulmonary hypertension. The alveolar gas equation predicts an A-a gradient of 52.7 mmHg. A-a gradient elevation may be due to V/Q mismatch, right-to-left shunt or diffusion limitation. The work-up was negative for V/Q mismatch or diffusion limitation. Therefore, the elevated A-a gradient and hypoxemia in this case is best explained by shunt physiology, which was incidentally evidenced on a V/Q scan.

CONCLUSION: Hepatopulmonary syndrome should be considered when patients with cirrhosis present with hypoxemia. The presence of a right-to-left shunt can be detected by contrast-enhanced echocardiography or perfusion lung imaging.

AN UNUSUAL "TROOPER"-ELLA DFU

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LEARNING OBJECTIVE #1: Recognize *T. bernardiae* infections and potential complications

LEARNING OBJECTIVE #2: Understand antibiotic management for *T. bernardiae*

CASE: TB is a 49 year old man with poorly treated diabetes presents with a left calcaneal ulcer. One month prior to his presentation he stepped on a toenail clipping and developed a wound that has been progressively enlarging and draining purulent fluid. TB had a syncopal event, prompting his presentation to the ED. He was diagnosed with diabetes two years earlier; at that time, he was started on metformin and insulin which he stopped taking 18 months ago. TB was febrile to 39.6. Physical exam showed edematous left ankle with globular deformity, a 7 cm ulcer purulent annular overlying the plantar surface of the left heel. A1c on presentation was 13. ESR, CRP and Ferritin were all elevated. White count on presentation was 18,000. Radiographs revealed soft tissue edema with extension to the bone. There was high clinical concern of a skin soft tissue infection complicated by osteomyelitis. Blood cultures revealed anaerobic gram variable coccobacilli on microscopy, growing *Truoperella bernardiae*. TB was initially on vancomycin and Zosyn. Source control was achieved via BKA and antibiotics were narrowed to amoxicillin.

IMPACT/DISCUSSION: *Truoperella bernardiae* is a rare anaerobic gram positive curved formerly known as *Actinomyces bernardiae*. Case reports show *T. bernardiae* involved urinary tract infections, joint infections and skin infections. Complications of *T. bernardiae* include thrombophlebitis, ileal conduit infections and brain abscesses. *T. bernardiae* can be difficult to identify and may be confused with streptococci and other coryneform or nondiphtheroid gram positive bacilli. Reliable identification often requires confirmation by molecular methods, including PCR and DNA sequencing. Studies show that isolates are susceptible to cephalosporins, carbapenems, vancomycin, rifampicin and clindamycin and resistant to ciprofloxacin, norfloxacin and fosfomycin. In this particular case, we were able to narrow to amoxicillin.

Given the challenges in identification, infections with *T. bernardiae* can be difficult to diagnose. Co-infections with other bacteria are often observed. Infections progress slowly and respond well to surgical debridement and antibiotic treatment. Patients with *T. bernardiae* often have co-morbidities including advanced type II diabetic mellitus, morbid obesity, and chronic obstructive pulmonary disease. In this case, the gradual progression of infection and co-morbid diabetes reflect the course of this pathogen. This case illustrates the need to be cognizant of atypical pathogens in common infections.

CONCLUSION: *T. Bernardiae* is an uncommon infection that can be seen in SSTIs and UTIs. Complications include thrombophlebitis and brain abscesses. This pathogen can be difficult to identify as it can be confused with streptococci and other gram positive bacilli. This pathogen is susceptible to cephalosporins, carbapenems, vancomycin, rifampicin and clindamycin.

AN UNUSUAL CASE OF VENTRICULAR FIBRILLATION ARREST DURING PREGNANCY

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LEARNING OBJECTIVE #1: Evaluate potential causes of ventricular tachycardia in pregnancy

LEARNING OBJECTIVE #2: Identify appropriate indications for ICD placement

CASE: Patient is 23 yo G3P0112 female at 36 weeks' gestation with history of tobacco use during pregnancy, prior meth use, and no known cardiac disease, who presented with ventricular fibrillation [VF] cardiac arrest after a syncopal event with no seizure activity. Per EMS, patient's rhythm showed sustained monomorphic ventricular tachycardia prior to becoming VF; she was resuscitated after 10 minutes of life-saving measures. On arrival, she underwent emergent C-section with delivery of twins, one of whom later expired. Initial EKG showed sinus tachycardia with global ischemia and prolonged QT at 570 ms. Initial echocardiogram had reduced ejection fraction at 40%, with no wall motion or valvular abnormality; repeat echo later showed normal systolic function. QT interval on repeat EKG was normal at 360 ms. Stroke workup was negative. Due to unknown etiology of VF, patient underwent left heart catheterization, which showed no coronary artery disease, and implantable cardioverter-defibrillator placement. She was medically optimized and discharged with follow-up.

IMPACT/DISCUSSION: Ventricular tachycardia [VT] in pregnancy is often seen in structural heart disease, including hypertrophic cardiomyopathy, congenital, or valvular heart disease—all negative in our patient, who had no personal or family history of cardiac disease or early death. Her recovered LV systolic function and normal RV also ruled out peripartum cardiomyopathy and arrhythmogenic right ventricular cardiomyopathy, respectively. Finally, as left heart cath eliminated ischemia or spontaneous coronary artery dissection with reperfusion, our patient's VF was thought to be due to primary electrical disease, including Brugada syndrome or catecholaminergic polymorphic ventricular tachycardia [CPVT]. Her initial QT of 570 ms suggested long QT syndrome as an etiology, but this later normalized.

Patient lacked history of syncope prior to this event. In retrospective studies of women with Brugada syndrome (104 women) or CPVT (96 women), 6% and 5% of women, respectively, had recurrent syncope during pregnancy. While understudied, one of these electrical diseases may have precipitated her arrest. As an exact cause was unidentifiable, patient underwent ICD placement to prevent cardiac death. Also of note, patient was unwilling to share extent of prior meth use or tobacco use, however these substances likely contributed to her adverse outcomes. Animal studies have shown tobacco use to induce arrhythmia; meanwhile, meth is known to induce cardiomyopathy and a retrospective study showed that up to 72% of meth users have EKG abnormalities including arrhythmias and prolonged QT.

CONCLUSION: In evaluating etiologies of VF, a detailed history remains crucial, even if not directly revealing as in our case. When no reversible cause of VT or VF is identified, ICD placement is indicated for secondary prevention of sudden cardiac death.

AN UNUSUAL PRESENTATION OF REFRACTORY SPONTANEOUS SALMONELLA PERITONITIS IN A CIRRHOTIC PATIENT

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LEARNING OBJECTIVE #1: Diagnose non-typhoidal Salmonella as a cause of spontaneous bacterial peritonitis (SBP) in patients who are immunocompromised or have an occupational exposure.

LEARNING OBJECTIVE #2: Recognize the importance of diagnosing persistent SBP early because of the poor prognosis it portends in patients with advanced liver failure.

CASE: A 61-year-old man with decompensated non-alcoholic steatohepatitis cirrhosis and end-stage renal disease (ESRD) presented with sudden-onset hypotension. He described 3 days of fatigue, lethargy, and loss of appetite. He denied drinking alcohol and reported working as a chicken breeder. He was

afebrile, blood pressure was 70/40, and abdomen was distended without tenderness to palpation. Initial diagnostic paracentesis showed 13,000 white blood cells with neutrophilic predominance. Culture of ascitic fluid revealed pan-sensitive salmonella. Blood cultures were negative. He was diagnosed with spontaneous bacterial peritonitis (SBP) secondary to salmonella and treated with a 7-day course of ceftriaxone. Following treatment, repeat paracentesis revealed an increased WBC count to 26,000 and ascitic cultures again grew salmonella. CT of his abdomen showed no abscesses, bowel leak, or other intra-abdominal infections. Ceftriaxone was restarted and ascitic fluid showed improved WBC count without bacterial growth. Despite this improvement, he was unable to tolerate dialysis due to hypotension and ultimately transitioned to home hospice.

IMPACT/DISCUSSION: Spontaneous bacterial peritonitis (SBP) is a frequently encountered condition in patients with advanced liver cirrhosis. Pathogens commonly associated with SBP include *E. coli*, streptococcal species, and *Klebsiella pneumoniae*. Non-typhoidal salmonella is a rare cause of SBP with previous case reports citing immunocompromised states such as HIV, malignancy and chemotherapy as risk factors. In our case, ESRD and occupational exposure may have also played a role. Alterations of the immune system in ESRD may contribute to an increased infection risk due to dysfunction from uremia and a chronically activated inflammatory state. Patients with salmonella SBP frequently lack overt peritoneal signs and appear non-toxic as in this patient reporting only lethargy and decreased appetite. Treatment of salmonella SBP is ceftriaxone, after which patients typically show decreased neutrophils in ascitic fluid and clinical improvement. Patients with persistent infection may require prolonged antibiotic course and imaging to look for a possible surgical source of infection such as an abscess or other intra-abdominal infection. Heightened clinical vigilance and patient-centered communication about a guarded prognosis is necessary in these cases given the higher mortality rates associated with persistent SBP despite patients feeling asymptomatic.

CONCLUSION: This case illustrates the need to consider atypical pathogens as a cause of recurrent SBP in patients with risk factors from occupational exposures and comorbidities that impact the immune response.

PAGE BREAK

A PAIN IN THE BACK: TB OR NOT TB

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LEARNING OBJECTIVE #1: Diagnose retroperitoneal fibrosis and differentiate between primary versus secondary causes

LEARNING OBJECTIVE #2: Identify reasons for false positive QuantiFERON-TB tests

CASE: A 42-year-old male with a history of type 1 diabetes mellitus, chronic kidney disease, hypothyroidism, and hypertension presented to the emergency department with one month of progressive abdominal and low back pain. Physical exam revealed blood pressure of 177/104 with normal temperature and pulse. He was well-appearing with a 3/6 systolic murmur and mild bilateral CVA tenderness without midline pain. The remainder of the exam was normal. Laboratory evaluation demonstrated a creatinine of 2.74 mg/dL, ESR of 78 mm/hr, and CRP of 5.0 mg/dL. A CT scan of the abdomen/pelvis revealed increasing soft tissue around the distal abdominal aorta to the common iliac arteries and involving the ureters consistent with retroperitoneal fibrosis (RPF). PET scan also consistent with diagnosis. Further work-up for etiology revealed negative RF, CCP, ANA, IgG4 levels, and blood cultures. QuantiFERON-TB was strongly positive times two. Interestingly, the patient had no risk factors for TB or evidence of pulmonary disease on imaging. Biopsy of the peri-aortic area was AFB negative and most suggestive of IgG4-related disease although all diagnostic criteria were not met. Although suspicion for tuberculosis aortitis was low, RIPE therapy was started given need for immunosuppression and reports of small focus of TB infection and retroperitoneal fibrosis. He was additionally started on steroids followed by Rituximab for likely IgG4 related RPF. **IMPACT/DISCUSSION:** Retroperitoneal fibrosis (RPF) is a rare disease and can be either idiopathic (primary) or secondary to other processes such as infection. Over 70 percent of cases are primary with IgG4-related disease increasingly being recognized as a cause of idiopathic cases. While varying features of CT and MRI may help suggest a cause of RPF, this case was unique as PET scan and biopsy were suggestive of IgG4-related disease but the positive QuantiFERON-TB could not be ignored. While it is known that tuberculosis can cause aortitis, this is rare and often associated with

contiguous spread and additionally associated with aortic aneurysm or dissection which was not seen in this case. Given that no etiology for a false positive quantIFERON-TB such as a non-tuberculous mycobacterium infection or recent tuberculin skin testing was identified, it was felt the safest option was to complete RIPE therapy. This was felt particularly important given the need for immunosuppression given high suspicion RPF was due to IgG4-related disease.

CONCLUSION: IgG4-related disease needs to be on the differential for etiology of retroperitoneal disease but given limitations in diagnostic criteria, secondary causes such as infection should also be investigated.

A PARALYZING DIAGNOSIS: SERONEGATIVE PARANEOPLASTIC ENCEPHALOMYELITIS

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LEARNING OBJECTIVE #1: Diagnose paraneoplastic encephalomyelitis, which is a rare autoimmune disorder in which the body's immune response to a malignancy causes damage to the brain and spinal cord resulting in a variety of neurologic symptoms including weakness, ataxia, and confusion.

LEARNING OBJECTIVE #2: Recognize that paraneoplastic encephalomyelitis may represent the initial presentation of an undiagnosed malignancy and treating the underlying malignancy can lead to significant neurologic improvement.

CASE: A previously healthy 77-year-old male was admitted to the hospital for two months of progressive confusion, lower back pain, and bilateral lower extremity weakness to the point of being bed bound. Physical examination demonstrated 1/5 strength in his left lower extremity and 2/5 strength in his right lower extremity. He was alert and oriented only to person and place. MRI of the brain revealed medial temporal juxtacortical lesions. MRI of the cervical/thoracic/lumbar spine and pelvis demonstrated a T2-weighted hyperintensity from T8 to the conus medullaris and an incidental 6.3 cm pelvic mass along the left sciatic notch with associated lymphadenopathy. Lumbar puncture showed elevated protein and WBC count, and cytology was negative for malignant cells. The pelvic mass was biopsied. A thorough infectious, metabolic, and rheumatologic workup was negative. There was a strong suspicion for a paraneoplastic syndrome given the presence of the pelvic mass and the otherwise non-revealing work up, so a serum paraneoplastic panel was sent and plasmapheresis was initiated with minimal improvement in his symptoms. The pelvic mass biopsy resulted as high grade B-cell lymphoma. He was then initiated on R-miniCHOP chemotherapy with significant improvement in his weakness and encephalopathy after completion of one cycle of chemotherapy. At discharge, he had 4/5 strength in his bilateral lower extremities, was able to walk 100 feet with a walker, and was alert and oriented x4. The serum paraneoplastic syndrome panel returned negative. One month after discharge, repeat MRI of the brain and spine showed resolution of the previous abnormalities.

IMPACT/DISCUSSION: Our patient's clinical course was consistent with seronegative paraneoplastic encephalomyelitis secondary to occult aggressive B-cell lymphoma with remarkable improvement in his neurologic symptoms following chemotherapy. Importantly, a negative serum paraneoplastic panel does not preclude the diagnosis of paraneoplastic encephalomyelitis, as it is not uncommon for paraneoplastic syndromes associated with lymphoma to be seronegative. This case illustrates the importance of recognizing the potential relationship between an underlying lymphoma and subacute presentation of neurologic symptoms.

CONCLUSION: If paraneoplastic encephalomyelitis is suspected, confirming the diagnosis of the underlying malignancy is paramount, as treatment of the underlying malignancy can lead to dramatic neurologic improvement, as seen in this case.

APATHETIC HYPERTHYROIDISM PRESENTING WITH THYROTOXIC PERIODIC PARALYSIS (TPP)

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LEARNING OBJECTIVE #1: Diagnose Apathetic Hyperthyroidism in elderly in absence of clinical evidence of thyrotoxicosis or hyperadrenergic state.

LEARNING OBJECTIVE #2: Early recognition and treatment of Thyrotoxic Periodic Paralysis. **CASE:** A 70-year-old female with no past cardiac history, presented after an episode of tachycardia; Heart Rate- 167, Blood pressure- 150/91 and atrial fibrillation on EKG.

Patient was very lethargic, had exophthalmos and complained of muscle pain and cramping in both legs. She denied any chest pain or dyspnea. Family reported that the patient has been less interactive, not interested in any activities lately. She also had generalized weakness, decreased appetite and weight loss since few months. Her metabolic profile was insignificant except for potassium of 2.8 mEq/L, Thyroid stimulating hormone (TSH) was undetectable, and Free T4 was 4.83 ng/dl (0.7- 2.19). Thyroid Ultrasound showed thyromegaly and 5x6x7 mm spongiform nodule in the left lobe of thyroid gland. Patient had positive Thyroid peroxidase and Thyroid stimulating Immunoglobulin and was diagnosed with Grave's Thyrotoxicosis.

During the hospitalization, patient reported of episodes of severe muscle cramping and proximal muscle weakness in both legs mostly during early morning hours. Patient had hyporeflexia in both legs and decreased muscle tone. Patient also had hypokalemia every day during these episodes despite appropriate replacement.

The patient was started on Methimazole and propranolol. Patient started showing clinical improvement in terms of increased appetite, being more communicative and decreased fatigue. Her hypokalemia, muscle weakness and arrhythmias resolved after being in euthyroid state. Repeat free T4 was 1.66 ng/dl.

IMPACT/DISCUSSION: Apathetic Hyperthyroidism is an atypical presentation of hyperthyroidism in the elderly characterized by lethargy, apathy and depression rather than hyperkinesia and sympathetic overactivity.

TPP is a sporadic form of hypokalemic periodic paralysis due to an ion channel defect that drives potassium into cells by increasing the sensitivity of Na⁺/K⁺-ATPase pump in the presence of excess thyroid hormones. The patient presents with periodic, reversible attacks of muscle weakness and arrhythmias due to hypokalemia.

CONCLUSION: Apathetic Hyperthyroidism is often masked in elderly and misdiagnosis of dementia or senile depression is made that is refractory to treatment. Any elderly patient with symptoms of apathy, depression or new onset cardiac arrhythmias should be investigated for hyperthyroidism and treated appropriately. The response to treatment is excellent with significant improvement in quality of life.

Thyrotoxic Periodic Paralysis should be suspected in any patient with muscle weakness; clinical or biochemical signs of hyperthyroidism; persistent hypokalemia and negative family history of periodic paralysis. Potassium replacement, propranolol and eventually remission of thyrotoxicosis is the mainstay of treatment.

APPROACH TO REFRACTORY NIVOLUMAB-INDUCED COLITIS WITH CONCURRENT CLOSTRIDIUM DIFFICILE INFECTION

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LEARNING OBJECTIVE #1: To diagnose two simultaneous causes of colitis.

LEARNING OBJECTIVE #2: To treat concurrent immune-mediated and infectious colitis.

CASE: A 66-year-old man with history of stage IIIId melanoma, who received 6 cycles of Nivolumab, presented with anorexia and large-volume diarrhea.

Initial workup included a non-elevated white blood cell count of 6.9 k/mm3 and creatinine of 1.6 mg/dL from a baseline of 0.8 mg/dL. CT imaging of the abdomen showed wall thickening and hyperenhancement of the duodenum and proximal jejunum with stomach, small and large bowel distension. Due to a lack of leukocytosis, fever, or other signs of infection, a presumptive

diagnosis of immunotherapy-induced colitis was made. He was started on methylprednisolone at 1 mg/kg/day (100 mg daily). His symptoms initially improved, but then worsened within three days. Clostridium difficile toxin polymerase chain reaction (PCR) testing was positive. Steroid therapy was stopped and oral vancomycin was started.

Symptoms persisted after four days of antibiotic therapy. Subsequently, IV metronidazole and rectal vancomycin were added to his regimen. Worsening abdominal pain and distention prompted daily abdominal x-rays to monitor colonic dilation. He was then started on fidaxomicin, after which his abdominal pain began to abate, diarrhea began to lessen, and x-rays showed slow resolution of his dilated colon.

Due to continued severe diarrhea, a cytotoxicity assay for *C. difficile* was obtained on day eight of antibiotic therapy. This assay was negative on day ten, and therefore steroid therapy was resumed while continuing IV metronidazole and fidaxomicin. His clinical status improved with resolution of diarrhea and abdominal pain.

IMPACT/DISCUSSION: Nivolumab is an immune checkpoint inhibitor (ICI) that blocks signaling from human programmed death receptor-1 (PD-1). Nivolumab-induced colitis is immune-mediated and can be fatal if untreated. Treatment is with high dose steroids, but concurrent infectious colitis complicates management. Combined Clostridium difficile infection (CDI) and ICI-induced colitis does not have a standard treatment protocol. The few reported cases showed response to a combination of metronidazole, vancomycin, and steroids. To our knowledge, this is the first reported case of CDI with ICI-induced colitis in which a comparable approach was unsuccessful, prompting use of fidaxomicin.

As per the Infectious Diseases Society of America (IDSA) guidelines, oral vancomycin and fidaxomicin are preferred over metronidazole for non-severe and severe CDI. Thus, to treat refractory CDI, we added fidaxomicin to our patient's therapy. Additionally, this may be the first reported case where a cytotoxicity assay was used as an indicator for CDI resolution.

CONCLUSION: Concurrent infectious colitis must be considered in ICI-induced colitis refractory to steroids. Early guideline-directed treatment of CDI should be employed to avoid delay in steroid therapy. A cytotoxicity assay can help guide clinicians in timing of steroid therapy with CDI.

A PREVENTABLE ROAD TO DIALYSIS

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LEARNING OBJECTIVE #1: Identify indications for workup of secondary hypertension.

LEARNING OBJECTIVE #2: Recognize consequences of untreated, uncontrolled hypertension.

CASE: A 26-year-old male presented with 4 days of hematuria and blurry vision in his left eye. His vitals were significant for BP of 242/146. Labs showed BUN 67, creatinine 8.60, potassium 6.1, phosphorus 5.9, negative toxicology screen, and troponin 0.122. Echocardiogram demonstrated left atrial dilation and severe LVH.

Patient was diagnosed with hypertensive emergency due to signs of end organ damage including acute kidney injury and demand cardiac ischemia. His BP was initially decreased with labetalol and nicardipine drip. Oral carvedilol, torsemide, and nicardipine were started and titrated to goal.

Further history revealed that he was diagnosed with hypertension at age 11. His grandfather and father were diagnosed with hypertension at ages 20-30. Despite this, a secondary hypertension workup was never initiated by his PCP who instead attributed his hypertension to obesity and prescribed him lisinopril. He intentionally lost 160 pounds, discontinued lisinopril, and stopped following up assuming that his hypertension was resolved.

During the hospitalization, his kidney function never normalized. Renal artery doppler was significant for bilateral tardus parvus, suggestive of renal artery stenosis. Kidney biopsy revealed renal disease secondary to accelerated hypertension. At discharge, his creatinine remained elevated at 9.93. Nephrology informed him that dialysis would likely be initiated in a few months.

IMPACT/DISCUSSION: Hypertension is one of the most prevalent medical conditions today. Its commonality may result in providers allocating less time

and resources to its management, potentially leading to serious yet preventable complications.

This case demonstrates the importance of searching for secondary causes of hypertension and strict BP control in a young, otherwise healthy, patient. According to the ACC/AHA 2017 Hypertension Guidelines, the onset of hypertension before age 30 and malignant hypertension with known kidney dysfunction should have elicited a workup much earlier in his life. Our studies revealed renal artery stenosis as a cause of his hypertension. It is important to remember that ACE-inhibitors, as was prescribed to this patient, can worsen azotemia in significant renal artery stenosis by inhibiting the compensatory response of elevated angiotensin II to preserve renal blood flow.

CONCLUSION: This case highlights the importance of treating uncontrolled hypertension, as well as the indications for a secondary hypertension workup. Our patient was mostly asymptomatic until his presentation, so it is imperative to remember that hypertension earns its title as the "silent killer." In this 26-year-old patient, a diligent work up and education from his PCP starting at the age of 11 may have saved his kidneys. Unfortunately, he is now on a quick, yet preventable, road to dialysis.

A RARE AND INTERESTING CASE OF THROMBOCYTOPENIA

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LEARNING OBJECTIVE #1: Recognize the association between Piperacillin-Tazobactam and thrombocytopenia.

LEARNING OBJECTIVE #2: Review work up of acute thrombocytopenia.

CASE: 61-year-old female with a history of hypertension and obstructive sleep apnea presented with hematemesis and severe sepsis secondary to the infected wound of the right lower extremity. Physical exam showed cellulitis of the right foot and ankle. Her labs revealed hemoglobin of 6.1g/dl, white cell count of 33.9 x10⁹/L, and platelet of 228 x10⁹/L. She was treated with broad spectrum antibiotics – intravenous vancomycin and Piperacillin/Tazobactam. There were temporary fluctuations in the platelet count, which was attributed to sepsis, that later stabilized. Her hospital course was further complicated with recurrent upper GI bleed from duodenal ulcer despite endoscopic treatment. She subsequently underwent open ligation, pyloroplasty, and truncal vagotomy. Due to the complicated course, her antibiotic was continued for two weeks. On the fourteenth day of hospitalization, her platelet count acutely dropped from 372,000 to 18,000. Her Piperacillin-Tazobactam was discontinued due to the suspicion for drug-induced thrombocytopenia. She was treated with platelet transfusion and was carefully observed for any bleeding and worked up for causes of acute thrombocytopenia. Heparin induced thrombocytopenia panel was negative. The platelet morphology was normal, there were no megakaryocytes identified in the peripheral smear. The smear was also negative for immature cells and schistocytes. ADAMTS-13 levels were not consistent with thrombotic thrombocytopenic purpura. After three days of stopping the drug, the platelet counts started to show an upward trend and got normalized by day five.

IMPACT/DISCUSSION: Severe thrombocytopenia caused by Piperacillin-Tazobactam is rare but should be kept in mind as it is a commonly used medication in critically ill patients and if overlooked can lead to serious bleeding complications. Megakaryocyte toxicity from drug exposure is the common mechanism of thrombocytopenia. Typically, there is a history of exposure for several days before the count falls, however when it manifests, the drop can be precipitous. Our patient developed severe thrombocytopenia with an acute drop from 354,000 to 18,000 after being treated with Piperacillin-Tazobactam for 14 days. Immune thrombocytopenia is another common cause for low platelet counts seen in medical patients, however, the recovery pattern in our patient after stopping the drug argues against it. The platelet count returned to normal within 5 days of stopping Piperacillin-Tazobactam indicating that it was the most likely cause.

CONCLUSION: Physicians should consider drug induced thrombocytopenia as a differential diagnosis for the acute drop in platelet count. Prompt recognition and cessation of the medication can prevent bleeding complications and hemorrhagic shock.

A RARE CASE OF EARLY ONSET PANCREATIC ADENOCARCINOMA IN A YOUNG WOMAN WITH NO IDENTIFIABLE RISK FACTORS

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LEARNING OBJECTIVE #1: To identify risk factors for early onset pancreatic cancer

LEARNING OBJECTIVE #2: To recognize presenting symptoms associated with pancreatic adenocarcinoma

CASE: Our patient is a 37-year-old female who initially presented to the hepatology clinic for evaluation of a 2-month history of nausea, pruritus, insomnia, and xerostomia in the setting of transaminasemia. Her outpatient workup was significant for positive ANA and negative AMA. She was then started on ursodiol for suspected PBC. After 3 weeks of no symptomatic improvement, further workup with liver biopsy revealed mild portal hepatitis, focal cholangitis, and mild sinusoidal dilatation on pathology. Within 24 hours postoperatively, she presented to our hospital with complaints of right-sided abdominal pain and nausea. Vital signs were significant for temperature of 38.9C and heart rate of 134bpm. Physical examination was significant for diffuse right upper quadrant tenderness to palpation with voluntary guarding. Labs demonstrated the following: total bilirubin 1.8 mg/dL, ALT 215 U/L, AST 154 U/L, and ALP 420 U/L. Lactic acid and procalcitonin were 2.3 mmol/L and 0.15 ng/mL, respectively. CT of the abdomen revealed 1.6 cm common bile ductal dilation and mild to moderate intrahepatic biliary ductal dilatation. MRCP showed a geographically indeterminate mass in either the duodenum/duodenal diverticulum or pancreaticoduodenal groove with mass effect on the pancreatic head and distal CBD. CA19-9 was unremarkable. Subsequent EGD with EUS revealed a 3 cm x 3 cm lesion in the head of pancreas/ampullary area causing biliary obstruction and a dilated CBD to 15 mm. Pathology from biopsy of mass showed poorly differentiated adenocarcinoma. The patient was referred to hepatobiliary surgery for Whipple procedure and oncology for further care.

IMPACT/DISCUSSION: Pancreatic adenocarcinoma is the eighth and ninth leading cause of cancer deaths in men and women, respectively, and is most commonly diagnosed around 70 years of age. When diagnosed before 60 years, it is termed "early onset pancreatic cancer (EOPC); a diagnosis before 45 years is called "very early onset pancreatic cancer" (VEOPC). EOPC is responsible for only 5-10% of all pancreatic cancer cases. Risk factors include smoking, hereditary pancreatitis, genetic syndromes, family history of pancreatic cancer, diabetes mellitus, and obesity. Common presenting symptoms include abdominal pain, weight loss, diabetes and jaundice. CT, biopsy, and tumor markers CA19-9 and CEA are used in the diagnostic evaluation of pancreatic cancer. Treatment options include surgical resection with pancreaticoduodenectomy and adjuvant chemoradiotherapy. Unfortunately, over 90% of those diagnosed with pancreatic cancer die due to this malignancy.

CONCLUSION: Pancreatic adenocarcinoma has a life expectancy of 5% 5 years from time of diagnosis and is most commonly diagnosed in patients older than 70 years of age. Only 5-10% of cases are diagnosed before 60 years and it is even more rarely diagnosed in those less than 40.

A RARE CASE OF IBRUTINIB RELATED HEMORRHAGIC PERICARDIAL EFFUSION CAUSING CARDIAC TAMPONADE

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LEARNING OBJECTIVE #1: To recognize life threatening bleeding as a side effect of Ibrutinib.

LEARNING OBJECTIVE #2: The role of antiplatelet mechanisms in Ibrutinib related hemorrhagic complications.

CASE: A 68 year old male with a history of Chronic Lymphocytic Leukemia (CLL) diagnosed in 2012 and treated with Ibrutinib since 2019, pulmonary sarcoidosis without standing immunosuppressive therapy who presented with a week of progressive shortness of breath, dizziness, subjective fevers, and fatigue. He was initially seen at an outside hospital where he was found to have a pericardial effusion on transthoracic echocardiography (TTE) and transferred to our hospital for further management. Upon arrival, the patient had a temperature of 100.6 Fahrenheit, blood pressure of 138/94 mm Hg, heart rate 136 beats per minute, respiratory rate 24 breaths per minute, oxygen saturation of 98% on 3liter nasal cannula. On physical exam, he was noted to be tachypneic and tachycardic with distant heart sounds and elevated jugular venous pressure. Electrocardiogram showed sinus tachycardia. TTE showed normal left ventricular size with mildly reduced ejection fraction to 45-50% and large pericardial effusion with ventricular interdependence and significant mitral inflow variation. Due to narrow pulse pressure with TTE findings of tamponade, the patient underwent pericardiocentesis with drainage of 460 ml bloody fluid. Pericardial fluid analysis showed a hemorrhagic effusion with glucose 57 mg/dl, protein 4.6 mg/dl, pH 8.0, and LDH 716 IU/L. Fluid gram stain was negative and cytology did not reveal malignant cells. The decision was made to discontinue Ibrutinib given high concern for ibrutinib related hemorrhagic pericardial effusion. Follow up TTE after drain removal and Ibrutinib cessation did not demonstrate fluid reaccumulation. The patient remained clinically stable throughout the remainder of his hospital course and was discharged home.

IMPACT/DISCUSSION: Ibrutinib is a FDA approved therapy for CLL, which is associated with increased risk of major bleeding including subdural hematoma, gastrointestinal bleeding, and hematuria. It has been associated with increased risk of bleeding through its effect on several antiplatelet mechanisms. It irreversibly inhibits Btk (Bruton tyrosine kinase) and Tec (tyrosine kinase expressed in hepatocellular carcinoma) kinases which play a vital role in platelet activation via downstream signaling of the platelet collagen receptor glycoprotein-VI and C-type lectin-like receptor 2 (CLEC-2). It also interferes with glycoprotein-Ib mediated platelet function.

CONCLUSION: While there is an increased rate of Ibrutinib related major bleeding when use concurrently with antiplatelet or anticoagulation agents, in this report we present a case of Ibrutinib related hemorrhagic pericardial effusion in a patient who was not on any antiplatelet or anticoagulation agents. Clinicians should be mindful of an Ibrutinib related rare but life-threatening hemorrhagic complication while taking care of patients.

A RARE CASE OF SKELETAL FLUOROSIS SECONDARY TO COMPUTER CLEANER HUFFING

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LEARNING OBJECTIVE #1: Identify a rare cause of skeletal fluorosis

LEARNING OBJECTIVE #2: Recognize dust cleaner inhalation as a potential source of toxicity and substance abuse

CASE: Skeletal fluorosis (SF) is a rare osteosclerotic bone disorder in developed countries caused by excessive ingestion of fluoride. Here, we present a case of SF secondary to inhalation of difluoroethane-containing computer cleaner.

A 34 y.o. Male with history of heavy alcohol use, recent heavy inhalation of difluoroethane-containing computer cleaner (not quantified by patient), PTSD, anxiety and ADHD presented with acute polyarthralgia of 2 weeks. On admission, vitals were unremarkable. Exam was significant for diffuse bony enlargement of bilateral distal phalanges, wrists, elbows, knees, ankles and toes. Synovitis was not present but there was mild erythema overlying bony enlargements. All joints were extremely tender to palpation and patient was unable to ambulate independently. Labs were notable for an elevated CRP of 42.1, elevated ESR of 68, and elevated ALP of 136. CBC, CMP, TSH, vitamin D level, PTH, CK, hepatitis panel, and complement levels were within normal

limits. RF, anti-CCP, ANA, HIV, anti-mitochondrial ab, tick panel and parvovirus IgM were negative. X-ray of bilateral feet, R hand, R knee and R elbow showed periosteal bone formation. CT chest/abdomen/pelvis was notable for diffuse osteosclerosis. Hematologic work-up including bone marrow biopsy was not consistent with malignancy. Patient's serum fluoride level was normal at 0.6 mg/L. Urine fluoride and fluoride to creatinine ratio however, were elevated at 51.2 mg/L and 34.6 mg/g creatinine respectively making skeletal fluorosis the most likely cause of patient's presentation.

IMPACT/DISCUSSION: SF is a metabolic bone disease more commonly caused by exposure to fluoride contaminated ground water in developing countries. There have been a few recent case reports identifying computer cleaner inhalation as a new source of skeletal fluorosis. Our patient presented with similar findings to prior reports: pain, diffuse osteosclerosis on imaging, elevated ALP, normal serum fluoride level and an elevated urine fluoride level. Limited data is available regarding the progression and management of SF from difluoroethane inhalation. Refraining from further fluoride exposure, restoration of vitamin D as needed, and hydration given risk of nephrolithiasis during skeletal unloading of fluoride are the mainstay of management at this time. We hope that this case will increase awareness of a rare cause of skeletal fluorosis and decrease time to diagnosis of future cases.

CONCLUSION: - Dust cleaner inhalation abuse is a rare source of skeletal fluorosis

- Dust cleaner inhalation should be considered in patients with acute-subacute osteosclerosis.

A RARE ETIOLOGY OF ISCHEMIC COLITIS

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LEARNING OBJECTIVE #1: Non-specific symptoms: weight loss, abdominal bruit, and postprandial abdominal pain should lead to a consideration of median arcuate ligament syndrome (MALS), a potentially fatal syndrome.

LEARNING OBJECTIVE #2: Ischemic colitis (IC), the feared complication of MALS, can lead to catastrophic sequela if untreated. Duplex US of the mesenteric arteries can quickly and efficiently visualize the median arcuate ligament compressing the celiac trunk, a potential etiology of IC.

CASE: A 75-year-old woman with a history of hyperlipidemia, C. diff infection, chronic gastritis, GERD, PUD, hiatal hernia, tubal ligation, and history of intermittent abdominal pain, presented to our emergency department (ED) with abdominal pain and 20 watery bowel movements with scant dark blood clots. Intermittent abdominal pain started 4 years ago becoming constant 2 months prior to presentation. Pain localized to the LLQ of abdomen with subjective severity of 8-9 out of 10 on pain scale. She had nausea but no vomiting. During 3 months prior, she reported unintentional 15lb weight loss. Last hospitalization for abdominal pain was 1 week prior to this presentation where she was discharged home. New-onset complaints included self-resolving substernal, non-radiating chest pain for 20 minutes without inciting event associated and shortness of breath. Her vitals in the ED: 182/74 mmHg, 65 bpm, 18 breaths/min, 36.5C, saturating at 96% room air. Fluids and analgesics relieved her abdominal pain. The abdomen was soft, no rebound or guarding, but tender to LLQ palpation. Labs: Leukocytosis 19.3 x 10³ cells/ μ , hemoglobin of 16.0 g/dL, platelet count of 307 x 10³ cells/ μ L. Abd CT results yielded L-sided colitis (distal transverse, descending, proximal sigmoid), likely infectious or inflammatory, however, we were unable to rule out IC. There was evidence of colonic diverticulosis without evidence of acute diverticulitis and inferior mesenteric artery appeared patent on abd CT. Colonoscopy showed 22 to 50 cm of likely ischemic colitis. Duplex US of the mesenteric arteries showed compression of the celiac trunk by the median arcuate ligament, most consistent with MALS.

IMPACT/DISCUSSION: MALS must be quickly identified to prevent serious complications and death. The nonspecific symptoms of weight loss, abdominal bruit, and postprandial abdominal pain present a challenge to the clinician. However, due to the risk of IC, a colonoscopy is necessary, and a duplex US can quickly identify MALS.

CONCLUSION: We present a case of MALS, a rare disorder often characterized by weight loss, celiac artery compression often presenting with an abdominal bruit, and postprandial abdominal pain. These non-specific complaints often raise suspicion for a range of pathologies from the most benign to possibly fatal if diagnostic workup and treatments are delayed. It is in the patient's best interest for the clinician to consider MALS as a cause of IC, especially in the scope of chronic complaints as early surgical intervention may prevent bowel resection or even death.

A RARE OCCURRENCE OF HIV POSITIVE BURKITT LYMPHOMA PRESENTING AS AN INTRA-CARDIAC MASS

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LEARNING OBJECTIVE #1: Distinguish lymphoma as a cause, although extremely rare, of intra-cardiac masses.

LEARNING OBJECTIVE #2: Recognize that HIV+ patients have a higher incidence of more aggressive lymphoma's, including Burkitt Lymphoma

CASE: A 41-year-old man with no significant medical history, presented with acute onset right and left upper quadrant pain, as well as flank pain for 2 days. He also revealed that he had intermittent diarrhea, night sweats, chills, and a 35-pound weight loss over the last several months. Computed tomography (CT) of the abdomen revealed a right atrial filling defect. CT angiography was then ordered, which revealed a lobulated soft tissue mass in the right atrium extending to the subcarinal lymph nodes. Transesophageal echocardiogram showed an ejection fraction of 60%-65%, with a right atrial mass obstructing the SVC and a small pericardial effusion. Initial laboratory results revealed anemia, mild transaminitis, and positive HIV with a CD4 count of 28 cells/mm³. The patient underwent bronchoscopy and biopsy of the subcarinal lymph nodes. He was started on bictegravir, emtricitabine, and tenofovir alafenamide after approval from physicians in Infectious Disease. Pathology of the biopsy was classified as a Burkitt lymphoma that had a Ki-67 nuclear proliferation rate of 95%-100% and was positive for IGH/MYC translocation and negative for BCL2 and BCL6. Bone marrow biopsy revealed low-grade bone marrow involvement (<5%), and cytogenetic studies were positive for t(8;14) translocation. He was started on R-EPOCH treatment (rituximab, etoposide, prednisone, vincristine sulfate, cyclophosphamide, and doxorubicin) and discharged after 6 days of treatment.

IMPACT/DISCUSSION: This case describes a rare presentation of HIV-associated Burkitt lymphoma as an intra-cardiac mass. Burkitt lymphoma is an aggressive form of non-Hodgkin lymphoma (NHL) representing just 1%-2% of all NHL cases. HIV is the most common risk factor of Burkitt lymphoma. HIV-associated Burkitt lymphomas are usually aggressive and associated with a higher incidence of extranodal involvement, especially in the gastrointestinal tract, liver, and bone marrow. An intra-cardiac mass secondary to Burkitt lymphoma is extremely rare, accounting for less than 2% of all primary cardiac masses. Intra-cardiac masses are usually due to structural abnormalities, infections, thrombi, and hamartomas and are rarely non-neoplastic. Neoplastic causes of intra-cardiac masses include metastasis and primary cardiac tumors such as myxomas, fibromas, or lipomas and sarcomas.

CONCLUSION: Given the aggressive nature of Burkitt lymphoma and its association with arrhythmias and pericardial effusion with cardiac involvement, it is important to keep lymphoma in the differential diagnosis for intra-cardiac masses especially in an HIV+ patient. Delays in treatment can decrease the chances of survival; therefore, early detection and treatment are key factors. Notably, HIV infection is a very important risk factor for Burkitt lymphoma, particularly for aggressive cases

A RARE SEQUELA FOR PNEUMOMEDIASTINUM IN A MARIJUANA SMOKER

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LEARNING OBJECTIVE #1: Barotrauma due to deep inhalation of smoke may be a contributing factor to pneumomediastinum (PM) and subcutaneous emphysema (SCE).

LEARNING OBJECTIVE #2: The use of 100% oxygen has been shown to produce a nitrogen gradient which allows nitrogen to diffuse from the high partial pressure of the pleural space into the low partial pressure of the alveoli. **CASE:** An 18-year-old male with a history of traumatic brain injury, schizophrenia, and marijuana abuse presented to our emergency department (ED) with an ill-defined complaint of dry cough, sore throat, and neck pain. Patient was altered and tangential; he was unable to provide reliable history. Initially, the patient was dyspneic; oxygen was given via nasal cannula at 4L/min. Vital signs in the ED were normal except for sinus tachycardia of 111 bpm. Atypical pneumonia was suspected due to tachycardia and leukocytosis of 13,500/ μ L of blood. As a result, he received 1L of normal saline, vancomycin, cefepime, and fluconazole. Physical exam performed in the ED only revealed bilateral neck crepitus on palpation. Chest radiographs demonstrated pneumothorax, SCE, and PM. Computed tomography (CT) scan with contrast of the neck and chest was performed due to suspicion of benign mediastinal emphysema and to rule out esophageal injury. Chest and neck CT revealed SCE of the neck, chest, and visualized portions of the upper extremities, PM, pneumopericardium, and flattening of the right ventricle, raising concern for possible cardiac tamponade. Patient's vitals were monitored closely in relation to cardiac tamponade suspicion. Bedside echocardiography was performed and showed all four chambers contracting without evidence of intrapericardial compression from air or fluid, ruling out cardiac tamponade. Emergent surgical intervention was deferred. Instead, serial chest radiographs were ordered for monitoring progression because the patient remained clinically stable.

IMPACT/DISCUSSION: Marijuana smoking carries unique risks. In this case, we highlight the risk of barotrauma due to the deep inhalation of smoking, causing a nidus for PM and SCE. With the use of 100% oxygen as treatment for our patient, the production of a nitrogen gradient allowed nitrogen to diffuse from the pleural space's higher partial pressure into the alveoli's lower partial pressure. Despite the known risks of marijuana, patients may continue to regard marijuana use as harmless. As a result, clinicians must educate patients on these emerging risks.

CONCLUSION: We present a case of PM which is characterized by neck pain, dyspnea, and SCE. These complaints often raise concern for a range of pathologies and can be fatal if diagnostic workup and treatments are delayed. In rare instances, trapped air can dissect between the mediastinum and upper spine resulting in pneumorrhachis. The astute clinician will consider pneumomediastinum when a patient with a history of marijuana use presents with ill-defined complaints of dry cough, sore throat, and neck pain to prevent further decompensation.

ARE YOU WILLING TO GAMBLE? A TERRIBLE AND RARE COMPLICATION FROM SINUSITIS

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LEARNING OBJECTIVE #1: Diagnose life-threatening complications associated with acute sinusitis including acute stroke, vasculitis, encephalitis, increased ICP, cavernous sinus thrombosis, and subdural empyema.

LEARNING OBJECTIVE #2: Recognize this case as a medical emergency and institute a rapid plan involving IM, neurosurgery, ID, and ENT.

CASE: A 63-year-old male with a PMH of depression presented with fever and HA after a fall while visiting from Brazil. Rhinitis had begun three months prior. The patient was initially awake and confused. Notable vitals were 102.7F, 161/94mmHg, and HR 116. HEENT was unremarkable. Neuro exam revealed AMS, inappropriate speech, inability to follow commands, and

normal strength/reflexes. Labs included a neutrophilic leukocytosis of 22. CT head revealed right MCA infarct, cytotoxic edema, and sinusitis. CT temporal bones showed acute left sinusitis superimposed on presumed chronic allergic fungal pansinusitis with nasal polyposis. MRI showed meningitis, an 8mm subdural empyema, the right MCA infarct arising as a complication of infection/vasculitis, and mass effect with left shift. Neurosurgery, neurology, ID, and ENT were consulted. The patient was started on vancomycin, ceftriaxone, voriconazole, dexamethasone, levetiracetam, and was admitted to the Neuro ICU. CT venogram was notable for possible cavernous sinus thrombosis and CT angiogram showed multifocal intracranial vessel narrowing concerning for vasculitis. CT sinus was notable for osseous dehiscence of the left sphenoid, presumably the source of infection. His neurologic status ultimately declined resulting in bilateral sphenoidotomy, bilateral frontal sinusotomy, right craniectomy with abscess evacuation, and right temporal lobectomy. Extensive pressurized purulence was noted once the dura was entered. Tissue culture was notable for *Citrobacter koseri*, Diphtheroids, and coagulase negative Staph. Antimicrobials were narrowed to vancomycin and meropenem. At the time of this vignette, the patient is deceased.

IMPACT/DISCUSSION: Literature on life-threatening intracranial complications of acute sinusitis is sparse. They occur in 3.7% of patients hospitalized with sinusitis. Also unique in our case was a right MCA infarct as a result of vasculitis and empyema. Mechanisms of spread from the sinuses to the intracranial compartment are through anatomical dehiscence, direct extension, or the diploic veins. Infections are often polymicrobial and operative cultures do not yield growth in 7-53% of cases. Fungal infections involving *Aspergillus*, *Rhizopus*, or *Mucormycosis* can predispose to superimposed bacterial infections similar to that observed in our case.

CONCLUSION: Acute sinusitis can progress, though rarely, to complications that are life-threatening and have no known preventative strategy. Recognizing these as medical emergencies and rapidly instituting a multidisciplinary approach is of utmost importance. Also, our vignette illustrates how further investigation is warranted in order to improve upon treatment for these patients.

A TALE OF TWO DRUGS

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LEARNING OBJECTIVE #1: Recognize that Methotrexate (MTX) toxicity can present with diffuse skin erosions

LEARNING OBJECTIVE #2: Recognize that concurrent use of trimethoprim-sulfamethoxazole (TMP-SMX) with MTX can increase bone marrow toxicity.

CASE: A 70-year-old male with medical history significant for rheumatoid arthritis presented to the emergency department with several day history of odynophagia, oral ulcers, skin lesions and epistaxis. He was treated for foot cellulitis with TMP-SMX for one week prior to admission. The patient had been receiving 10 mg SQ weekly injectable MTX for Rheumatoid Arthritis. However, he had not been taking folate supplementation.

On exam, the patient was afebrile. He had stomatitis and oral bleeding. Skin exam revealed erythematous papules, plaques with dusky erosions scattered on arms, chest, abdomen, legs and his right foot. His labs showed pancytopenia and eosinophilia. His folate level was 2.88 ng/ml (normal range >3.10 ng/ml). His MTX was held and the patient was started on intra-venous (IV) folate. He quickly developed worsening anemia and thrombocytopenia and he received supportive platelet and RBC transfusions. His course was notable for neutropenic fever that improved with antibiotics. His hematopoietic cell lines eventually recovered with folate supplementation and his pancytopenia was resolved 9 days after admission.

IMPACT/DISCUSSION: Methotrexate (MTX) is known to inhibit Dihydrofolate Reductase (DHFR), an enzyme needed to replenish folate in nucleic acid synthesis. MTX therapy can be either low dose (LDMTX) as seen in Rheumatoid Arthritis patients and our patient or high dose (HDMTX) as used in chemotherapy regimens. Supplemental folate is vital when using

LDMTX and folic acid is essential while on HDMTX to prevent bone marrow suppression. MTX's effect on non-immune cells causes several other toxicities including stomatitis and gastro-intestinal symptoms. Less common manifestations of MTX toxicity include an increased risk of lymphoproliferative disorder, skin erosions, as observed in our patient, and skin cancer.

Trimethoprim like MTX, is a folate depleting drug which inhibits DHFR increasing the risk of bone marrow toxicity when added to MTX. In addition, Sulfamethoxazole inhibits MTX renal excretion which further increases the risk for methotrexate toxicity. MTX is usually well tolerated in patients taking trimethoprim-sulfamethoxazole prophylaxis (usually as one double-strength tablet three times weekly, such as on a Monday-Wednesday-Friday regimen), but this combination should be avoided when the antibiotic is used in a twice-daily regimen for treatment of an active infection. Significant bone marrow and other toxicities have been observed with use of a daily sulfa antibiotic regimen as seen in our patient

CONCLUSION: Twice daily TMP-SMX is contra-indicated in combination with MTX and folate supplementation is crucial while using MTX.

ATYPICAL PRESENTATION OF EGPA WITH SPONTANEOUS DEVELOPMENT OF NSAID SENSITIVITY

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LEARNING OBJECTIVE #1: Avoid NSAIDs in patients with undifferentiated eosinophilic lung disease

LEARNING OBJECTIVE #2: p-ANCA is specific, but not sensitive for EGPA; therefore, its absence should not rule out the diagnosis

CASE: A young woman with no past medical history or allergies presented with significant hypoxia after subacute nocturnal cough. She denied history of asthma, sinusitis, atopy, fever, weight loss, or rash. Initial work up revealed peripheral eosinophilia and elevated inflammatory markers. Chest CT showed infiltrates and interstitial thickening. BAL demonstrated 85% eosinophils with persistent peripheral eosinophilia throughout admission. Infectious, allergic and rheumatologic tests (including ANCA) were all negative. No clear diagnosis was found. Patient was discharged on 60mg prednisone. Soon after tapering off prednisone, she presented to emergency room for significant epigastric pain, nausea, diarrhea and dyspnea. An intramuscular dose of ketorolac was given for pain control. Within minutes of administration of this drug, the patient experienced acute respiratory failure which required extensive resuscitation. She did not have any urticaria, angioedema, or wheezing. Due to the patient's consistent eosinophilia, multiorgan involvement, paranasal symptoms, and pulmonary imaging, a diagnosis of EGPA was eventually determined. The patient had a positive aspirin challenge in clinic, diagnosing AERD. Patient responded to continuous immunosuppressive therapy.

IMPACT/DISCUSSION: EGPA is a rare autoimmune vasculitis, which is seen in patients with history of airway allergic hypersensitivity. Cardinal features are history of asthma in >95% cases and presentation in 3 stages: allergic, eosinophilic, and vascular. AERDis a relatively common finding (15%) in severe asthmatic patients. The three cardinal AERD symptoms are aspirin sensitivity, nasal polyps and asthma. Pathophysiology is generally accepted to be due to imbalance of synthetic products of arachidonic acid. It is not believed to be an IgE mediated reaction. The etiology is currently poorly understood. While EGPA and AERD have overlapping symptoms, they have only been reported together once. This patient has an atypical presentation of EGPA in addition to new development of severe NSAID sensitivity. She skipped the allergic stage - there were no prior allergic symptoms or previous sensitivity to NSAIDs. Rather, the patient's disease started in the second stage with peripheral eosinophilia >1500/uL, then progressed to the third stage (vascular stage) with multiorgan involvement, and abnormal chest CT findings.

CONCLUSION: Patients with eosinophilic diseases may develop new syndromes. If a patient with unknown severe pulmonary disease has an initial negative history or work up, do not rule out EGPA. If a patient with respiratory disease is found to have eosinophilia, do not use NSAIDs.

AVOIDING BENZODIAZEPINES IN THE ELDERLY: A FALL CAUSED BY AN UNLISTED MEDICATION

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LEARNING OBJECTIVE #1: Consider sedative and hypnotic medications on the differential for patients presenting with a mechanical fall even if not listed on the medication list

LEARNING OBJECTIVE #2: Recognize the importance of avoiding benzodiazepines in older adults, especially those with dementia or delirium

CASE: NB is an 89-year-old man with a history of gradual cognitive decline, hypertension, and asthma who was admitted to the hospital with acute altered mental status and superficial head laceration after a mechanical fall.

Prior to admission, the patient was seen at an outside hospital emergency department with a complaint of increased confusion and unsteady gait for several days. A CT scan of the head was obtained, without signs of intracranial hemorrhage. He received 1mg of lorazepam for sedation in order to obtain an MRI of the head, which ultimately was not performed. The patient was discharged with home health services, and he was reported to remain increasingly confused and unsteady with marked difficulty with ambulation. Later that evening, the patient was noted to possibly aspirate and developed a cough. When attempting to ambulate, he had a fall and head trauma without noted loss of consciousness, and he was brought in by EMS for further evaluation.

Home medications included albuterol as needed and vitamins. Exam was significant for lethargy and sedation, decreased breath sounds at the left lung base, small hematoma and laceration on the forehead, and little spontaneous movement on neurological exam consistent with profound hypoactive delirium. Labs were significant for a leukocytosis of 15 K/uL, and chest x-ray showed atelectasis without evidence of consolidation. A repeat CT scan of the head was negative. Patient was empirically started on ceftriaxone and azithromycin for presumed aspiration pneumonia and remained stable for transfer back to the outside hospital.

IMPACT/DISCUSSION: Studies have shown that benzodiazepines can double the risk of a fall. Despite the American Geriatrics Society's BEERS criteria identifying benzodiazepines as an inappropriate treatment in older adults, 8.7% of Americans aged 65 and older continue to receive benzodiazepine prescriptions for inappropriate indications including insomnia, agitation, or delirium. This case of mechanical fall demonstrates the danger of administering benzodiazepines to an older patient with risk factors for fall, and also highlights the importance of determining if medications other than those listed on a patient's medication list were administered for patients with a sudden change in mental status or mechanical fall.

CONCLUSION: Prescription of sedative and hypnotic medications is a significant, modifiable risk factor for falls. These medications may not be listed on the patient's home medications and it is important for clinicians to rule out administration of new medications in a patient with a recent mechanical fall.

BAMBI STRIKES AGAIN!

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LEARNING OBJECTIVE #1: Recognize clinical features of Powassan virus infection.

LEARNING OBJECTIVE #2: Recognize management of Powassan virus infection highlighting special diagnostic tests and prevention.

CASE: A 57-year-old male from Massachusetts, with past medical history of hypertension presented to the Emergency Department with constant bifrontal headache for 5 days duration. Two days later, he developed chills, malaise, nausea and vomiting. He reported exposure to mosquitoes and ticks. He was febrile (38.6C) and on exam was noted to have decreased strength (power 4/5) of the proximal muscles on right upper limb. Labs

revealed normal CBC, CMP and Urinalysis. CT scan of the head, CT angiogram of head and neck and Chest X-ray were normal. Serum Tick-Borne Disease Antibodies Panel was negative. CSF analysis showed 190 leukocytes (75% lymphocytes), normal glucose and 47 mg/dL of protein. Cryptococcus, West Nile virus, Eastern Equine Encephalitis virus, HSV 1/2, EBV, and Lyme quantitative PCR, Gram stain of CSF were negative. He was treated empirically with doxycycline, acyclovir, ceftriaxone and ampicillin. As the patient resided in an endemic area, reported tick exposure and presented with fever, headaches and focal neurological deficits, CSF Powassan virus IgM Capture ELISA was requested, which came back positive with Powassan plaque reduction titer of 1:320. The patient clinical improved within 48 hours. Antibiotics and acyclovir were discontinued after receiving CSF results. On discharge and follow up 2 weeks later, he was asymptomatic.

IMPACT/DISCUSSION: Powassan virus (deer tick virus) is a Flavivirus that can be responsible for tickborne encephalitis in the Eastern US. It is transmitted by the deer tick within 15 minutes of tick attachment and has an incubation period ranging from 8-34 days. Patients present with nonspecific symptoms such as fever, weakness, paralysis, somnolence, GI disturbance, headache, confusion and seizures. The past decade has witnessed an increase in Powassan virus (POWV) infection in number and across state lines. A diagnosis can be established by demonstration of IgM antibody by capture immunoassay of CSF, a fourfold rise in serum antibody titers against virus, or isolation of virus from tissue, blood, or CSF. There is no specific treatment for the virus. The case-fatality rate is approximately 10 percent. After recovery, patients are found to have a high incidence of residual neurological dysfunction.

There is no vaccine available against POWV. Prevention depends largely on decreasing the exposure to infected ticks. By identifying potential cases early, preventive interventions can be undertaken by public health department, communities and individuals to reduce exposure.

CONCLUSION: Powassan virus is a serious tick-borne disease that can manifest with vague symptoms and inconclusive lab/imaging results. As the standard arbovirus panels do not test for POWV, clinical suspicion and focused testing is important for early detection and is crucial for public health and epidemiologic purposes due to the morbidity risks.

BE CAREFUL WITH THE BEE'S!

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LEARNING OBJECTIVE #1: To identify Kounis syndrome

LEARNING OBJECTIVE #2: To learn management of Kounis syndrome

CASE: 38-year-old healthy male was brought to the emergency room for evaluation of syncope after bee sting while working on a cranberry marsh. His other symptoms were lightheadedness, fatigue, headache and itching. There was no prior history of anaphylaxis or bee allergies. Physical exam was remarkable for erythematous maculopapular and urticarial rash on trunk and legs. Significant labs were leukocytosis, hypokalemia and mildly elevated troponin I 0.09 ng/ml (cutoff 0.04 ng/ml). Due to anaphylaxis concern he was treated with prednisone, epinephrine, IV fluids and diphenhydramine. His EKG was unremarkable. Troponin I 2 hrs. later was further elevated to 0.5 ng/ml. Patient was referred to tertiary hospital for cardiology evaluation. Subsequently high sensitivity troponin was also checked and was elevated to 410 ng/ml. An echocardiogram was unremarkable. Coronary CT angiography revealed normal coronary arteries without stenosis. A specific IgE to wasp was elevated to 2.23. Patient remained stable during hospital stay and was discharged with an epi-pen. He was evaluated by allergy specialist and workup revealed he had allergic sensitivity to yellow jacket (9.85), yellow faced hornet (0.94) and white-faced hornet (4.79) but negative for systemic mastocytosis. He was instructed to begin venom immunotherapy and advised to take antihistamines, H2 blockers and Montelukast on daily basis during stinging insects' season and to keep epi-pen always available.

IMPACT/DISCUSSION: Our patient's presentation resembles to Type I Kounis syndrome (KS). KS is an acute coronary syndrome (ACS) due to mast cell activation from allergic or anaphylactoid reactions. It is implicated that

mast cell activation releases inflammatory cytokines that leads to coronary vasospasm and atheromatous plaque erosion and/or rupture. There are three variants of KS. Type I KS includes patients with normal coronary arteries without predisposing factors for coronary artery disease (CAD) in whom acute allergic insult leads to coronary artery vasospasm with normal cardiac biomarkers or infarction with positive cardiac biomarkers. Mild reaction is treated with antihistamines, steroids and anaphylaxis with epinephrine. Beta-blockers should be avoided when using epinephrine as that can cause un-opposed alpha-adrenergic activity aggravating vasospasm. Morphine should also be avoided as it can potentially stimulate histamine release and exacerbate pathologic cascade.

CONCLUSION: Our patient almost had a near fatal allergic reaction after bee sting which was timely and appropriately treated. This case helps us recognize a potentially rare consequence of ACS after a bee sting which can have a more severe manifestation in people with underlying CAD. We also learn that patient's with anaphylaxis type reaction after bee sting should be prescribed an epi-pen and instructed to keep it always available to them. These patients should also be referred to an allergy specialist.

BEYOND POLYMYOSITIS: A UNIQUE PRESENTATION OF PROGRESSIVE NECROTIZING MYOPATHY AND NEUROPATHY SECONDARY TO NUTRITIONAL DEFIANCE.

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LEARNING OBJECTIVE #1: Recognize that progressive necrotizing myopathy and neuropathy can be secondary to nutritional deficiencies.

LEARNING OBJECTIVE #2: Treat patients with necrotizing myopathy and neuropathy secondary to nutritional deficiencies with riboflavin and biotin.

CASE: A 49-year-old woman with a past medical history of Hashimoto's hypothyroidism, hyperlipemia, and B12 deficiency receiving IM B12 injections who was transferred to our academic medical center with a 4-month history of progressive proximal muscle weakness in bilateral upper and lower extremities, sensory neuropathy, poor nutritional intake, and a 40-pound weight loss. Family history negative for any autoimmune disorders. Social history notable for active tobacco use with a 30-pack year history. Physical exam revealed 3/5 strength in shoulder abduction in left upper extremity, 4/5 on shoulder abduction on right upper extremity, 2/5 in bilateral hip flexors, and decreased vibratory sensation distal to T10. On admission, CPK levels >10,000, aldolase 40, and LDH at 1700 with elevated LFTS and inflammatory markers. Commercial myositis panel and other autoimmune serologies including ANA, SSA/B, RF, and HMG-CoA antibody levels were negative. Electromyogram demonstrated evidence of a proximal myopathic process and a non-length-dependent sensory axonal polyneuropathy. Muscle biopsy of the left deltoid showed necrotizing myopathy concerning for possible lipid storage myopathy. Paraneoplastic panel, CT chest/abdomen/pelvis, and SPEP/UPEP were negative. Metabolic workup including urinary organic acid levels were highly elevated suggestive of a catabolic state, but not consistent with a specific metabolic disorder. Genetic sequencing for lipid storage diseases are still pending. Vitamin B12 on admission was normal and malabsorption was evaluated with normal endoscopy and negative enzyme tests. A unifying diagnosis is vitamin and cofactor deficiencies that resulted in myopathy and neuropathy. The patient was initiated on biotin, folic acid, thiamine, and riboflavin with improvement in strength and sensation. Patient was seen one week after discharge with continued improvement.

IMPACT/DISCUSSION: This is a unique case of progressive myopathy and polyneuropathy in a patient with a negative malignant, inflammatory, genetic, and autoimmune workup. Although vitamin deficiencies are often considered in the workup of neuropathy and myopathy, we rarely consider deficiencies in cofactors such as riboflavin and biotin. This case is an example where supplementation with these cofactors results in significant clinical improvement over time and should be considered in the management of myopathy and neuropathy without another identified etiology.

CONCLUSION: Consider vitamin and cofactor deficiencies in patients who present with myopathy and polyneuropathy with a negative malignant, inflammatory, genetic, and autoimmune workup. Cofactors such as biotin and

riboflavin are relatively harmless supplements and should be administered in patients with concern for cofactor deficiencies.

BEYOND RUN OF THE MILL ENCEPHALOPATHY - A CASE OF CEFEPIME NEUROTOXICITY

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LEARNING OBJECTIVE #1: Recognize the clinical presentation of Cefepime induced neurotoxicity

LEARNING OBJECTIVE #2: Identify the risk factors and manage Cefepime neurotoxicity

CASE: A 69-year-old woman with end-stage renal disease (ESRD) on thrice-weekly hemodialysis via right internal jugular tunneled dialysis catheter presented to our hospital from a nursing home with altered mental status and twitching movement of extremities. Her past medical history was notable for cognitive impairment (alert and conversive at baseline), hypertension, and diabetes. Two weeks before this presentation, she had a right flank abscess from *Citrobacter werkmanii*. She had received intravenous cefepime 1 gm daily for 6 days, followed by Cefepime 1 gm twice daily for 6 days. She was afebrile in the emergency room with BP 170/80 mmHg and SpO₂ of 95% on ambient air. On exam, she was encephalopathic with minimal response to sternal rub. Bilateral lid twitching and synchronous myoclonic movements of both upper and lower extremities were noted. Lab data revealed hypoglycemia with glucose 49 mg/dl, white cell count 8,500/uL, sodium 135 meq/L, blood urea nitrogen 43 mg/dL, and ammonia level 35 u/dL. CT head showed no acute finding. Despite the correction of hypoglycemia, the neurological symptoms persisted. EEG confirmed epileptic discharges on the left temporal, frontal, and central regions. Cefepime was discontinued, and intravenous levetiracetam was administered. The patient was dialyzed consecutively for three days with complete resolution of presenting symptoms. A follow-up EEG showed no epileptic activity.

IMPACT/DISCUSSION: Cefepime is renally cleared and can cross the blood-brain barrier. Its high affinity for the central nervous system GABA-A receptor is implicated in the pathogenesis of neurotoxic symptoms. Older age and abnormal renal function (AKI, CKD, or ESRD) are the risk factors for cefepime neurotoxicity. Incorrect dose calculation or overestimation of GFR from creatinine clearance based equations, especially in unsteady-states (e.g., AKI), can lead to overdosing and accumulation of the drug in the serum, cerebrospinal fluid, and brain tissue. Our patient had received double the recommended dose for ESRD (500mg to 1gm daily), leading to toxicity. Diminished consciousness is the hallmark of cefepime neurotoxicity, but symptoms can range from aphasia, non-convulsive status epilepticus, to frank seizures. The diagnosis is challenging as the condition may mimic altered mental status from hospital delirium, infection, metabolic changes, or toxic ingestion. Myoclonus is a discreet finding seen in 40% of cefepime neurotoxicity cases and can serve as a clue to the diagnosis as in our patient. Cefepime is dialyzable with an 85% reduction in serum concentration from a 4-hour dialysis treatment.

CONCLUSION: Cefepime neurotoxicity must be considered in a patient with new-onset altered mental status or myoclonus with underlying renal failure. Internists, hospitalists, and intensivists must be aware of this entity for prompt diagnosis and treatment.

BLAME IT ON THE SPIROCHETE

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LEARNING OBJECTIVE #1: Develop an approach to polyarthritis

LEARNING OBJECTIVE #2: Identify common pathogens associated with reactive arthritis

CASE: A 19-year-old man presented with a 2-week history of joint pain in his shoulders, wrists, and ankles with bilateral wrist and ankle swelling. He also

endorsed sore throat, congestion, headache, and low-grade fever. At a prior visit, he was diagnosed with a viral syndrome due to either EBV or CMV.

Electrolytes and renal function were normal. No cytopenias were noted. AST and ALT were 59 and 124, respectively, with a normal bilirubin level. Acute hepatitis panel, EBV, and CMV serologies returned negative. ANA and RF were negative. Fibrinogen, complement C3, ESR, and CRP were elevated. Further history was obtained due to an inconclusive diagnosis. He reported having unprotected sex with a female partner. *Treponema pallidum* antibodies were positive; RPR titer of 1:256. Testing for gonorrhea, chlamydia, and HIV was negative.

He developed tenderness and swelling consistent with enthesitis in his bilateral plantar surfaces and new right knee effusion. Arthrocentesis was performed and no organisms were identified on synovial fluid culture.

Due to his headache, cerebrospinal fluid studies were obtained by lumbar puncture. Results revealed a white blood cell count (11) and positive FTA-ABS. He was treated for neurosyphilis with IV penicillin for 14 days. Joint pain resolved with penicillin and ibuprofen.

IMPACT/DISCUSSION: Polyarthritis is defined as the presence of pain in more than four joints. Evaluating for an underlying etiology can be challenging as polyarthritis may be due to various causes. Utilizing the pattern of joint involvement, symmetry, and onset of involvement may assist in narrowing the diagnosis. Further serologic testing is often needed to uncover the diagnosis. The evaluation includes testing for systemic lupus erythematosus, rheumatoid arthritis, inflammatory bowel disease, viral infections, or bacterial infections. After a thorough workup for other rheumatologic causes of polyarthritis is unrevealing, a diagnosis of reactive arthritis may be considered. Due to its low prevalence, reactive arthritis is a diagnosis of exclusion.

Reactive arthritis is typically caused by gastrointestinal or genitourinary pathogens – most commonly salmonella, shigella, *Yersinia*, *Campylobacter*, *C. difficile*, or chlamydia. Syphilis has rarely been shown to cause reactive arthritis. Identifying a causative agent can become difficult if the patient does not endorse any preceding symptoms like diarrhea, conjunctivitis, or urethritis. With syphilis initially presenting as a painless ulcer, it is easily missed by patients, making the process of identifying a pathogen for reactive arthritis more difficult.

CONCLUSION: Polyarthritis requires a systematic approach to uncover the diagnosis. In reactive arthritis, identifying a causative agent can become difficult if the patient does not endorse any preceding gastrointestinal or genitourinary symptoms.

BROADENING THE DIFFERENTIAL OF FEVER AND LYMPHADENOPATHY: A CASE OF KIKUCHI-FUJIMOTO DISEASE

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LEARNING OBJECTIVE #1: Recognize the various presenting signs and symptoms of KFD

LEARNING OBJECTIVE #2: Describe possible dermatologic manifestations of KFD

CASE: We present a case of Kikuchi-Fujimoto Disease (KFD) diagnosed in a 30-year-old man of Jamaican descent with no significant PMH or PSH who presented with a four-week history of fevers, tender lymphadenopathy, weight loss, malaise, desquamation of the lips, and hyperpigmented papules on the face. He had recently arrived to the United States from Jamaica. Initial concern was for atypical infectious process given his clinical presentation and travel history. He underwent an extensive infectious disease work-up that was negative. Additional workup revealed a negative ANA, negative drug screen, no oligoclonal bands on SPEP/UPEP, and negative leukemia/lymphoma panel. CT scan of C/A/P was significant only for bilateral axillary lymphadenopathy. The final diagnosis remained elusive until skin and lymph node biopsies both confirmed the diagnosis of KFD.

IMPACT/DISCUSSION: Kikuchi-Fujimoto Disease (KFD) is a rare but benign cause of fever and tender lymphadenopathy. Most common symptoms

of the disease include fever and tender lymphadenopathy. Onset of symptoms can be acute or subacute and typically develop over a period of 2 to 3 weeks. Symptoms of KFD most commonly include low-grade fevers and tender, painful lymphadenopathy of the posterior cervical chain (typically unilateral) as well as axillary and supraclavicular nodes. Other reported symptoms include weight loss, nausea, headache, night sweats, and weakness.

Many patients with KFD do not have any skin findings, but dermatologic manifestations of KFD have been noted in anywhere from 10–40% of patients with biopsy-proven KFD. The most common locations of skin lesions are the face, trunk, and upper extremities. Out of all the possible cutaneous manifestations, the most common finding is nonspecific “rash,” followed by erythematous macules, patches, papules or plaques that can vary widely in appearance. Other less common manifestations also include oral ulcers, alopecia, malar erythema, photosensitivity, nodules, bullae, LCV, and erythema multiforme. Most patients with KFD have normal laboratory findings, but if present, can include elevated ESR, lymphopenia, mild anemia, elevated aminotransferases, and elevated LDH. Imaging studies are also non-specific and may reveal clusters of lymph nodes. Diagnosis of KFD is almost exclusively made via histopathological examination of an affected lymph node, which should be obtained via excisional lymph node biopsy. Kikuchi-Fujimoto Disease continues to be a perplexing, elusive diagnosis that clinicians struggle to understand. While the disease course itself is typically benign, timely and accurate diagnosis is needed in order to rule out more nefarious causes of lymphadenopathy and fever.

CONCLUSION: - Describe KFD in order to broaden the differential diagnosis for patients presenting with fever and lymphadenopathy as well as other possible systemic and dermatologic findings

CATASTROPHIC ANTIPHOSPHOLIPID ANTIBODY SYNDROME

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LEARNING OBJECTIVE #1: The unique characteristics of Catastrophic Antiphospholipid Syndrome (CAPS) are rapid onset thrombosis resulting in multiple organ dysfunction, common association with other thrombotic microangiopathies, high risk of systemic inflammatory response syndrome, unusual organ involvement, and high mortality rate despite optimal therapy

LEARNING OBJECTIVE #2: Newer therapies as rituximab and eculizumab may be options but need further study.

CASE: Our patient was a 44 year old man with known history of hypertension, diabetes mellitus, chronic thrombocytopenia, and autism admitted for right sided weakness. He was diagnosed with acute ischemic stroke, treated for it, and transferred to acute rehabilitation facility. He developed abdominal pain and distention during the rehabilitation facility stay. Imaging of the abdomen revealed emboli in pulmonary arteries, superior mesenteric artery, splenic artery, and he was started on unfractionated heparin. Repeat abdominal imaging showed thickening of small bowel in right abdomen concerning for intramural hemorrhage and large territory splenic infarction. He underwent exploratory laparotomy for bowel ischemia secondary to thrombosis. He further developed lower extremity venous thrombus as well. Transthoracic echocardiogram revealed a patent foramen ovale. He tested positive for anticardiolipin antibodies and was started on plasma exchange along with Solumedrol for CAPS. The anticoagulation therapy was transitioned from intravenous heparin to warfarin, with a goal INR of 2-3 and intravenous heparin was later discontinued. He was switched to oral prednisone and placed on an appropriately scheduled steroid taper. He was discharged once medically stable and was planned to follow up with hematology, Coumadin clinic, and general surgery for appropriate continuation of care.

IMPACT/DISCUSSION: Antiphospholipid syndrome (APS) is a multisystem autoimmune condition that is characterized by vascular thrombosis and, or pregnancy loss associated with persistently positive antiphospholipid antibodies (APLA). Catastrophic antiphospholipid syndrome (CAPS) also known as Asherson's syndrome is the most severe form of APS with acute multiorgan involvement and is usually associated with micro thrombosis. CAPS has been defined as thrombosis in three or more organs, development of manifestations

in less than a week, histological evidence of intravascular thrombosis, and APLA positivity on two occasions six week apart. If a patient has three out of four abovementioned criteria then they are probable CAPS as opposed to definite CAPS. Previous diagnosis of APS and persistently positive APLA is of significance for APS diagnosis but almost half of the patients with CAPS have no history of APLA positivity. All patients should be treated with anticoagulants, corticosteroids, and possibly plasma exchange.

CONCLUSION: CAPS should be considered as a diagnostic possibility in patients with rapid onset thrombosis involving multiple organs and unusual organ involvement.

CAT EYES

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LEARNING OBJECTIVE #1: Recognizing etiologies associated with neuroretinitis

LEARNING OBJECTIVE #2: Importance of taking a detailed history

CASE: An eighteen-year-old woman presents to the hospital with one week of blurry vision and eye pain with movement. Symptoms were worse in the left eye. Family history was significant for multiple sclerosis in her first cousin. Physical examination was remarkable for impaired visual acuity in the left eye with a central scotoma and relative afferent pupillary defect. Routine admission labs were within normal limits, with the exception of an ESR of 72mm/hour. A brain MRI showed bilateral optic disk edema. Lumbar puncture revealed a white blood cell count of 10, with lymphocytic predominance, a normal opening pressure, glucose, total protein, and a negative gram stain and culture. CSF encephalitis panel which included BioFire, Lyme, Epstein-Barr virus, Syphilis, and West Nile virus was negative. She was treated with 1g prednisone for five days for the management of optic neuritis. Ultimately, CSF studies revealed markedly elevated titers of Bartonella henselae IgM and IgG. Upon further historical review, the patient had recently obtained a new kitten and had received scratches on her face prior to the development of her symptoms. Subsequently, a six-week course of rifampin and doxycycline was given for the management of B. henselae neuroretinitis. Two weeks later, a follow-up ophthalmologic evaluation revealed improvement in eye pain, visual symptoms, and optic disk edema.

IMPACT/DISCUSSION: More than 90% of kittens under one-year-old carry B. henselae. Following an incubation period of about a week, patients develop fever and malaise, although the most common symptom of cat scratch disease (CSD) is self-limited tender lymphadenopathy. Rarely, infections of visceral organs, such as the liver and spleen, central nervous system, or culture-negative endocarditis may develop. Amongst all patients with CSD, only about 1-2% will develop neuroretinitis.

CONCLUSION: Bartonella henselae is the most common cause of infectious neuroretinitis in the United States. Diagnosis requires cerebrospinal fluid analysis of B. henselae specific immunoglobulins, as serological tests are insensitive. Alternatively, polymerase chain reaction-based tests of intraocular fluid can also be confirmatory.

Along with corticosteroids, the treatment of choice is doxycycline and rifampin for four to six weeks. With appropriate treatment the long-term prognosis is generally favorable.

CAT GOT YOUR CATHETER?

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LEARNING OBJECTIVE #1: Recognize the clinical symptoms and risk factors for Pasteurella multocida peritonitis.

LEARNING OBJECTIVE #2: Obtain pet history when patient presents with symptoms suggestive of infection.

CASE: A 51-year-old Caucasian female with end-stage renal disease on peritoneal dialysis (PD), type 2 diabetes mellitus, and hypertension who presented to the ED due to intractable vomiting. She reported a fever of 102.7°F four days prior to presentation and drainage from her PD catheter site one day prior to presentation. The patient also had severe sharp, constant abdominal pain in the right and left lower quadrants that radiated to the hips bilaterally. She noticed that she had not been draining off fluid from her PD catheter that week. She denied prior history of catheter infections or any sick contacts. On the second day of hospitalization, the patient mentioned that her peritoneal dialysate fluid flooded her bedroom floor, concerning for her pet cat possibly biting the PD tubing.

Leukocytosis and elevated CRP of 27.1 were present. Peritoneal fluid was drained and notable for 35,860 total nucleated cells, consistent with peritonitis. PD fluid culture grew *P. multocida*. *P. multocida* peritonitis was diagnosed secondary to the patient's cat biting the tubing of the catheter which then seeded into the fluid and peritoneum. Infectious disease was consulted and recommended a 21-day course of cefepime intraperitoneally.

IMPACT/DISCUSSION: The differential diagnosis included PD catheter infection versus cholecystitis. Physical exam findings such as worsening abdominal pain with movement combined with the patient's pain feeling similar to how she initially felt when she received her first peritoneal dialysis session made PD catheter infection at the top of the differential. *P. multocida* is a gram-negative coccobacillus located in the oral cavity of both domesticated and wild animals such as dogs and cats that is transmitted via bites and licks to exposed areas. Typically, skin infections, upper and lower respiratory infections, and soft tissue infections can be associated with *P. multocida*. Peritonitis is typically rarely associated gram-negative anaerobic bacilli. However, one specific patient population associated with *P. multocida* peritonitis is end stage renal disease (ESRD) patients dependent on peritoneal dialysis (PD). History and physical exam should include asking the patients if they have pets along with observing the tubing for bite marks. Patients who choose to get PD catheters should be counseled on making sure their tubing does not come in contact with domesticated animals. Steps can be taken such as avoiding sleeping in the same room as your pets can prevent transmission of *P. multocida*.

CONCLUSION: - A thorough history, including asking if domesticated animals are living in the house, should be done in patients on PD with signs of peritonitis. - Local, targeted treatment with a fourth-generation cephalosporin such as cefepime can be administered intraperitoneally to avoid systemic side effects.

CLINICAL CONSIDERATIONS IN THE MANAGEMENT OF KAPOSI'S VARICELLIFORM ERUPTION IN AN IMMUNO-COMPETENT ADULT

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LEARNING OBJECTIVE #1: Recognize Kaposi's varicelliform eruption as a differential diagnosis in a patient presenting with disseminated cutaneous eruption.

LEARNING OBJECTIVE #2: Manage systemic symptoms and fulminant sequelae of KVE in hospital settings where inpatient dermatology consultative services are limited, including bacteremia/septicemia, anemia, cellulitis, and multiple organ involvement

CASE: A 60 y/o male presented with an erythematous scaly rash and skin sloughing noted diffusely from head to toe. He had bilateral lower extremity edema with active weeping from the left leg. He complained of pruritus and a burning sensation all over his body. Patient appeared unhygienic and had flaking skin on his face and arms. His left leg was wrapped in a bag to contain serous drainage. He described an initial vesicular rash on the back of his neck 3 months prior which eroded and became small, round, open, and painful areas, with larger eroded areas on his posterior trunk and limbs. Further history revealed that the patient had not seen a medical provider in many years. Inpatient workup included blood cultures positive for methicillin-sensitive *S.*

aureus. Bacteremia was treated with 4 weeks of oxacillin. Skin punch biopsies from multiple sites all revealed herpes viral cytopathic changes. The patient was diagnosed with herpetic dermatitis and started on acyclovir. A podiatrist was consulted for wound care of chronic venous stasis ulcer and cellulitis of the left leg and lower extremity edema. After the course of acyclovir and improvement in KVE, the patient was transferred to a long-term acute care facility.

IMPACT/DISCUSSION: This patient is an immunocompetent male with no apparent predisposing factors who was diagnosed with KVE due to herpes viral infection. He reported no history of atopy or eczematous lesions prior this episode. The diagnosis of KVE was initially overlooked, and review of his medical records reveal past diagnoses with a variety of skin conditions including psoriasis, atopic dermatitis, and erythroderma of unknown origin. It is important to recognize KVE and differentiate it from the aforementioned skin conditions. The patient exhibited rapid decline before improving upon administration with acyclovir. Although KVE is more common in infants and children, it is important to consider in adults who present with similar clinical signs. Eczematous lesions that are unresponsive to emollient/steroidal treatment should raise the suspicion of KVE infection, especially in a rapidly declining patient

CONCLUSION: This case highlights how KVE should be considered in the differential of an otherwise healthy patient with a progressing vesiculopustular rash. Inpatient management of KVE requires concomitant attention to sequelae such as bacterial superinfection, dysmetabolism, and organ compromise.

CLOT BUSTERS: OUTPATIENT CASE REPORT OF RECURRENT VTE CAUSED BY NEPHROTIC SYNDROME

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LEARNING OBJECTIVE #1: Review nephrotic syndrome as a cause of venous thromboembolism

LEARNING OBJECTIVE #2: Illustrate the importance of recognizing anchoring bias, particularly as it pertains to outside medical records

CASE: A 48 year-old woman with hypertension and abnormal uterine bleeding presented to clinic with a two-year history of painless bilateral lower extremity edema. Outside records revealed a prior history of venous insufficiency and a left iliofemoral deep vein thrombosis thought to be provoked secondary to a diagnosis of May-Thurner syndrome that was treated one year ago with stent placement and three months of anticoagulation. Repeat venography was planned at her last visit for persistent lower extremity edema, but she was lost to follow-up after insurance changes. She was referred to vascular clinic.

One month later, the patient presented with acute shortness of breath. Vital signs showed an oxygen saturation of 95% on room air. Labs revealed an elevated d-dimer and iron deficiency anemia with Hgb 10 g/dL, MCV 78 fL, Ferritin 4.6 ng/mL, and Iron 15 g/dL. The patient was diagnosed with sub segmental pulmonary emboli on CT. She was reinitiated on therapeutic anticoagulation and discharged with stable blood counts.

For work-up of her recurrent venous thromboembolism (VTE), mammography and colonoscopy were done and returned without evidence of neoplasia. Pelvic US was performed for her history of abnormal uterine bleeding showing only a fibroid uterus. An endometrial biopsy was pursued which returned also with benign pathology. The patient was referred to Hematology for further hypercoagulable work-up. A subsequent urinalysis returned with nephrotic-range proteinuria with a total protein/creatinine ratio of 5,609 mg/g. The patient underwent renal biopsy and was diagnosed with AL-amyloid nephropathy.

IMPACT/DISCUSSION: Nephrotic syndrome (NS) is characterized by proteinuria (>3.5 g/24 hr), hypoalbuminemia, hyperlipidemia, and edema. Owing to the loss of anti-thrombotic proteins, venous thromboembolism is an important clinical complication of NS; however, its evaluation is often overlooked in patients who present with unprovoked VTE. Here, we present a case that highlights the importance of recognizing nephrotic syndrome as an etiology for venous thromboembolism with chronic leg edema.

Our case also illustrates the importance of avoiding anchoring to diagnoses found in outside records. Studies have shown that cognitive biases are responsible for up to 28% of diagnostic errors which, in turn,

contribute to delays in treatment. Further strategies to bring awareness to these biases are needed.

CONCLUSION: While rare, clinicians should consider a diagnosis of nephrotic syndrome in the evaluation of patients with unprovoked venous thromboembolism.

COMPLICATIONS ASSOCIATED WITH A CLASSIC CASE OF TUBEROUS SCLEROSIS

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LEARNING OBJECTIVE #1: Identify classic features of tuberous sclerosis
LEARNING OBJECTIVE #2: Recognize severe complications associated with tuberous sclerosis

CASE: A 39 year-old African-American woman with a history tuberous sclerosis presented with acute left flank pain that radiated to her left shoulder. Examination was notable for left costovertebral angle tenderness. She also had facial angiofibromas, hypomelanotic macules, fibrous cephalic plaques, and an acral shagreen patch. CT scan revealed multiple fat-containing mixed density lesions on her kidneys bilaterally and a retroperitoneal bleed from a ruptured angiomyolipoma on the left kidney. Interventional radiology performed coil embolization of the left renal artery and angiomyolipomas on both kidneys. During her hospitalization, she developed acute dyspnea and hypoxemia. Chest imaging revealed a large left-sided pleural effusion with innumerable bilateral thin-walled cysts of variable sizes, characteristic of lymphangiomyomatosis (LAM). Thoracentesis retrieved sterile exudative chylous fluid with a triglyceride level of over 500. She was started on sirolimus and discharged on supplemental oxygen. After a month of treatment, she reported improvement in her dyspnea but continued to require supplemental oxygen.

IMPACT/DISCUSSION: Tuberous sclerosis (TS) is an autosomal dominant disorder associated with tumors of the eye, CNS, heart, lungs and kidneys. Clinical manifestations of TS include seizures, cognitive impairment, kidney disease and skin manifestations including facial angiofibromas, fibrous cephalic plaques, ungual or periungual fibromas, hypomelanotic macules, and shagreen patches. Severity of symptoms is variable. TS affects men and women in equal numbers and occurs in all race/ethnic groups.

A potentially severe complication of TS is renal angiomyolipoma, a benign perivascular epithelial proliferation that can cause mass effect and hemorrhage. Rupture of an angiomyolipoma is an emergency requiring emergent embolization. Large angiomyolipomas (>3cm) should be preemptively treated to reduce risk.

TS is also associated with LAM, a cystic proliferation of smooth muscles around lymphatics primarily affecting the lungs. LAM increases the propensity for pneumothorax and lymphatic block causing chylothorax. While serial thoracentesis may be used for symptomatic relief, pharmacologic treatment with mammalian target of rapamycin (mTOR) inhibitors like sirolimus is a first line treatment for LAM.

CONCLUSION: This case illustrates the acute complications of benign tumors of the lungs and kidneys associated with TS. Physicians need to be aware of the potential for these complications in patients impacted by this rare condition.

CONCOMITANT TAKOTSUBO CARDIOMYOPATHY AND OCCLUSIVE CORONARY ARTERY DISEASE: A DIAGNOSTIC CHALLENGE

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LEARNING OBJECTIVE #1: Diagnose a patient with Takotsubo cardiomyopathy (TC) based on diagnostic work-up.

LEARNING OBJECTIVE #2: Recognize the presence of obstructive coronary artery disease does not rule out TC.

CASE: 70-year-old female with history of chronic obstructive pulmonary disease (COPD) and hypertension presented with worsening shortness of breath for two days. Upon presentation, patient was noted to be hypertensive and in respiratory distress for which she was initially placed on non-invasive positive pressure ventilation, however required intubation for continued respiratory distress. Laboratory evaluation revealed elevated troponin to 1.37 with electrocardiogram (EKG) showing T-wave inversions in anterolateral leads, concerning for ischemia. Emergent bedside echocardiogram revealed severely decreased left ventricular systolic function (ejection fraction < 30%) with dilated left atrium and diffuse wall motion abnormalities involving the anterior, lateral, inferior, and apical wall segments. Patient was started on anticoagulation with continuous heparin drip. Subsequently, she underwent cardiac catheterization which revealed severe circumflex, borderline severe diagonal 2, mild left anterior descending, and moderate non-obstructing right coronary artery disease (CAD). Given that the overall areas of obstruction were not in distribution with the wall motion abnormalities seen on echo, diagnosis of Takotsubo cardiomyopathy (TC) with CAD was made. Echocardiogram was repeated the next day, showing improvement in left ventricular systolic function (EF 35-40%) but still with moderate impairment and hypokinetic apical septal and apical anterior wall segments. The patient is currently being medically managed with a plan for percutaneous coronary intervention (PCI) to the left circumflex artery in the near future.

IMPACT/DISCUSSION: TC is an acute reversible cardiomyopathy characterized by transient left ventricular apical ballooning. The pathogenesis is not well understood, however current evidence suggests catecholamine excess with resultant microvascular dysfunction as the most likely mechanism. Presently, the Mayo Clinic Criteria is used for the diagnosis of TC, which requires the absence of significant CAD for diagnosis. However, this has been called into question recently with reports of patients with coexistence of both TC and obstructive CAD, as seen in our case. In addition, studies have shown that the outcome of patients with TC who have concomitant CAD have an overall poorer prognosis. Therefore clinicians need to be cognizant that the diagnosis of TC does not exclude the possibility of obstructive CAD contributing to symptomatology.

CONCLUSION: TC is a rare clinical entity that was thought to occur only in the absence of obstructive CAD, however current research is suggesting that the existence of one does not exclude the other. Therefore it is imperative clinicians do not rule out the possibility of underlying CAD with a diagnosis of TC as their coexistence has been shown to be associated with worse outcomes.

CONCURRENT TERBINAFINE INDUCED ACUTE GENERALIZED EXANTHEMATOUS PUSTULOSIS AND HEPATITIS

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LEARNING OBJECTIVE #1: Recognize the presence of AGEF and Hepatitis, two rare side effects of terbinafine, in the same patient.

LEARNING OBJECTIVE #2: Encourage physicians to keep AGEF in the differential diagnosis of terbinafine use.

CASE: The patient, a 55-year old woman with a past medical history of osteopenia treated with alendronate, presents with an intensely pruritic rash of two weeks duration. Initially, the patient had visited her primary care physician with onychomycosis in which she was treated with terbinafine and ciclopirox lacquer. One week after initiation of treatment, the patient began to develop a rash, beginning on her left flank and extending to the chest, back and upper part of lower extremities. She was diagnosed with a drug reaction and was treated with both topical and oral steroids, however, the rash continued to worsen and she was admitted to our institution. ROS was unremarkable. The skin examination showed innumerable red, round to annular plaques, many coalescing with three distinct areas of colors (a classic targetoid lesion) and few scattered pustules. The laboratory studies reveal ALT 770 Unit/L, AST 564 Unit/L, Alkaline phosphatase 169 Unit/L, white blood cell count 15.7 x 10³ with normal eosinophils. A skin biopsy was performed showing subcorneal pustule, spongiosis, papillary dermal edema, necrotic keratinocytes, red blood

cell extravasation, interstitial and perivascular inflammatory infiltrates supporting the clinical diagnosis of AGEP. We further postulated terbinafine was responsible for both the induction of AGEP as well as hepatitis given the patient's clinical presentation, elevated liver enzymes, and pharmaceutical profile. The patient started treatment with intravenous methylprednisolone and topical triamcinolone and hydrocortisone. Seven days after starting the treatment the liver enzymes normalized and the rash had resolved on her chest and back. The patient was advised to limit sun exposure and continue treatment with titrating dose of oral steroids.

IMPACT/DISCUSSION: AGEP is an uncommon condition caused by drugs in more than 90% of cases. Nondrug causes of AGEP can be viral infections, exposure to mercury, or ingestion of food allergens. AGEP is a rare side effects of terbinafine and has a clear correlation with the treatment of our patient. Terbinafine has also been related with drug induced hepatitis. After a perusal review of the literature, we have only found one previous case of concurrent AGEP and with minimally elevated liver enzymes secondary to labetalol. Steroid treatment improved both side effects. Terbinafine is a commonly used antifungal medication and physicians need to be aware of AGEP in the differential diagnosis, although it is a rare side effect.

CONCLUSION: Acute generalized exanthematous pustulosis (AGEP) is an extremely rare Type IV hypersensitivity reaction, typically occurring in only 1-5 patients in a million. In AGEP, keratinocytes are destroyed creating a vesicle; and due to immunomodulators, manifests into a pustule which rarely involves the mucosa.

COOMB'S NEGATIVE HEMOLYTIC ANEMIA FOLLOWING IVIG TREATMENT FOR ACUTE INFLAMMATORY DEMYELINATING POLYRADICULONEUROPATHY (AIDP)

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LEARNING OBJECTIVE #1: Recognize IVIg as a potential etiology for hemolytic anemia

LEARNING OBJECTIVE #2: Appreciate the potential for coomb's negative testing in suspected hemolytic anemia

CASE: A 63-year-old man was transferred to our acute rehab facility following a ten-day hospitalization for Acute Inflammatory Demyelinating Polyradiculoneuropathy (AIDP), where he was treated with 5 days of Intravenous Immunoglobulin (IVIg). During the rehab stay, the patient had an acute, orthostatic syncopal episode with work-up showing a hemoglobin of 8.4 (during hospitalization the patient's hemoglobin was between 14-16) without any evidence of acute bleeding. Additional lab work showed a Total Bilirubin = 1.6, direct bilirubin = 0.2, and an indirect bilirubin = 1.4. Reticulocyte count was elevated at 7.2%, LDH = 430, and Haptoglobin <30 mg/dL. Peripheral blood smear showed evidence of spherocytes. Interestingly, the patient's Coomb's Test was initially negative, but was subsequently sent for additional auto-antibody analysis; the results of which were positive. The patient was started on folic acid and was monitored with subsequent labs showing resolution of hemolysis labs, including total bilirubin and LDH, and hemoglobin began to uptrend to 10.1 approximately nine days following the initial syncopal episode.

IMPACT/DISCUSSION: Rarely, do we find something that can both induce or treat a given condition based on the circumstance. In certain clinical settings, IVIG can be used for treatment of Auto-Immune Hemolytic Anemia (AIHA), however it can also be a precipitant of the same disease.

Moreover, the diagnosis may be confounded by the presence of a negative coomb's test in the course of laboratory work-up. However, with high clinical suspicion, additional testing for auto-antibodies inducing hemolytic anemia can lead to true identification of the disease. This case demonstrates new-onset coomb's negative AIHA that developed 10 days after the initiation of IVIG treatment for Acute Inflammatory Demyelinating Polyradiculoneuropathy (AIDP).

CONCLUSION: Although better remembered as a treatment for AIHA, it is important to remember that IVIg can result in paradoxical autoimmune hemolytic anemia, similar to a transfusion reaction. This is related to the way which IVIg is procured, and the presence of specific alloantibodies that can cause

hemolytic disease. Due to these allo-antibodies, initial coomb's testing may be negative, and may be better identified with alternative antibody testing if clinical suspicion is high enough for autoimmune hemolytic disease.

CORRECTING A MISDIAGNOSIS: WHEN NONINFECTIOUS SKIN LESIONS MASQUERADE AS CELLULITIS

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LEARNING OBJECTIVE #1: Recognize signs and symptoms of Necrotizing Sweet Syndrome (NSS)

LEARNING OBJECTIVE #2: Implement appropriate workup for NSS

CASE: A 23-year-old man with a history significant for multiple admissions with upper extremity cellulitis was hospitalized due to concern for a necrotizing soft tissue infection (NSTI). He reported severe pain and blister formation of the right wrist at the site of an incision and drainage (I&D) the day prior. Additionally, he noted worsening redness and swelling of the right forearm where a peripheral IV was placed previously.

examination of the affected area revealed bullae formation with surrounding necrotic tissue at the site of the I&D. Laboratory findings were unremarkable. Computed tomography (CT) imaging demonstrated fat-stranding along the radial aspect of the forearm as well as multifocal foci of gas in the subcutaneous tissue, consistent with a NSTI.

Empiric broad-spectrum antimicrobial coverage was started. Surgical debridement and fasciotomy were performed which yielded turbid fluid of the right wrist. Despite these efforts, the patient clinically deteriorated with persistent high fevers, extension of erythema, and worsening pain.

Wound and blood cultures did not grow any organisms. Biopsy showed lobular panniculitis with a neutrophilic predominance, suggestive of neutrophilic dermatosis. These findings along with signs of pathergy prompted consideration of underlying Sweet syndrome. High-dose prednisone was started with subsequent rapid improvement in symptoms. The patient was diagnosed with Necrotizing Sweet Syndrome (NSS) and discharged with a tapered-course of prednisone.

IMPACT/DISCUSSION: Sweet syndrome is characterized by pathergy, a non-specific inflammatory response to cutaneous trauma resulting in erythematous or pustular skin lesions. NSS is a rare and locally-aggressive form of Sweet syndrome that clinically resembles a NSTI.

Further exacerbation may have been avoided if pathergy had been identified earlier. The diagnostic challenge lies in the appearance of pathergy on examination, which is strikingly similar to cellulitis. A high index of suspicion from pertinent historical data is necessary in the approach to diagnosis. Our patient's history was suggestive of an underlying autoimmune process, as we would not expect such a robust inflammatory response from an otherwise sterile IV site.

The progression to a necrotizing response is not well described in the literature. There are only a few case reports of NSS, all of which were idiopathic. Most cases of Sweet syndrome are caused by an underlying inflammatory process, most commonly a hematologic malignancy or inflammatory bowel disease (IBD). Workup of NSS should look for these processes as well as any offending medications, such as granulocyte colony stimulating factor, antibiotics, or NSAIDs.

CONCLUSION: Pathergy is caused by minor cutaneous trauma, such as IV insertion

Underlying causes of NSS, such as malignancy, medications, or IBD, should be considered in workup of the disease

COVID-19 ASSOCIATED SYSTEMIC VASCULITIS IN AN ADOLESCENT MALE

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LEARNING OBJECTIVE #1: Identifying vascular complications of COVID-19

LEARNING OBJECTIVE #2: Recognizing alternative lung pathologies of COVID-19

CASE: The patient is an 18-year-old male with a history of COVID-19 infection two months prior to presentation, who presented from an outside hospital for evaluation of pulmonary nodules. Three weeks prior, he endorsed fatigue and chills, and was diagnosed with infectious mononucleosis. Two weeks later, the patient developed black pustular wounds of his left 3rd and 4th digits, initially treated with cephalexin. Due to worsening lesions, he presented to an outside hospital.

He had an extensive work up done, which included blood and wound cultures, as well as testing for hematologic malignancies and autoimmune causes of vasculitis. All laboratory workup was negative, except for elevated D-dimer. A CT chest displayed three cavitary lesions, the largest measuring 3.3 cm. He was started on vancomycin and ceftriaxone for pneumonia coverage. The following day, he developed a spontaneous hydropneumothorax, relieved by chest tube placement. Fungal etiologies and tuberculosis were ruled out, as well as infective endocarditis with a negative transesophageal ultrasound.

Dermatology believed the lesions were secondary to a vasculitis of unknown etiology. Patient remained stable with resolution of pneumothorax. Due to profound negative autoimmune, infectious, and malignant workup, it was determined that the etiology of cavitary lesions and digit ulceration was a late post-COVID infection. He was discharged with outpatient follow-up, where patient showed complete resolution of cutaneous wounds, along with a repeat CT displaying near resolution of cavitary lesions.

IMPACT/DISCUSSION: The classic presentation of COVID-19 is predominantly respiratory due to the virus' preference to target pneumocytes and vascular endothelial cells. Due to its additional target of vascular endothelial cells, many cases of COVID-19 associated vasculitis and coagulopathies have been reported. Our patient appears to present another case of this vascular picture.

Cavitary lesions have been reported in one case of COVID-19 in the literature, interestingly also with a pneumothorax. These are likely stemming from microvascular inflammatory changes from a sequelae of COVID-19. In addition, our patient's skin lesions further point to this microvascular etiology. First-line treatment of COVID associated vasculitis remains unclear, however regimens of corticosteroids, IVIG, aspirin and anticoagulation have been reported with inconclusive results due to a small sample size.

CONCLUSION: Vasculitis appears to be a serious complication of post-COVID-19 infection that should be promptly recognized. Steroids, IVIG and anticoagulation should be considered on a case by case basis using risk stratification for life-threatening clotting.

CRYPTOCOCCAL MENINGITIS AND FUNGEMIA IN AN HIV NEGATIVE PATIENT WITH CIRRHOSIS

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LEARNING OBJECTIVE #1: Recognize cryptococcal meningitis as a complication of advanced cirrhosis

LEARNING OBJECTIVE #2: Diagnose and treat cryptococcal meningitis promptly to reduce mortality

CASE: A 57 year old female with a history of advanced alcoholic cirrhosis presented to the ED with altered mental status. The patient had been hospitalized frequently for hepatic encephalopathy s/p TIPS and was listed as a liver transplant candidate. Recent MRI and EEG were negative. On the day of admission, the patient's family reported they had found her in the shower fully clothed. The patient had no recollection of this event. She reported fatigue but denied abdominal pain or swelling, nausea, vomiting, diarrhea, melena, hematochezia, and fever. She admitted that she had not been taking her lactulose regularly. On exam: temperature was 37.9 C, pulse 58 bpm, respiratory rate 18, O₂ saturation normal on room air. She responded slowly to questions. Mild tenderness to palpation was noted in the right upper quadrant. Lab results were as follows: WBC 9.7 thousand/ul, Hgb 10.4 gm/dL, platelets

171 thousand/uL, Na 133 mmol/L, K 3.0 mmol/L, lactic acid 2.2 mmol/L, and ammonia 77 mmol/L. CT head was negative. Abdominal ultrasound showed no ascites. She was treated with lactulose and rifaximin and quickly returned to her baseline mental status but reported intermittent headaches and neck pain. She remained afebrile. On hospital day 4, blood cultures drawn on admission grew *Cryptococcus neoformans*. Intravenous liposomal amphotericin B was started, and lumbar puncture was performed. Cerebrospinal fluid (CSF) analysis showed opening pressure of 20cm H₂O, glucose 24 mg/dl, protein 132.6 mg/dL, nucleated cell count 37/uL, (56% polymorphonuclear cells, 25% lymphocytes, 19% monocytes), RBC count 13/uL. Cryptococcal antigen assay was positive and CSF culture grew *Cryptococcus*. HIV test was negative. The patient was treated for cryptococcal meningitis with liposomal amphotericin B and flucytosine.

IMPACT/DISCUSSION: *Cryptococcus neoformans* is an encapsulated yeast which infrequently causes meningitis in HIV-negative patients. Immunocompromised patients, including those with end stage liver disease (ESLD), are at risk. A PubMed search yielded only 18 case reports of cryptococcal meningitis associated with ESLD. The incidence is 5.3 times higher in ESLD patients than in other non HIV patients, and a mortality rate as high as 80% has been reported. Diagnosis is made with serum antigen testing and CSF analysis, which is often delayed because symptoms are incorrectly attributed to hepatic encephalopathy. Thus it is crucial to maintain a high suspicion for cryptococcal meningitis in ESLD patients presenting with acute encephalopathy, and to begin antifungal therapy immediately.

CONCLUSION: Patients with end stage liver disease are at an increased risk of developing *Cryptococcus neoformans* meningitis. Due to the high mortality rate associated with this condition, it is important to diagnose and treat these patients promptly.

DELAYED HYPERCALCEMIA AFTER RHABDOMYOLYSIS-INDUCED ACUTE KIDNEY INJURY IN LEGIONNAIRES' DISEASE

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LEARNING OBJECTIVE #1: Identify common and uncommon forms of hypercalcemia.

LEARNING OBJECTIVE #2: Recognize the relationship between rhabdomyolysis-associated AKI and delayed hypercalcemia.

CASE: A 65 year old man presented with three days of weakness and altered mental status. He was febrile to 102.7 F, tachycardic to 145, tachypneic to 26, with SpO₂ 94% on room air. He had a leukocytosis of 13.9, creatinine of 6.5, potassium of 5.5, creatine kinase of >40,000, AST of 915, ALT of 160, and glucose of 400. CT showed a right lower lobe opacity and legionella urine antigen was positive, consistent with *Legionella pneumoniae*.

Dialysis was initiated for anuric acute kidney injury in the setting of rhabdomyolysis. While his calcium level was initially low for the first 23 days of hospitalization, after he began making urine on day 20, his calcium level began to steadily increase to 17.5 on day 34. At this time, his PTH was suppressed at 15.5, phosphate high at 9.0, Vitamin D 1,25-OH low at <8, and free T4 normal. Work-up for malignancy was unrevealing with normal PTHrP and unremarkable SPEP. A nuclear medicine bone scan was not suggestive of osseous malignancy; however, it was suggestive of dystrophic calcification with increased diffuse radionuclide uptake, including in the bilateral lungs, stomach, bilateral groins, bilateral iliopsoas muscles, bilateral buttocks and right upper arm. Since the hypercalcemia persisted despite dialysis sessions, he received denosumab and calcitonin, with improvement of his calcium. Additionally, his kidney function recovered completely, no longer requiring dialysis, with a normal creatinine on discharge.

IMPACT/DISCUSSION: Hypercalcemia most often occurs due to hyperparathyroidism or malignancy, comprising 90% of cases. The approach to hypercalcemia includes first measuring PTH to determine if the disease is PTH-mediated or non-PTH mediated. If PTH is low or normal, other diagnostic tests include PTHrP, 1,25-dihydroxyvitamin D, and 25-hydroxyvitamin D. An important rare setting of hypercalcemia is the recovery phase of rhabdomyolysis-associated acute renal failure; the prevalence of hypercalcemia has been shown to be approximately 9% in patients with rhabdomyolysis. The mechanism is thought to involve initial calcium deposition in injured

muscles from rhabdomyolysis, followed by release of calcium from the muscle during the diuresis phase of acute kidney injury. For this patient, this etiology of hypercalcemia was demonstrated by the diffuse calcium deposition seen on nuclear medicine bone scan as well as the timing of the hypercalcemia during the diuresis phase of acute renal failure. Prompt recognition of hypercalcemia and management of fluids and electrolytes is paramount.

CONCLUSION: Hypercalcemia associated with the diuresis phase of rhabdomyolysis-associated renal failure is a rare cause of hypercalcemia. This is an important diagnosis to be aware of when more common etiologies of hypercalcemia are ruled out.

DEVASTATING METHICILLIN-SUSCEPTIBLE STAPHYLOCOCCUS AUREUS BACTEREMIA WITH AN UNKNOWN SOURCE

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LEARNING OBJECTIVE #1: Diagnose MSSA bacteremia in immunocompetent individuals with no obvious source of infection

LEARNING OBJECTIVE #2: Manage the progression of MSSA bacteremia despite adequate antibiotic therapy

CASE: 29-year-old healthy male from Yemen presented to our hospital with 3-day history of fevers, malaise, and pleuritic chest pain. He denied history of drug use. On admission, he was tachycardic, febrile to 103.2 F, and tachypneic with bloodwork notable for elevated troponin to 0.84 ng/mL. EKG revealed normal sinus rhythm without evidence of ischemia. Initial Computed Tomography (CT) Chest, Abdomen, and Pelvis revealed diffuse septic pulmonary emboli, bilateral renal infarcts, and a partially occlusive right renal vein thrombosis. Therapeutic anticoagulation was deferred given risk of hemorrhagic conversion of the septic emboli. 4/4 blood cultures were positive for methicillin-susceptible *Staphylococcus aureus* (MSSA) bacteremia. In order to determine the cause of bacteremia, patient was extensively questioned however denied recent skin/soft tissue infections, pneumonia, and neurologic symptoms among others. He was treated with intravenous (IV) nafcillin, and underwent both transthoracic and transesophageal echocardiogram, neither of which revealed endocarditis. Quantiferon-TB gold was indeterminate, and both human immunodeficiency virus and hepatitis C virus testing were negative. Despite IV nafcillin, he had increasing oxygen requirements, with CT chest showing large right and moderate left loculated pleural effusions, causing near complete collapse of both lungs. He underwent video-assisted thoracoscopic surgery (VATS) converted into open mini-thoracotomy with right lower lobe decortication and upper lobe resection, with pleural fluid growing MSSA. IV nafcillin was continued, with clinical improvement and resolution of infection.

IMPACT/DISCUSSION: MSSA is a gram-positive cocci in clusters and is a common cause of community and hospital-acquired bacteremia with a high rate of both morbidity and mortality. In patients who present with MSSA infection, a thorough history and physical exam must be done to determine the source of infection. Intravenous drug use (IVDU), indwelling prosthetic devices, and immunocompromised states increase the risk of community-acquired MSSA, however our patient had none of these risk factors. In addition, no source of infection was identified despite extensive work-up. Treatment of choice remains either nafcillin or oxacillin, and nafcillin has been shown to be superior to vancomycin in treating MSSA bacteremia. Therefore it is uncertain why our patient developed loculated pleural effusions despite treatment with nafcillin, however upon continued treatment, the infection eventually resolved.

CONCLUSION:

MSSA, though a common organism, is associated with high mortality and morbidity especially in hospitalized patients. Therefore early recognition and treatment can improve outcomes, even in cases with no foci of infection or classic risk factors, as illustrated here.

DIABETIC MYONECROSIS: AN UNCOMMON COMPLICATION OF A COMMON DISEASE

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LEARNING OBJECTIVE #1: Recognize the clinical presentation of Diabetic Myonecrosis

LEARNING OBJECTIVE #2: Diagnose and manage Diabetic Myonecrosis

CASE: A 29-year-old woman with type-1 diabetes presented to our hospital with painful swelling of the left thigh, knee joint, and inability to bear weight for a 3-month duration. The symptoms were progressive, with no fever or trauma. Her past history included hypertension, retinopathy, neuropathy, and diabetic nephropathy with eGFR 20ml/min/1.73m². She was afebrile, and her vital signs were stable. An exam revealed edema of the left medial thigh and posterior knee with tenderness without erythema. The left knee joint had minimal effusion, and flexion was limited. Labs showed leukocytosis, 13.9 cells/mm³, elevated inflammatory markers, CRP 41.3 mg/L, and ESR > 140mm/hr. Creatine Kinase was mildly elevated at 247 U/mL. Poor glycemic control was present with an A1c of 11%. The patient was started on empiric antibiotics with analgesia. The left knee x-ray, doppler ultrasound, and blood cultures were unremarkable. MRI left knee showed a partial tear of the medial patellofemoral ligament with joint effusion. MRI left thigh showed a heterogeneous T2 signal throughout the anteromedial compartment muscles with subcutaneous edema and perifascial fluid, clinching the diagnosis of Diabetic Myonecrosis. Antibiotics were discontinued, insulin regimen was adjusted for tight glycemic control. The patient was discharged with rest, analgesics, and physical therapy. On a 4 weeks follow-up, she had improvement in her symptoms and was able to ambulate with a cane.

IMPACT/DISCUSSION: Diabetic myonecrosis or diabetic muscle infarction is a rare complication of type 1 and type 2 diabetes mellitus. A total of 126 unique cases were reported in a systematic review from 2015. The pathogenesis is unclear but likely involves vasculopathic changes. Diabetic nephropathy is seen in 75% of cases followed by retinopathy, and neuropathy. Thigh, followed by the calf, is the most common site of involvement. Due to leukocytosis, elevated CK, and inflammatory markers, the condition may mimic infectious myositis, cellulitis, DVT, or a sarcoma making the diagnosis challenging. Our patient was initially started on antibiotics, and other common etiologies were ruled out. We performed the MRI in pursuit of establishing the etiology of symptoms that prevented the patient from prolonged exposure to antibiotics, invasive procedures, and potential rheumatology referral.

CONCLUSION: Diabetic myonecrosis must be considered in the differential diagnosis in a patient with poorly controlled diabetes who presents with atraumatic, painful swelling of thigh or calf muscles. MRI is the most sensitive diagnostic modality (high intensity in T2 weighted sequences), and muscle biopsy is rarely needed. A high index of suspicion is required for prompt diagnosis and to avoid unnecessary testing and procedures.

DIFFUSE ALVEOLAR HEMORRHAGE AS A COMPLICATION OF ANTIPHOSPHOLIPID SYNDROME

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LEARNING OBJECTIVE #1: Recognize indications for bronchoscopy in patients presenting with hypoxia.

LEARNING OBJECTIVE #2: Describe the association between antiphospholipid syndrome and diffuse alveolar hemorrhage.

CASE: LT is a 63 year old cis-gender woman with mild intermittent asthma, obstructive sleep apnea, two pulmonary emboli, chronic kidney disease and Crohn's disease on infliximab who presented with 5 days of progressive dyspnea on exertion in the setting of her coumadin being held for an endoscopy. Her dyspnea was initially on moderate exertion, then at rest and was unresponsive to albuterol. She endorsed daily marijuana vaping, but denied fever, chest pain, orthopnea, paroxysmal nocturnal dyspnea or bloody stools. On presentation she was afebrile with oxygen saturation 85% on room air, heart rate 68, bi-basilar expiratory wheezing and bilateral asymmetric lower extremity edema. On 4L nasal cannula, her oxygen saturation improved to

97%. She had brown, guaiac negative stool. A lower extremity doppler ultrasound was negative for deep vein thrombosis. Labs significant for hemoglobin 7.6 (baseline 10), troponin 0.06, INR 2.8 and BNP 366. She received furosemide without significant improvement in hypoxia or work of breathing. EKG showed normal sinus rhythm without ischemic changes or right ventricular strain. Chest x-ray showed diffuse multifocal opacities and CTA showed bilateral ground glass opacities in a “crazy paving” pattern without pulmonary emboli. Echocardiogram with normal biventricular function but insufficient tricuspid regurgitation to estimate pulmonary pressures. Bronchoscopy found diffuse alveolar hemorrhage (DAH). Right heart catheterization (RHC) showed a PCWP of 25, mPAP 37 and CO 6.6. Autoimmune workup revealed ANA titer 1:320 and positive anticardiolipin and anti-beta2 microglobulin IgG. Antiphospholipid syndrome (APS) was presumptively diagnosed and methylprednisolone was initiated.

IMPACT/DISCUSSION: This case demonstrates the broad differential diagnosis for dyspnea with hypoxia, especially in medically complex patients, and highlights the need for a stepwise diagnostic approach. Dyspnea and hypoxia were initially concerning for a pulmonary embolism. The acute drop in hemoglobin, however, proved to be an early sign of DAH. This was confirmed on bronchoscopy, and broadened the differential to include microscopic polyangiitis, pulmonary hypertension or vaping-induced lung injury. RHC suggested bland DAH with pulmonary hypertension due to left heart disease. However, autoimmune workup revealed APS, of which DAH is a rare complication. The mechanism of DAH in APS is uncertain, but most likely due to microvascular thrombosis or pulmonary capillaritis incited by antibodies. The patient responded to intravenous steroids.

CONCLUSION: Acute dyspnea warrants a broad differential diagnosis, especially in the setting of multisystem comorbidities. In this case, an unexplained drop in hemoglobin in the setting of progressive dyspnea and hypoxia raised suspicion for DAH and prompted further workup with bronchoscopy.

DISSEMINATED HISTOPLASMOSIS AS A SIDE EFFECT FROM TNF INHIBITION WITH ADALIMUMAB

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LEARNING OBJECTIVE #1: Recognize the risk associated with anti-TNF therapy and the development of disseminated histoplasmosis

LEARNING OBJECTIVE #2: Recognize the clinical features of disseminated hepatic histoplasmosis

CASE: A 39-year-old female from Lafayette, Louisiana with a history of Crohn’s disease presented with a five-week history of abdominal distension, nausea, early satiety, and subjective fevers. Patient was taking adalimumab weekly for over 3 years. Exam notable for abdominal distension with positive fluid wave, decreased bilateral basilar lung sounds and multiple, small papules along the bilateral arms and chest. Testing showed AST 33 IU/L, ALT 19 IU/L, alkaline phosphatase 661 IU/L, total bilirubin 1.1 mg/dL. Imaging demonstrated new large volume ascites with moderate bilateral pleural effusions, splenomegaly, and a nodular appearing liver with a circumferential 1.9 x 1.3 cm peri-biliary mass with segmental biliary ductal dilation. Peritoneal fluid analysis revealed a SAAG <1.1 and 30 neutrophilic cells per mm³. Cytology was negative for malignant cells. Liver biopsy revealed multiple non-necrotizing granulomas within the lobar parenchyma with GMS stain positive for narrow budding yeast suggestive of *Histoplasma* species. Subsequent *Histoplasma* serum Ag was positive. Adalimumab was discontinued and the patient was started on treatment for disseminated histoplasmosis with liposomal amphotericin B for 2 weeks and then transitioned to itraconazole for 12 months.

IMPACT/DISCUSSION: *Histoplasma capsulatum* is an endemic mycosis that is found in the United States particularly in the soil around the Ohio and Mississippi River valley, with Lafayette, LA demonstrating high environmental suitability for survival. The magnitude of exposure to *Histoplasma* can be as minor as walking on contaminated soil with bird or bat droppings. Patient’s at highest risk for disseminated histoplasmosis are those with compromised immune systems such as with HIV, organ transplant, and those taking anti-TNF medications. Of the endemic mycosis, *Histoplasmosis* is the most

correlated with TNF alpha antagonism, largely due to the intracellular growth of disseminated *Histoplasma* within macrophages, and the suppression of a T-lymphocytic response. Clinical manifestation of disseminated histoplasmosis can include weight loss, fever, lung and GI involvement, and skin changes. Specifically, disseminated hepatic histoplasmosis can present as granulomatous hepatitis with portal hypertension and ascites. The definitive treatment includes discontinuing the anti-TNF therapy and initiating amphotericin B for 1-2 weeks, followed by itraconazole for 12 months.

CONCLUSION: *Histoplasma* is the most associated endemic mycosis known to cause disseminated disease in patient’s taking anti-TNF therapy.

Physicians should have a high clinical suspicion in patient’s presenting with abnormal liver findings, such as stigmata of portal hypertension, in the setting of anti-TNF therapy.

DON’T FORGET YOUR ABC’S: A CASE OF ACUTE ADULT SUPRAGLOTTITIS DUE TO GROUP A STREPTOCOCCUS

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LEARNING OBJECTIVE #1: Adult patients with sore throat need to be carefully monitored if there is any signs or symptoms of possible airway compromise

LEARNING OBJECTIVE #2: When Penicillin-based antibiotics are not able to be used in patients with strep throat, Azithromycin and Clindamycin offer alternative coverage

CASE: Our patient is a 39-year-old Caucasian female who presented with a 4-day history of feeling unwell with a sore throat. Initial testing revealed strep throat, and she was given a shot of Penicillin G Benzathine and discharged home. Later that same day, she presented back with feelings of “throat swelling”. CT scan revealed evidence of supraglottitis. She was immediately given racemic epinephrine and started on IV Methylprednisolone. While she never required intubation or supplemental oxygen during her stay, there was high concern for airway protection. ENT was consulted, and a direct laryngoscopy demonstrated supraglottitis. Patient was made NPO and was started on IV antibiotics and continuation of steroids. Due to concern with possible reaction with Penicillin, she was started on Azithromycin and Clindamycin for strep coverage. It is of note she reported no problems with taking amoxicillin prior. Over the span of a few days, her clinical course improved, and she was discharged with oral Clindamycin with plans for scheduled follow up with ENT.

IMPACT/DISCUSSION: Adult supraglottitis is a potentially life-threatening diagnosis if not managed appropriately. While more common in children, it can more rarely occur in adults. The presence of dysphagia along with stridor should be of major concern. Urgent ENT consult is warranted along with close monitoring for airway compromise and a low threshold for intubation. What can make this diagnosis a challenge is it is not commonly seen in adults, and it presents with milder symptoms than children. While there are many underlying etiologies the most common bacterial etiology is Group A *Streptococcus*, the most common of which is *S. pyogenes*. Treatment consists of antibiotics, typically Penicillin or cephalosporins, along with steroids. Our case was complicated by concern for an adverse reaction to Penicillin, leading to hesitation for Cephalosporin use in a patient with already compromised airway. While we don’t believe this was an anaphylactic reaction given the time course, nevertheless we maintained conservative treatment. Penicillin, being bactericidal, may also have contributed to release of toxins contributing to subsequent inflammation. Patient was maintained NPO, with gradual increase in her diet as tolerated. Azithromycin and Clindamycin were initiated along with IV steroids which led to abatement of her presenting symptoms.

CONCLUSION: This case highlights the importance of managing patients with supraglottitis in terms of airway management along with treatment of strep throat in those who may not be able to tolerate Penicillin

DON'T SUGARCOAT IT... DECOMPENSATED CIRRHOSIS PRESENTING WITH A NEW DIAGNOSIS OF DIABETES

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LEARNING OBJECTIVE #1: Describe HHS as an unusual first presentation of type II diabetes in a patient with cirrhosis.

LEARNING OBJECTIVE #2: Discuss the relationship between cirrhosis and impaired glucose metabolism.

CASE: A 65-year-old man with a history of cirrhosis from chronic HBV, remote HCC, and alcohol use, presented with six days of generalized weakness. On exam, he had dry mucous membranes and abdominal distension with ascites. Labs were notable for glucose of 815 without an anion gap, hyponatremia to 125, and Cr 2.1 from a baseline of 0.9. Ketones in urine and blood were negative. He was admitted for hyperosmolar hyperglycemic state (HHS) and treated with IV fluids and insulin. HbA1c resulted at 11.6% supporting a new diagnosis of type II diabetes. He was also found to be in acute decompensated cirrhosis with a MELD-Na score of 19.

With insulin, his glucose improved but no clear etiology of his diabetes was found. History was negative for obesity, weight gain, or family history of diabetes. A CT abdomen and pelvis ruled out pancreatic abnormality or malignancy. Notably, the patient's liver function also worsened and required esophageal variceal banding, paracentesis for ascites, and transfusions for thrombocytopenia. The patient was treated for decompensated cirrhosis and discharged on insulin.

IMPACT/DISCUSSION: The relationship between dysfunctional glucose metabolism and liver cirrhosis is well established; the liver stores glycogen through glycogenolysis and produces glucose in gluconeogenesis [1]. Research shows that only 30% of patients with cirrhosis have normal glucose tolerance, while 50-70% of patients have overt diabetes [2]. Additionally, the presence of diabetes in patients with cirrhosis is an indicator of poor survival and is associated with increased morbidity [1]. This patient did not carry a diagnosis of diabetes at the time of his initial presentation of HHS, and while the relationship between cirrhosis and diabetes is well-studied, the initial presentation of diabetes as HHS or DKA has only been documented once in the literature [3].

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CONCLUSION: Patients with cirrhosis are at high risk of abnormalities in glucose metabolism. In the outpatient setting, glucose levels should be monitored closely in all patients with cirrhosis to prevent severe presentations of diabetes, including HHS and DKA.

DRIVING UNDER THE INFLUENCE: A RARE CASE OF INTRAVASCULAR LARGE B-CELL LYMPHOMA

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LEARNING OBJECTIVE #1: Recognize the heterogeneous neurological symptoms associated with intravascular lymphoma

LEARNING OBJECTIVE #2: Discuss treatment modalities currently available for intravascular lymphoma

CASE: A 59-year-old female without significant medical history was brought to the emergency department after police found her driving erratically. Her neurological examination was non-focal. Extensive workup for altered mental sensorium revealed multiple deep white matter lesions on brain magnetic resonance imaging (MRI) and temporal lobe epileptiform discharges on electroencephalogram. Transesophageal echocardiogram visualized calcification of the aortic arch, raising suspicion for an embolic stroke. She was initiated on anticoagulation, lacosamide and discharged. She was readmitted a month later for short-term memory loss, aphasia and behavioral changes. Repeat MRI brain showed increasing supratentorial white matter lesions. Laboratory workup revealed an elevated C-reactive protein of 12.3 mg/dl (0-0.5). She was treated on high-dose steroids for possible cerebral vasculitis without improvement. She ultimately underwent a right frontal lobe biopsy, which concluded a diagnosis of intravascular large B-cell lymphoma. She received eight cycles of high dose methotrexate and R-CHOP chemotherapy. Post chemotherapy, repeat brain imaging was indicative of remission. Due to the increased risk of relapse, she underwent an autologous stem cell transplant with BEAM regimen. Outpatient follow-up a year after diagnosis affirmed clinical improvement.

IMPACT/DISCUSSION: Intravascular lymphoma (IVL), a subtype of diffuse large-cell lymphoma limited to the intravascular space, is a rare condition. Global incidence is estimated at less than one person per million, with a mean age of 70 years at diagnosis.

Neurologic manifestations of IVL include fever, altered mentation, motor or sensory deficits, or cutaneous involvement. This can make the diagnosis of IVL challenging as symptoms mimic more common pathologies such as stroke or vasculitis as in our patient. Definitive diagnosis requires biopsy of the affected site with characteristic pathology demonstrating malignant lymphocytes filling the lumen of small vessels.

Currently, there is no defined treatment for IVL. Most protocols, derived from case reports, consist of anthracycline-based chemotherapy regimens. Hematopoietic stem cell transplantation can be considered in patients with non-cutaneous IVL once remission is achieved, given the high risk of recurrence. Prognostic information is limited given the disease's rarity; however, mean survival is estimated at 13 months following anthracycline-based regimens.

CONCLUSION: Intravascular large cell lymphoma is a rare diagnosis with neurologic symptoms that can mimic more common disease processes and is often ultimately diagnosed on postmortem assessment.

Given that the disease can be fatal, a high index of clinical suspicion is necessary in the setting of rapidly progressive neurological symptoms to determine the diagnosis and initiate treatment.

DRUG REACTION WITH EOSINOPHILIA AND SYSTEMIC SYMPTOMS - A MISNOMER FOR MAKING THE DIAGNOSIS

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LEARNING OBJECTIVE #1: Describe the epidemiology and clinical manifestations of DRESS.

LEARNING OBJECTIVE #2: Outline the diagnosis and treatment of DRESS.

CASE: A 57-year-old male presents with a morbilliform rash on his extremities, trunk, and back. A week prior, he began sulfamethoxazole/trimethoprim for cellulitis. On his sixth treatment day, the patient became febrile to 102°F with rash eruption a day later. He therefore presented to the hospital for evaluation.

On arrival, he was afebrile, resting comfortably without conjunctival injection, mucosal lesions, or lymphadenopathy. Petechiae were on the bilateral upper extremities coalescing into patches on the lower extremities. A blanching, erythematous rash was on the trunk and back. Laboratory work up was remarkable for a platelet count of 112,000, AST 124, ALT 217, and bilirubin 3.0. He had no eosinophilia. Dermatology was consulted, he was diagnosed with Drug Reaction with Eosinophilia and Systemic Symptoms (DRESS), and treated with a thirty-day prednisone taper. At discharge, he was afebrile with improving liver function tests. On outpatient follow-up, his rash had resolved after twenty-one days of treatment.

IMPACT/DISCUSSION: DRESS is a severe, drug-induced type IV hypersensitivity reaction, with an estimated population risk of one case per every thousand to ten thousand drug exposures and carries a 10% mortality rate. Common culprit medications are anticonvulsants, sulfonamides, and vancomycin. Clinical manifestations after drug exposure remain latent up to several weeks and include fever, skin lesions, and internal organ involvement. Lymphadenopathy and eosinophilia are also classic findings, but may not appear for weeks after rash onset, and are not required for diagnosis.

The diagnosis of DRESS is clinical and does not require skin biopsy.

Of the three sets of diagnostic criteria proposed for DRESS, the Registry for Severe Cutaneous Adverse Reactions (RegiSCAR) criteria is designed for inpatient use. First, the patient must meet inclusion criteria: hospitalization and drug-related reaction, plus three of five other features including rash, fever $>100.4^{\circ}\text{F}$, lymphadenopathy of \geq two sites, involvement \geq one internal organ, and blood count abnormalities. If met, then validation criteria are used with additional considerations (e.g. illness duration, rash extent), to give a score that classifies the potential of a DRESS diagnosis from “no case” to “definite case”. Management involves withdrawal of the suspected causative drug, supportive care, and in patients with organ involvement oral prednisone of 1.0 mg/kg is initiated and tapered.

CONCLUSION: Our patient presented with fever, rash, and hepatic involvement, while lacking eosinophilia. He still met RegiSCAR criteria as a “possible” DRESS case and was treated with symptom resolution. Overall, this case emphasizes the importance of maintaining a high clinical suspicion for DRESS even in the absence of characteristic findings (e.g. eosinophilia) as the criteria for the diagnosis of DRESS are wider than the name suggests.

EMPAGLIFLOZIN AND DIABETES - DR. JEKYLL OR MR. HYDE?

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LEARNING OBJECTIVE #1: Recognize and manage euglycemic DKA.

LEARNING OBJECTIVE #2: Become familiar with risk factors for euglycemic DKA.

CASE: A 53-year-old man with noninsulin-dependent diabetes mellitus, treated with empagliflozin, presented with 3 days of burning epigastric pain radiating to his back. He consumed 1-4 beers daily prior to presentation. Labs revealed sodium (Na) of 127 mEq/L, chloride (Cl) 89 mEq/L, bicarbonate 20 mEq/L, anion gap (AG) 18 mmol/L, glucose 239 mg/dL, venous pH 7.38, pCO₂ 46, lipase 233 U/L and beta-hydroxybutyrate 1.9 mmol/L. Abdominal CT showed mild pancreatitis. The patient was made NPO and given intravenous fluids (IVF). Empagliflozin was held and sliding scale insulin was started. His blood glucose remained in the 80-180 mg/dL range over the next 48 hours. On hospital day 3, his lab values deteriorated (Na 123, Cl 89, bicarbonate 11, AG 23, glucose 246, venous pH 7.19, pCO₂ 26, beta-hydroxybutyrate 8.9 and lactic acid 2.9 mmol/L). Urinalysis showed 500 mg/dL glucose and 80 mg/dL ketones. The patient was treated with insulin infusion and IVF, with improvement of his lab values within 24 hours (AG 12, bicarbonate 17, venous pH 7.34 and pCO₂ 33). He was eventually discharged on subcutaneous insulin, with recommendations for alcohol cessation and empagliflozin discontinuation.

IMPACT/DISCUSSION: Diabetic ketoacidosis (DKA), a potentially life-threatening complication of diabetes, is defined by hyperglycemia, anion-gap acidosis, and increased plasma ketones. Euglycemic DKA (euDKA) is characterized by euglycemia (blood glucose <250 mg/dL) in the presence of severe metabolic acidosis (arterial pH <7.3 and bicarbonate <18 mEq/L). Sodium glucose co-transporter 2 (SGLT2) inhibitors, such as empagliflozin, have been associated with euDKA. Their main mechanism of action is thought to be inhibition of renal glucose reabsorption and glycosuria, which can minimize hyperglycemia despite development of ketoacidosis. Patients with euDKA generally require both insulin and glucose to reverse the ketoacidosis.

Our patient did not meet classical criteria for DKA on presentation, but he had an elevated beta-hydroxybutyrate level and developed worsening lab abnormalities over 48 hours. While we instructed him not to resume empagliflozin, it is unclear if this medication was the only etiology of his ketoacidosis. He reported alcohol consumption, presented with pancreatitis and was made NPO, all of which have also been recognized as risk factors for euDKA. Furthermore,

alcoholic ketoacidosis is similar in presentation to euDKA, but often with low glucose levels. Finally, we had discontinued empagliflozin on admission. While this medication has a half-life of ~ 12 hours, previous case reports suggest that pharmacodynamic effects of SGLT-2 inhibitors can last longer.

CONCLUSION: Diagnosis of euDKA can be missed or delayed due to normal blood glucose levels.

This case highlights the importance of prompt diagnosis and treatment of euDKA and its precipitating cause.

ENDOSCOPIC ULTRASONOGRAPHY-GUIDED BILIARY DRAINAGE FOR ACUTE CHOLECYSTITIS IN A PATIENT WHO WAS NOT A CANDIDATE FOR CHOLECYSTECTOMY OR PERCUTANEOUS TRANSHEPATIC GALLBLADDER DRAINAGE

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LEARNING OBJECTIVE #1: Identify patients who are poor surgical candidates that may benefit from endoscopic ultrasonography-guided biliary drainage for acute cholecystitis.

LEARNING OBJECTIVE #2: Consider endoscopic ultrasonography-guided biliary drainage for acute cholecystitis in patients who are not candidates for cholecystectomy or percutaneous cholecystostomy.

CASE: 62 year old female with a history of heart failure, atrial fibrillation, morbid obesity, who presented with a complaint of fever, malaise, and nausea. She presented with sepsis and isolated hyperbilirubinemia. On exam, scleral icterus was observed, with diffuse abdominal tenderness although Murphy's sign was difficult to elicit secondary to body habitus. Abdominal ultrasound revealed cholelithiasis and thickened gallbladder wall. Echocardiogram confirmed an ejection fraction of 20-25%. Radionuclide hepatobiliary scan demonstrated no filling of gallbladder after 5 hours, suspicious for cystic duct obstruction and cholecystitis. Magnetic resonance cholangiopancreatography was ordered to rule out choledocholithiasis, however the patient exceeded the weight limit for this exam. General surgery was consulted for cholecystectomy, however, due to her multiple comorbidities, she was deemed a poor surgical candidate. Thus, percutaneous cholecystostomy tube was recommended, for which interventional radiology was consulted. This was also deemed unfeasible due to patient's multiple comorbidities and morbid obesity. Gastroenterology was consulted as patient continued to be symptomatic with ongoing abdominal pain and nausea. After a discussion with an advanced endoscopist, the patient agreed to endoscopic ultrasonography-guided biliary drainage (EUS-GBD) with stent placement. Linear array endoscope was used to identify the gallbladder from the duodenal bulb. A lumen apposing stent was introduced into the gallbladder and position was confirmed with an upper endoscope demonstrating bile draining through the stent. Patient's symptoms quickly improved and she was able to tolerate a diet. Patient was ultimately discharged to an acute rehabilitation facility for continued therapy.

IMPACT/DISCUSSION: This case exemplifies the need for critical thinking and alternative treatment options for patients with cholecystitis who are unsuitable for standard of care cholecystectomy or percutaneous transhepatic gallbladder drainage. In this subset of patients, the option for EUS-GBD should be considered when an advanced endoscopist is available. This case illuminates that EUS-GBD has significant therapeutic potential as an interventional procedure for gallbladder disease, more specifically, a method of permanent drainage. While this exhibits only a single case, it supports that the lumen-apposing stent was safe and feasible consistent with prior reviews.

CONCLUSION: Endoscopic ultrasonography-guided biliary drainage should be considered for patients who are not candidates for cholecystectomy or percutaneous transhepatic gallbladder drainage when an advanced endoscopist is available.

EUGLYCEMIC DIABETIC KETOACIDOSIS ASSOCIATED WITH SODIUM-GLUCOSE COTRANSPORTER 2 INHIBITOR USE AND SARS-COV-2: A CASE REPORT

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LEARNING OBJECTIVE #1: Identify the association between euglycemic diabetic ketoacidosis and use of SGLT-2 inhibitors

LEARNING OBJECTIVE #2: Recognize COVID-19 as a cause of diabetic complications

CASE: A 71-year-old male with DM type 2 on empagliflozin and metformin-glyburide presented to the ED in Mar 2020 with 3 days of fever and progressive dyspnea. Physical exam: T 101.5 F, HR 108 bpm, RR 28 breaths/min, O₂ sat 85% on room air. He was dyspneic at rest and diaphoretic. Labs revealed serum glucose 189 mg/dL, HCO₃ 14.4 mmol/L, anion gap 20, beta-hydroxybutyrate 3.71 mmol/L, and ketones present in urine. VBG showed pH 7.3 and PCO₂ 19.6mmHg. SARS CoV-2 PCR was positive. CXR revealed bilateral lung opacities. The patient was admitted to the ICU with euglycemic diabetic ketoacidosis (euDKA) and acute respiratory failure due to COVID-19. IV fluids, dextrose and insulin infusions were administered. On hospital day 3, patient's anion gap normalized. The patient's respiratory status deteriorated despite non-invasive ventilation. He was found unresponsive and in cardiac arrest, however resuscitation was unsuccessful and the patient ultimately expired.

A 77-year-old man with DM type 2 on empagliflozin, semaglutide, and metformin and CHF presented to the ED in April 2020 with 1 week of dyspnea, fatigue, diarrhea, and confusion. He was diagnosed with COVID-19 pneumonia 2 days prior to presentation. Physical exam: T 97.1 F, HR 90 bpm, RR 28 breaths/min, and O₂ sat 88% on room air. Patient was tachypneic with mild accessory muscle use while talking. Labs: serum glucose of 175 mg/dL, HCO₃ 13 mmol/L, anion gap of 17 and beta hydroxybutyrate at 2.55 mmol/L. VBG showed pH 7.3 and PCO₂ 30mmHg. CXR revealed basilar and peripherally diffuse opacities. The patient was diagnosed with euDKA and acute respiratory failure due to COVID-19. IV fluids, insulin infusion and dextrose were administered. While the patient's DKA ultimately resolved, his respiratory status continued to deteriorate and required intubation. Ultimately, he expired from respiratory failure.

IMPACT/DISCUSSION: We present two cases of euDKA associated with sodium glucose co- transporter 2 (SGLT2) inhibitors use and COVID-19. euDKA is defined as DKA without marked hyperglycemia and is a unique adverse effect of SGLT2 inhibitors. SGLT2 inhibitors are novel oral antihyperglycemic agents popular in the treatment of DM type 2. Data from the FDA Adverse Event Reporting System (FAERS) linked SGLT2 inhibitors to a 7-fold increase risk in DKA in patients with DM type 2, leading the FDA to issue a warning regarding use of these agents. This was present in 71% of cases of diabetic ketoacidosis in the FAERS data. These cases highlight the metabolic complications of SGLT2 inhibitors and COVID19 in diabetic patients. When caring for these patients, clinicians should remain vigilant for ketoacidosis, even in the presence of euglycemia.

CONCLUSION: COVID-19 has been associated with metabolic complications, including DKA in diabetic patients. euDKA is uniquely linked to SGLT2 inhibitors usage.

EXOGENOUS HUMAN GROWTH HORMONE AND PHEOCHROMOCYTOMA – IS THE SWOLE WORTH THE TOLL?

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LEARNING OBJECTIVE #1: Recognize a potentially strong relationship between exogenous human growth hormone use and the development of malignancy.

LEARNING OBJECTIVE #2: Encourage clinicians to take a thorough history and inquire about hormone use in patients presenting with newly diagnosed tumors.

CASE: A 44-year-old male with a past medical history of type 2 diabetes mellitus and hypertension presented to the hospital with atypical chest pain for a year associated with shortness of breath. The patient was using testosterone supplements as well as injectable exogenous human growth hormone to aid in body building. He had been on these supplements for more than a year. He had no family or personal history of cancer.

Vital signs revealed blood pressure of 204/103 and pulse of 112. CTA chest and abdomen showed an incidental large, necrotic retroperitoneal mass, likely an adrenal mass, which raised suspicion for pheochromocytoma. Plasma normetanephrine level was 8,928 pg/mL (normal range: 18-111 pg/mL). The presence of an adrenal mass, highly elevated normetanephrines, and patient's clinical picture were consistent with the diagnosis of pheochromocytoma.

IMPACT/DISCUSSION: Growth hormone is released by the pituitary gland, and one of its main functions is to stimulate the liver to release insulin-like growth factors (IGF) to target tissues for growth and metabolism. IGF-1 plays an important role in cellular proliferation and inhibition of apoptosis and has been implicated in carcinogenesis. Growth hormone therapy was initially introduced in 1985 to treat children with growth hormone deficiency. Since then, indications for use have expanded. However, this has raised concerns over the safety of using exogenous human growth hormone (HGH) in patients who do not have a true deficiency, such as in the population of body builders who use the drug for its anabolic effect. Although there is evidence of increasing lean body mass, well-documented side effects include fluid retention, joint pain, breast enlargement and carpal tunnel syndrome.

Our case raises the suspicion of direct effect of exogenous HGH on the development of pheochromocytoma. Upon reviewing the literature, we came across intriguing data from Fernandez et al in 2012. His work has shown that IGF-1 maintains tumor phenotype and survival of pheochromocytoma cells in mice models. In addition, mice with IGF-1 deficiency have decreased tumor incidence and decreased tumor vascularization. Further research is warranted to explore long- term side effects of HGH and its potential role in malignancy in humans.

CONCLUSION: This case demonstrates the importance of thorough history taking, especially when collecting data about hormonal supplements. We believe further research into the carcinogenic potential of human growth hormone would help us educate patients on risks of supplements and enhancements they may be using.

EXOPHTHALMOS IT'S NOT ALWAYS GRAVE'S DISEASE

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LEARNING OBJECTIVE #1: To recognize Hashimoto's thyroiditis as a cause of thyroid associated ophthalmopathy

LEARNING OBJECTIVE #2: Early recognition and treatment may prevent major cosmetic and functional complications

CASE: A 39-year-old female with history of hypertension and hypothyroidism secondary to Hashimoto's thyroiditis on levothyroxine, presented with worsening diplopia, bilateral proptosis, and dry eye since two months. Symptoms were sudden in onset. Associated with fatigable eye movements and worsening thyroid swelling. On examination her vital signs were normal, there was diffuse mildly tender thyroid swelling with multiple nodules, but no thyroid bruit. She had bilateral proptosis, conjunctival redness, and dry eyes. Labs were significant for thyroid stimulating hormone (TSH) 5.16 uU/ml (0.40 - 4.60 uU/ml), free thyroxine (Ft4) 1.2 ng/dl (0.8 - 1.7 ng/dl), thyroid stimulating immunoglobulin antibodies (TSI) were negative, thyroid peroxidase antibodies were > 1000.0 IU/ml (< 5 IU/ml). Thyroid ultrasound revealed an enlarged heterogeneous thyroid with increased vascularity consistent with thyroiditis. CT orbits with contrast showed mild bilateral proptosis with mild increase in bulk of inferior recti. Thyroid biopsy showed diffuse lymphocytic infiltrate. Thyroid binding inhibitory immunoglobulin (TBII) and TSI were repeated to

rule out delayed autoimmunity of Graves' disease, which were negative. She was started on increased dose of levothyroxine and oral steroids with improvement in symptoms.

IMPACT/DISCUSSION: Thyroid-associated ophthalmopathy (TAO) is a constellation of symptoms caused by an autoimmune process involving the orbital tissue. Typical signs are upper eyelid retraction, proptosis, periorbital edema, and impairment of eye motility. Although TAO is common in hyperthyroid patients due to Graves' disease with positive thyroid receptor antibodies, there have been reported cases in patients with Hashimoto's thyroiditis with prevalence reaching up to 22.7% and upper eyelid retraction being the most common finding. Pathogenesis of TAO in Hashimoto's thyroiditis is poorly understood but specific antibodies against eye muscle antigen specially calsequestrin and collagen XIII flavoprotein are also shown to be good markers of eye muscle damage in Grave's disease patients may be an alternative explanation for eye muscle damage in Hashimoto's thyroiditis. The decision to start steroids for TAO is based on clinical activity score (CAS) for thyroid eye disease. CAS \geq 4 has a positive predictive value of 80% for response to steroids. Our patient had CAS of 4 with one point each for increased proptosis, decreased eye movement, decreased visual acuity, and redness of the conjunctiva. Her symptoms improved with steroids, close endocrinology and ophthalmology follow ups.

CONCLUSION: Although thyroid associated ophthalmopathy is usually associated with Graves' disease there have been reported cases in Hashimoto's thyroiditis. Early recognition and treatment may prevent major cosmetic and functional complications.

FEVER, HEADACHE, NECK STIFFNESS – IT'S NOT ALWAYS MENINGITIS. AN ATYPICAL PRESENTATION OF SUBACUTE THYROIDITIS.

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LEARNING OBJECTIVE #1: Importance of considering thyroid pathology as differential for fever of unknown origin (FUO)

LEARNING OBJECTIVE #2: Recognizing the atypical presentation of subacute thyroiditis (SAT) **CASE:** A 37-year-old female presented with fever, neck stiffness, occipital headache, posterior neck pain associated with photophobia for 3 weeks. One week prior to this hospitalization, she was evaluated for similar symptoms. Labs showed subclinical hyperthyroidism, TSH - 0.26 (0.36-3.74 uIU/mL), free T4 - 1.28 (0.76-1.46ng/dL), free T3 levels - 2.97 (1-4.2 pg/mL). Work up was negative for neurologic, rheumatologic, and infectious etiology. She was discharged on broad-spectrum antibiotics for FUO. However, she continued to have fevers of 102F, with persistent symptoms that prompted admission to our facility. Physical exam: Temp 101.7F, HR 123bpm, posterior neck tenderness. Labs- ESR: 89 (0-20mm/hr), CRP: 24.2 (0-0.8 mg/dL). She was continued on broad- spectrum antibiotics and treated symptomatically. Further workup was negative for Influenza, HIV, rapid strep, urine drug screen, ANA, Monospot, VDRL, blood and urine cultures, CSF analysis, CSF cryptococcal antigen, CSF culture, and CSF viral studies (herpes/enterovirus/CMV/West Nile/varicella), Anti DS DNA, Anti-Sm Ab, RNP Ab. MRI of brain and cervical spine was normal. Subsequently, she developed dysphagia, anterior neck pain and tenderness, which prompted to repeat the thyroid studies: TSH $<$ 0.01 (0.36-3.74 uIU/mL), free T4 -2.57 (0.76-1.46ng/dL), free T3 - 6.47 (0.36-3.74 uIU/mL). Antithyroglobulin antibody and thyroid-stimulating immunoglobulin were normal. Thyroid ultrasound showed diffuse heterogeneous echotexture indicating possible thyroiditis. The patient was started on prednisone which resulted in symptomatic improvement. Follow up labs showed normal thyroid function studies.

IMPACT/DISCUSSION: SAT / DeQuervain's thyroiditis is a self-limiting inflammatory thyroid disorder, often preceded by a viral infection. Incidence is 3.6 cases per 100,000 person-years, with female predominance. It commonly presents with anterior neck pain, thyroid tenderness, and swelling. About 50% of patients present with hyperthyroidism. Very rarely SAT presents as FUO

(12%), late-onset, or minimal thyroid tenderness. Diagnosis of SAT is indubitable with thyroid tenderness and hyperthyroid symptoms. But our patient had an unusual presentation of fever, neck stiffness, and posterior neck pain mimicking meningitis which mislead the investigation to focus on an infectious etiology. Her atypical symptoms and absence of initial thyroid tenderness resulted in blind- siding subclinical hyperthyroidism, which can also be seen in SAT. Finally, with late-onset thyroid tenderness, diagnosis of SAT was made. This is one of the rarest presentations reported.

CONCLUSION: We would like to emphasize that thyroid pathology should be included in the differential for FUO. It is pivotal for the physicians to be aware of atypical presentations of SAT to avoid extensive workup, financial burden, and patient morbidity.

FEVER OF UNKNOWN ORIGIN VIGNETTE: WHEN A BASIC WORKUP IS STILL NOT ENOUGH

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LEARNING OBJECTIVE #1: Assess different causes of fever of unknown origin (FUO) including Adult Still's Disease (ASD)

LEARNING OBJECTIVE #2: Recognize immune activation syndrome as a complication of ASD

CASE: A 26-year-old man with past medical history of "juvenile rheumatoid arthritis" treated as a child in Mexico presented to outside care with fever, sore throat, macular rash, abdominal pain and diarrhea. After two consecutive antibiotic regimens, the patient's persistent fevers prompted a basic rheumatologic workup (ANA, ANCA, CCP, and RF), which was negative.

Four weeks later, he presented to our tertiary care facility with continued daily fevers \geq 101°F, severe joint pains, shortness of breath and 50 lb. weight loss. His physical examination noted left 5th PIP synovitis and point tenderness to lateral right ribs.

His labs were notable for a white blood cell count of 29.2 10⁹/L with 93% neutrophils, AST 43 U/L, ALT 53 U/L, hypertriglyceridemia, and profoundly elevated inflammatory markers with Ferritin of 4,124 ng/mL, and soluble CD25 4631.1 pg/mL. Broad infectious workup was negative, including multiple blood cultures and MTB-PCR testing. CT Imaging revealed splenomegaly and diffuse adenopathy without solid tumor or abscess. Lymph node biopsy revealed normal morphology and cytology.

On hospital day 3, the patient developed vasodilatory shock refractory to aggressive fluid resuscitation and vasopressors. He was treated empirically with IV methylprednisone and his shock, fevers, and joint pains quickly improved. A diagnosis of Adult Still's Disease (ASD) possibly complicated by Macrophage Activation Syndrome (MAS) was made. The patient continued to improve and was discharged with appropriate treatment and follow-up.

IMPACT/DISCUSSION: The differential diagnosis for Fever of Unknown Origin (FUO) is generally divided into four categories: infectious, non-infectious inflammatory disorders (NIID), malignant, and miscellaneous (e.g. drug fever). Of these, NIID is the most commonly diagnosed cause of FUO in developed countries, accounting for 23-35% of cases. While the prevalence of ASD is extremely low (\leq 0.4 per 100,000), it represents the final diagnosis in approximately 7% of FUO cases. Our patient met the Yamaguchi Criteria for ASD, as well as diagnostic criteria for MAS, an often fatal complication affecting ASD patients. Sudden hemodynamic collapse and high mortality are characteristic of immune activation syndromes. It is therefore important to have high clinical suspicion and a low threshold for treatment of an NIID such as ASD with associated immune activation in patients with FUO.

CONCLUSION: ASD is a disproportionately common cause of FUO relative to its prevalence and is associated with syndromic immune activation. In western FUO patients, clinicians should have a low threshold for empiric treatment of immune activation syndrome with high dose corticosteroids when patients demonstrate an appropriate history and laboratory workup in the context of hemodynamic instability

FLOATING AORTIC ARCH THROMBUS IN A PATIENT WITH COVID-19

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LEARNING OBJECTIVE #1: Diagnose and manage arterial thrombosis in a patient with COVID 19

LEARNING OBJECTIVE #2: Recognize the role of transesophageal echocardiography in diagnosis and management of aortic thrombosis

CASE: A 61-year-old man with a history of hypertension and a 1-week diagnosis of COVID-19 presented to our hospital with worsening dyspnea, myalgias and headaches. He was initially diagnosed with COVID-19 after having several days of fatigue and cough. He was initially hypoxic to 81% on room air and required supplemental oxygen via nasal cannula, then high flow nasal cannula to maintain adequate oxygenation. Labs showed peripheral lymphopenia, elevated inflammatory markers including Ferritin of 1175, CRP of 12, ESR of 95, d-dimer of 1630. Chest x-ray revealed extensive bilateral patchy infiltrates. He was treated with dexamethasone and compassionate-use Remdesivir.

He continued to have persistent hypoxia, therefore on hospital day 10 a CTA was obtained to evaluate for presence of possible pulmonary embolism. CTA did not show any acute or chronic pulmonary embolism; however, it demonstrated a 1.4 cm nodular filling defect in the aortic arch concerning for a floating aortic thrombus. TEE obtained which demonstrated a 1.14 cm x 0.87 cm mobile thrombus in the proximal descending aorta.

Patient was urgently taken to the OR where he had successful aspiration of the floating thrombus using the AngioVac system through open right femoral artery access. He did well post op and was eventually discharged home.

IMPACT/DISCUSSION: COVID-19 infection is being increasingly recognized as a cause of thrombotic events. Rates of up to 31% have been reported for incidence of venous thrombosis in patients with COVID-19 infection, however, rates of reported arterial thrombosis remain low. The most common reported arterial thrombotic event is a cerebrovascular event, however there are also reported cases of peripheral arterial thrombosis and aortic thrombosis. A floating thrombus in the aortic arch is a rare type of aortic thrombus that can have devastating consequences due to risk of cerebral or peripheral embolization. Here we report a case of floating aortic arch thrombus in a patient with COVID-19 infection. In this case, CT angio was used to make the initial diagnosis, however it is important to note the role TEE can play in diagnosis and management of this condition.

In our case, TEE was used to identify the exact location, size and characteristic of the aortic thrombus which in turn helped in planning and executing the final management. Based on the TEE findings, an AngioVac was used to aspirate the thrombus.

It is important to keep arterial thrombosis on the differential when assessing patients with severe COVID-19 infection.

CONCLUSION: - Aortic arch thrombus is a rare but potentially devastating complication of COVID due to risk of stroke and peripheral embolization - TEE is an important tool which can assist in diagnosis and better characterization of this complication which in turn guides management

HEMOPHAGOCYTIC LYMPHOHISTIOCYTOSIS: THE UTILITY OF DIAGNOSTIC CRITERIA

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LEARNING OBJECTIVE #1: Diagnose hemophagocytic lymphohistiocytosis (HLH) in patients with unremarkable bone marrow findings.

LEARNING OBJECTIVE #2: Recognize the clinical criteria for the diagnosis of HLH.

CASE: 46-year-old female with history of Systemic Lupus Erythematosus (SLE) presented with intractable nausea and vomiting. Physical examination was notable for tachycardia and fever to 102.2°F. Laboratory investigations

were unremarkable, including workup for an SLE flare. Infectious workup including Computed Tomography (CT) chest, abdomen, and pelvis showed no foci of infection. Due to persistent diarrhea, she underwent flexible sigmoidoscopy, which showed diffuse erythematous mucosa throughout the colon. Pathology revealed cytomegalovirus (CMV) colitis. The patient was started on intravenous ganciclovir with improvement in symptoms. Concurrently, the patient also developed anemia and thrombocytopenia, with hemoglobin dropping to 7.5 g/dL (baseline 12.3 g/dL) and platelets dropping to 80 thou/L (baseline >250 thou/L). Further workup revealed fibrinogen <0.45g/L, D-dimer 2.19ug/mL, LDH 1377U/L, ferritin 4390ng/mL, and haptoglobin <30mg/dL, raising concern for hemolysis. However, peripheral smear did not reveal schistocytes or spherocytes and cold agglutinins were negative. Soluble interleukin-2 receptor was elevated at 7214 U/mL, raising suspicion for HLH, with 5/8 diagnostic criteria met— fever, hypofibrinogenemia, bicytopenia, high soluble IL-2 receptor, and high ferritin. By this point, patient had improved significantly with treatment of underlying CMV and blood counts remained stable. Therefore, decision was made to forgo further work-up.

IMPACT/DISCUSSION: HLH is a rare, life-threatening syndrome of excessive immune activation, characterized by increased proliferation and activation of benign macrophages with hemophagocytosis with a mortality of 47%. Secondary HLH presents in adulthood and is associated with underlying infection, malignancy, or an autoimmune disease. The diagnosis is often delayed due to the paucity of symptoms and rarity of this condition. Diagnosis is made clinically, with 5/8 of the following parameters required for diagnosis: fever >38.5°C, splenomegaly, cytopenias affecting at least 2 cell lines, hyperferritinemia (>500 ug/L), hypertriglyceridemia (>265 mg/dL) and/or hypofibrinogenemia (<1.5 g/L), hemophagocytosis in the bone marrow, low or absent natural killer cell activity, and an increase in soluble IL-2 receptor (>2400 U/mL). It is important to note that hemophagocytosis is not pathognomonic for HLH, and it is neither sensitive nor specific for the disease. Though the gold standard for treatment is a hematopoietic stem cell transplantation, treating the underlying disease is advised in stable, not critically ill patients.

CONCLUSION: HLH can be rapidly progressive and fatal if undiagnosed, therefore clinicians should have a high level of suspicion in patients with underlying autoimmune disease and infection to prevent fatal outcomes.

HEMOPHAGOCYTIC LYMPHOHISTIOCYTOSIS IN A PATIENT WITH DISSEMINATED MYCOBACTERIUM AVIUM COMPLEX INFECTION.

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LEARNING OBJECTIVE #1: Recognize hemophagocytic lymphohistiocytosis (HLH) in patients with disseminated Mycobacterium avium complex (MAC).

LEARNING OBJECTIVE #2: Manage HLH in the setting of disseminated MAC.

CASE: A 51-year-old male with acute intermittent porphyria and rheumatoid arthritis with recent respiratory MAC infection was initially hospitalized for acute kidney injury (AKI) noted by his PCP. His baseline creatinine of 1.0 mg/dL had increased to 3.03 mg/dL. He was also found to have isolated elevated alkaline phosphatase 963 U/L, progressive pancytopenia with hemoglobin of 5.8 g/dL, white blood cell count of 0.3 cells/mm³, and platelets of 13 cells/mm³. Elevated D-dimer and low fibrinogen suggested disseminated intravascular coagulation (DIC). Blood and urine cultures were negative. Liver biopsy to rule out drug-induced liver injury showed non-caseating granulomas suggesting dissemination of MAC infection. Acid-fast bacillus and Grocott methenamine silver stains from biopsy were negative.

He began to receive cryoprecipitate for DIC. MAC therapy was initiated with azithromycin, ethambutol, and moxifloxacin. He was transferred to the ICU due to worsening hypotension requiring pressor support. Due to clinical deterioration, MAC therapy was switched to vancomycin and cefepime for broad-spectrum coverage. Bone marrow biopsy showed both non-necrotizing granulomas and hemophagocytic macrophages. With no clinical improvement after one week, we restarted MAC therapy and began salvage therapy with

dexamethasone 18 mg daily for possible HLH. Two days after initiating therapy, he was weaned off of pressors, with improvement in his blood hemoglobin levels and DIC labs. He was downgraded from intensive care, and dexamethasone therapy was continued.

IMPACT/DISCUSSION: Both HLH and disseminated MAC infection can be fatal if left untreated. Bone marrow biopsy in disseminated MAC infection shows acid-fast bacilli with small granulomas and abundant lymphocytes. HLH on biopsy classically reveals large multi-nucleated hemophagocytes, however, this may be seen during severe infections as well. Given the patient's ambiguous bone marrow biopsy results and failed antibiotic therapy, HLH treatment was pursued.

HLH is life-threatening, with an overall mortality of over 50%. Prognosis is worsened by bacterial infection. This patient's disease course supports prompt HLH treatment even despite ongoing infection. Moreover, he received only steroid monotherapy rather than combined steroid, chemotherapeutic, and biologic therapy in an attempt to mitigate infection spread. Large-scale data shows that patients with HLH benefit most from combined therapy, but risk of worsening infection must be balanced with the benefit of HLH treatment.

CONCLUSION: Bone marrow biopsy should be included in the workup of pancytopenia in disseminated MAC. HLH should be treated even during active infection.

HOT OR COLD: A SEARCH FOR INFLAMMATION

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LEARNING OBJECTIVE #1: Develop a differential diagnosis for cold abscesses.

LEARNING OBJECTIVE #2: Recognize and diagnose extrapulmonary tuberculosis.

CASE: A 38-year-old Guatemalan man presented with fluctuant nodules on his neck and chest. The first abscess started as a small pustule overlying the sternum two years prior to presentation. It slowly grew in size until opening and draining a thick yellow material. The other nodules formed a few weeks prior to presentation. The patient had a chronic nonproductive cough for a year, but it resolved six months ago. He worked on a farm in Guatemala, but he had not returned since 2000. He denied fevers, chills, night sweats, and weight loss. The patient's temperature was 37.6C, and his vital signs were stable. He had two mildly tender nodules overlying the right sternocleidomastoid and right supraclavicular region. He also had a linear, hyperpigmented, raised area at the base of his neck draining white liquid. Overlying the sternum, he had an 8 cm raised, non-tender, fluctuant mass with two openings in the skin surrounded by 1 cm of mild erythema.

CT neck and thorax revealed a 3 cm abscess overlying the sternocleidomastoid, a 1 cm rim-enhancing abscess adjacent to the right internal jugular vein, a 4 cm abscess in the supraclavicular area, an 8 cm abscess overlying the sternum, and a 3 cm retrosternal abscess. Opacifications of the left upper lobe and lingula were also present.

HIV was negative. Sputum and abscess acid-fast bacillus (AFB) smears were negative. Interferon- gamma release assay for tuberculosis (T-spot) returned positive. AFB cultures of abscess aspirate and induced sputum ultimately grew *M. tuberculosis*, leading to the diagnosis of pulmonary tuberculosis with tuberculous lymphadenitis.

IMPACT/DISCUSSION: Cold abscesses are defined as abscesses with minimal erythema and warmth. Causative organisms include *M. tuberculosis*, nontuberculous mycobacteria (e.g. *M. avium* complex), *Paracoccidioides brasiliensis*, and *Actinomyces* spp.

P. brasiliensis is endemic to Latin America and can remain dormant in the lungs for many years before causing disease. Manifestations include cold abscesses in addition to pulmonary symptoms.

Typical presentations of actinomycosis abscesses include cervicofacial actinomycosis related to dental infection and pulmonary actinomycosis in patients with poor oral hygiene at risk of aspirating. Pulmonary actinomycosis can spread from the lung to the pleura, mediastinum, and chest wall with chronic suppuration.

M. tuberculosis is the most common cause of cold abscesses, but diagnosing extrapulmonary tuberculosis requires multiple tests. A positive T-spot does not distinguish between latent, pulmonary, and extrapulmonary tuberculosis, so diagnosis requires PCR, AFB smear, or AFB culture yielding *M. tuberculosis*. **CONCLUSION:** -Cold abscesses due to *M. tuberculosis* may be present in the absence of active pulmonary symptoms.

-Diagnosis of extrapulmonary tuberculosis requires identification of the organism by AFB smear, PCR, or culture.

HYPERCALCEMIA IN LEUKEMIA: AN UNCOMMON CULPRIT

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LEARNING OBJECTIVE #1: Diagnose the cause of hypercalcemia in Leukemia.

LEARNING OBJECTIVE #2: Manage hypercalcemia due to malignancy.

CASE: A 75-year-old Japanese male with a past medical history of type 2 diabetes mellitus, hypertension, gout, and vitamin D deficiency presented with generalized malaise, weakness, loss of appetite, and a 20-pound weight loss over four months. The patient had also noted an increased frequency of urination.

Initial workup included labs significant for platelets of 53,000 K/uL(N=140 - 440 K/uL), BUN of 44 mg/dL(N=6 - 22 mg/dL), creatinine of 4 mg/dL(N=0.8 - 1.6 mg/dL), and ionized calcium of 8 mg/dL(N=4.4 - 5.4 mg/dL). Due to hypercalcemia and polyuria, the intact parathyroid hormone was obtained and was down to 8 pg/ml(N=15 - 65 pg/mL). PTHrP was found to be 4.1 pmol/ml(N=<2.0), Vitamin D 25 was 151.4 ng/ml(N=32.0 - 100.0 ng/mL), and 1,25 dihydroxy Vitamin D was 81.3 pg/ml(N=19.9 - 79.3 pg/mL). MRI head and CT chest/abdomen/pelvis were both negative for bony lytic lesions.

The patient received normal saline at 200cc/hr but bisphosphonates were deferred due to elevated creatinine. He was started on calcitonin 300 units twice a day for 3 days, and then received a one-time 4 mg IV dose of zoledronic acid after day 3 of calcitonin with gradual resolution of his hypercalcemia.

He subsequently underwent a bone marrow biopsy which showed hypercellular marrow with more than 95% B lymphoblasts expressing CD10, CD19, CD20, CD34, and TDT. BCR-ABL gene was positive. A diagnosis of acute B-cell lymphoblastic leukemia (ALL) was made, and the patient was started on induction chemotherapy.

IMPACT/DISCUSSION: Hypercalcemia due to PTHrP, even though most commonly seen with squamous cell carcinoma, can also be found in hematological malignancies like ALL. PTHrP has been hypothesized to be produced directly by lymphoblasts in patients diagnosed with ALL, leading to hypercalcemia as a paraneoplastic syndrome.

PTHrP functions by altering renal tubular calcium and phosphate transport, as well as by increasing renal cyclic adenosine monophosphate and 1,25-dihydroxy vitamin D production. It also stimulates osteoclasts which increase bone resorption. Hypercalcemia also will suppress intact PTH by negative feedback loops as seen in our patient.

Adverse effects due to hypercalcemia include polyuria, renal failure, confusion, and cardiac arrhythmias. This case illustrates the complexities of hypercalcemia of malignancy.

CONCLUSION: -PTHrP can be produced by lymphoblasts in Acute lymphoblastic leukemia.

-Rapid hydration, calcitonin, and bisphosphonates remain a cornerstone in the treatment of hypercalcemia of humoral malignancy.

HYPERCALCEMIA TWO WAYS: MULTIPLE MYELOMA MASKING A PARATHYROID ADENOMA

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LEARNING OBJECTIVE #1: Standard labs should always be drawn in cases of hypercalcemia including PTH, 1,25-OH vitamin D, albumin and ionized calcium

LEARNING OBJECTIVE #2: Head and neck imaging should always follow newly or unexplained elevations in PTH

CASE: A 64-year-old man with no healthcare contact for many years presented to the emergency department for fatigue and failure to thrive in the setting of one month of fevers, chills, night sweats, anorexia and a twenty pound weight loss. His past medical history was remarkable for BPH, his family medical history included unspecified malignancy in his father. He had no surgical histories and took finasteride for his BPH.

Notably, on admission, he was found to have anemia (hgb 9.8), elevated creatine (1.82), calcium of 14.6 (corrected to 15.2 with albumin of 3.2) and a protein gap of 4.1. Additionally, lower extremity ultrasound revealed bilateral deep vein thrombosis. As he met three of the five “CRAB (hyperCalcemia, Renal disease, Anemia, Bone pain)” criteria for multiple myeloma, an serum plasma electrophoresis, beta 2 microglobulin, kappa: lambda ratio and bone marrow biopsy were all planned for and the patient was admitted for treatment of his hypercalcemia. The patient’s hypercalcemia moderately improved with IV fluids and bisphosphonates.

Results from his multiple myeloma workup revealed abnormal kappa: lambda at 0.08 (normal range 0.26-1.25), SPEP was positive for a gamma/M-spike, beta 2 microglobulin was 5.5. bone marrow aspirate with 1.65-1.77% lambda restricted plasma cells consistent with plasma cell neoplasm and bone marrow biopsy with plasma cell myeloma at greater than 30% of the marrow population, diagnostic of multiple myeloma. An x-ray bone survey was completed and revealed no lytic lesions.

On day two of his admission, a PTH was drawn, and found to be paradoxically elevated (422pg/mL). This was puzzling at the time, as it was assumed his hypercalcemia was due to multiple myeloma, which would have a low PTH. A CT of the soft tissue of the neck revealed a 3.3x1.8cm nodule on the posterior aspect of the thyroid, suspicious for a parathyroid adenoma.

This gentleman presented with B symptoms of malignancy and hypercalcemia. A judicious workup revealed two independent causes of his hypercalcemia – multiple myeloma and parathyroid adenoma.

IMPACT/DISCUSSION: Calcium homeostasis is a complex interaction between PTH, calcitriol, and 1,25-OH vitamin D. Additionally, the thyroid, parathyroid, liver, kidney, bone and gastrointestinal tract all play important roles in the regulation of calcium in the body. Patients presenting with hypercalcemia should be thoroughly and adequately worked up with laboratory studies to ensure a comprehensive clinical understanding of the cause. An overt presenting cause may mask other, treatable causes as well.

CONCLUSION: Thorough work up is merited in patients presenting with newly discovered hypercalcemia, even with blatant findings on initial HPI.

HYPERVIRULENT KLEBSIELLA PNEUMONIA CAUSING DISSEMINATED INFECTION IN IMMUNOCOMPETENT HOST

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LEARNING OBJECTIVE #1: Recognize presentations of disseminated Klebsiella infection in immunocompetent patients

LEARNING OBJECTIVE #2: Discuss epidemiology of hypervirulent strains of Klebsiella Pneumonia

CASE: A 54 year old man with history of Type II diabetes presented with a 4 week history of right upper quadrant abdominal pain, subjective fevers, jaundice, anorexia and weight loss. The patient had moved from China 2 years ago and lived in a hostel in California for 6 months, then moved to Texas one month prior to live with his sister.

On admission, patient was afebrile, hypotensive and jaundiced. Abdominal US noted multiple hypoechoic liver lesions. CT chest/abdomen/pelvis was notable for bilateral pulmonary nodules and numerous hepatic lesions. Patient however left against medical advice. He returned 48 hours later and was found to be

febrile and hypotensive requiring pressor support. On day 2, patient developed altered mental status, right facial droop and right upper extremity weakness. CT stroke was negative for acute infarctions. LP was notable for leukocytosis and elevated protein levels and MRI was notable for leptomeningitis and ventriculitis. Blood cultures grew Klebsiella pneumoniae while CSF cultures were negative. Repeat abdominal imaging revealed interval increase in size of hepatic lesions. Ultrasound-guided aspiration and biopsy of one lesion was consistent with liver abscess and cultures were positive for Klebsiella pneumoniae. Follow-up colonoscopy showed a sigmoid polyp consistent with tubular adenoma. Several weeks later, patient’s Klebsiella genotype was confirmed to be the hyper-virulent strain, K2 serotype. Patient was discharged after finishing an extended course of IV antibiotics.

IMPACT/DISCUSSION: In the United States, Klebsiella pneumoniae is a common underlying cause of urinary tract infections, bacteremia and pneumonia, particularly in hospitalized patients or those with urinary tract hardware. Disseminated infections are much less common and usually confined to immunocompromised patients. Herein, we present a case of Klebsiella pneumoniae causing meningitis, ventriculitis, brain and liver abscesses in an immunocompetent patient to highlight a life-threatening presentation not often seen in western countries. Hypervirulent strains of Klebsiella pneumoniae (hvKp) have been known to cause disseminated infection in otherwise healthy individuals in countries in the Pacific Rim. Interestingly, Chinese ethnicity has been associated with increased intestinal colonization with Klebsiella pneumoniae. Nonetheless, cases of disseminated infection due to hvKp have been rising in the West and there are currently no standardized lab tests to distinguish classical Klebsiella pneumoniae from hvKp at this time.

CONCLUSION: In immunocompetent patients found to have Klebsiella pneumoniae bacteremia without classic risk factors such as recent hospitalization or urinary tract hardware, it is important to have a high clinical suspicion for hypervirulent strains that can cause life-threatening disseminated disease.

IATROGENIC IRON OVERLOAD CAUSING PORPHYRIA CUTANEA TARDA IN A PATIENT WITH A RARE NONSENSE HETEROZYGOUS UROD GENE MUTATION

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LEARNING OBJECTIVE #1: Recognize the clinical features of porphyria cutanea tarda (PCT)

LEARNING OBJECTIVE #2: Identify factors that can further decrease UROD enzyme activity in patients with familial PCT

CASE: A 61 year-old female with a past medical history of anemia of chronic kidney disease and end-stage renal disease presented to the emergency room with a blistering rash on her fingers and associated pruritus. She was started on conservative treatment with prednisone, diphenhydramine, and triamcinolone cream. The patient presented to the emergency department again for worsening rash, which now involved the face. She was admitted, and clinical genetics and hematology-oncology were consulted. A 4 mm punch biopsy was performed which showed thick homogeneous disposition within the walls of superficial dermal vessels of IgG, IgA and fibrinogen. Further workup for PCT was ordered which revealed elevated total porphyrins and uroporphyrin levels. Due to the patient’s history of anemia and regular iron and erythropoietin infusions every two weeks, previous iron studies were reviewed. Iron studies two weeks prior to symptom onset showed a high ferritin level and total iron binding capacity. MRI of the liver showed iron overload, steatosis, and high iron overload in the spleen.

A porphyria genome report revealed that the patient had a rare heterozygous nonsense mutation of the UROD gene for a sequence variant designated c.616C>T, which is predicted to result in premature protein termination(p.Gln206*). The mutation by itself does not necessarily cause PCT, however any condition that can cause liver damage or iron overload can trigger PCT in the setting of decreased enzyme activity in individuals with the mutation.

The patient was started on hydroxychloroquine 1,000 mg twice weekly. Phlebotomy was not recommended due to the patient’s anemia with an average

hemoglobin level of 8 mg/dL. Her erythropoietin dose was increased to 500 mcg twice weekly, and she was started on deferoxamine for iron chelation with the plan to bring the ferritin level down to less than 1000 ng/mL. Regular iron infusions with hemodialysis per treatment guidelines was discontinued to prevent further iron overload.

IMPACT/DISCUSSION: PCT is a disease marked by skin blistering on sun exposed areas of the skin. Most cases of PCT are sporadic and caused by factors that decrease hepatic function, but some cases of PCT are caused by familial mutations in the UROD gene. The clinical manifestations of PCT in patients with deficient UROD enzyme activity occur when enzyme activity is below 20%. This decrease in enzyme activity occurs when an individual with familial PCT is exposed to other factors that decrease hepatic function, such as alcohol, iron overload, and the hepatitis C virus.

CONCLUSION: This case highlights the importance of recognizing the clinical manifestations of PCT and factors that may lead to the development of this dermatologic disease. PCT should be included in the differential diagnosis in patients receiving iron infusions that develop any significant rash.

IGG4 CHOLANGIOPATHY MASQUERADING AS A KLATSKIN TUMOR: AN INTERESTING CASE

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LEARNING OBJECTIVE #1: To recognize IgG4 cholangiopathy as a possible diagnosis in patients presenting with biliary mass

LEARNING OBJECTIVE #2: To identify treatment options for IgG4 related disease

CASE: A 68-year-old male with a history of HCV and remote pancreatitis presumed to be from alcohol use presented with a two-month history of pruritus, steatorrhea, fatigue, and weight loss. On presentation vital signs were unremarkable and physical exam was significant for scleral icterus, jaundice, and skin abrasions. Labs revealed an albumin of 3.4 gm/dL, total bilirubin of 8.3 mg/dL, ALT of 188 U/L, AST of 78 U/L, and alkaline phosphatase of 596 U/L. CA19-9 was elevated to 53.91 U/ml. CT of the abdomen/pelvis and MRCP showed mild to moderate intrahepatic biliary ductal dilatation with a 4.5 x 2.5 cm hilar lesion favoring Klatskin tumor, Bismuth Corlette type IV. ERCP showed a common hepatic duct high grade stricture with a circumferential malignant appearing mass which was biopsied. Pathology revealed fibrous tissue consistent with mixed inflammation but with atypical cell clusters which were suspicious but not diagnostic of malignancy leading to oncologic referral. PET scan showed diffuse lymphadenopathy. Given this atypical PET finding of cholangiocarcinoma, further workup was done. A mediastinal and hilar lymph node biopsy was negative for malignancy. Subsequent CA19-9 levels were normal at 31 U/ml, but IgG4 levels were elevated at 312 mg/dl. With this unrevealing workup for malignancy, elevated IgG4 levels and clinical findings of cholangitis with LAD, patient was treated with high dose steroids for suspected IgG4 cholangiopathy. He significantly improved with both normalization of his liver enzymes as well as IgG4 levels (111 mg/dl). Repeat EUS revealed shrinkage of the hilar mass. Repeat PET scan showed decreased lymph node activity. The patient did have a recurrence of symptoms when taken off steroids and was later successfully transitioned to Azathioprine in outpatient setting.

IMPACT/DISCUSSION: IgG4 cholangiopathy, also referred to as IgG4 sclerosing cholangitis (IgG4 SC), is a biliary manifestation of the widespread inflammatory condition known as an IgG4 related disease (IgG4 RD). Diagnosis involves a combination of imaging, serological markers (IgG4 levels elevated in about 75% of cases), histopathological evidence, effective response to steroid therapy as well as association with other IgG4-RD. Despite diagnostic and clinical advancements, the differentiation of IgG4 cholangiopathy from cholangiocarcinoma can be challenging as the local inflammation in the biliary tract can mimic the later condition. In such atypical presentations, checking IgG4 levels early aid in diagnosis of IgG4 SC. The early treatment with steroids shows a drastic response in IgG4 cholangiopathy which can be reassuring of the condition.

CONCLUSION: It is important to have a high clinical suspicion for IgG4 RD. Patients can avoid unnecessary treatments after diagnosis and have improved quality of life with medical management.

IMMUNODEFICIENCY- HIDING IN PLAIN SIGHT

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LEARNING OBJECTIVE #1: Recognize the clinical constellation of immunodeficiency syndromes

LEARNING OBJECTIVE #2: Identify conditions that frequently accompany immunodeficiency syndromes

CASE: 29-year-old male with history of pneumonia and lung decortication in Mexico, 2015, presented with shortness of breath, weakness and was found to have pancytopenia, splenomegaly and lymphadenopathy. All infectious serologies negative, SPEP with low globulins, no m-spike. Infectious and rheumatologic workup negative except CMV PCR and Toxoplasma IgM. Bone marrow, lymph node biopsies revealed pancytopenia and increased T-cells without malignancy

Transfusion dependent, he was hospitalized two months later with massive splenomegaly, repeat biopsies showed increased T lymphocytes and paracortical hyperplasia without clonality. All serologies negative except T. Gondii IgM. Splenectomy performed, pathology revealed congestive splenomegaly with positive stain for parvovirus B-19, no malignancy. All vaccines given.

Pancytopenia improved, but still transfusion dependent due to ongoing hemolytic anemia. Hospitalized two months later with new ascites, thrombocytopenia, transaminitis. Paracentesis suggested portal hypertension but patent vessels on US, TTE normal. CT showed worse lymphadenopathy and newly enlarged nodes. Transjugular liver biopsy showed sinusoidal dilation, infiltration with T lymphocytes and early stage fibrosis. Flow cytometry of liver and repeat bone marrow showed aberrant kappa light chain restricted large B cells; all parvovirus positive. He was started on diuretics and re-vaccinated.

He returned days later with worsening ascites, pain, fever and cough due to sepsis, pneumonia, SBP, and empyema with all cultures positive for *S. pneumoniae*. EGD with portal gastropathy and bleeding ulcers. Trypanosoma Cruzi, HSV, Rubella, CMV IgM all positive. SPEP showed elevated IgM kappa and lambda light chains. Serum immunoglobulins with low IgG, IgA and increased IgM leading to hyper IgM diagnosis.

IMPACT/DISCUSSION: Immunodeficiency syndromes are often multi-system diseases. They virtually all require subspecialists who may not have the context to make the diagnosis and fragmentation of care is common. This can delay diagnosis by years, during which time morbidity increases relative to appropriately diagnosed patients. Recurrent infections and bizarre presentations of pathogens, as in this case with Parvo and CMV, should trigger suspicion for immune dysregulation.

Immune deficiencies rarely occur in isolation. They can be accompanied or triggered by infections or other immunodeficiency. Commonly ITP, AIHA, HLH, granulomatous disease, and various GI diseases are comorbid. Patients are also at increased risk of malignancy, largely from Non-Hodgkin lymphomas that should be evaluated after making the diagnosis.

CONCLUSION: Immunodeficiency syndromes impact all systems

It can be easy to fragment all the manifestations into organ-specific diseases

They require a high index of suspicion for timely diagnosis

Patients should be evaluated for associated diseases

INCIDENTAL CARDIAC MASS

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LEARNING OBJECTIVE #1: Learn how to diagnose and manage cardiac mass

LEARNING OBJECTIVE #2: Learn the utility of echocardiogram and cardiac MRI in characterizing cardiac masses

CASE: A 74 years old male with a known past medical history of hypertension and Parkinson's disease presented with new-onset anginal chest pain, shortness of breath, and nausea. Physical exam was unremarkable while ECG revealed normal sinus rhythm with first-degree heart block and T wave inversion in lead III and aVF. High sensitivity troponin peak at 407 ng/L.

The patient was diagnosed and treated for acute non-ST segment elevation myocardial infarction. Echocardiogram revealed a preserved ejection fraction with no wall motion abnormalities and a large, spherical, multi-lobulated mass on the septal tricuspid leaflet measuring 24 x 20 mm. Cardiac MRI showed a 2.3 cm mobile heterogeneous mass attached to the anterior tricuspid valvular apparatus. The mass had two components, a central enhancing component suggesting a mass and a peripheral non-enhancing component likely a superficial layer of peripheral thrombus.

Coronary angiogram revealed two-vessel obstructive coronary artery disease involving proximal left anterior descending artery and the right coronary artery. Given significant, coronary disease plus valvular mass, the patient underwent coronary artery bypass grafting, tricuspid valve mass excision, and tricuspid valve replacement with a bioprosthetic valve. Pathological evaluation of the mass showed myxoma with associated thrombus.

IMPACT/DISCUSSION: While cardiac myxomas are the most common primary tumor, they are more commonly found within the left atrium. In the case described above, the tumor location was the right atrium and tricuspid valve annulus. The differential diagnosis for cardiac masses is broad and can reflect several different etiologies including infection, thrombus, tumor, and anatomical variants. The most common of these being cardiac thrombi. Common presenting symptoms include chest pain, dyspnea, and syncope. Echocardiography remains an important tool in diagnosing cardiac masses. Cardiac MRI is a useful tool to better characterize cardiac masses to differentiate cardiac neoplasm versus thrombus. Discovery of a cardiac tumor requires prompt further evaluation due to the increased risk of embolization, arrhythmias, and other complications. Cardiac mass removal is dependent on the size, location, and associated valvular dysfunction. Pathological analysis is necessary for the final diagnosis. If a diagnosis of myxoma is made after complete removal, patients can generally expect an excellent prognosis with very low recurrence rates.

CONCLUSION: While cardiac myxomas, more commonly present in the left atrium, the diagnosis should be considered for any cardiac mass in the right atrium. Echocardiography and MRI are useful imaging modalities to further evaluate the tumor. Definitive diagnosis is made through pathology tissue sampling.

INSIDIOUS OSTEOMYELITIS OF PUBIC RAMI

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LEARNING OBJECTIVE #1: Recognize a unique clinical presentation of osteomyelitis of pubic rami.

LEARNING OBJECTIVE #2: Encourage patient education regarding development of these symptoms following prostate cancer treatment.

CASE: Our patient is an 83-year-old male with history of prostate cancer treated with radiation therapy 14 years ago, subsequent salvage cryotherapy, and continued hormonal treatment. He presented with a one-month history of groin pain and bilateral proximal lower extremity weakness, which caused a fall without any noted pelvic trauma.

In the emergency department, he was afebrile and hemodynamically stable. Physical exam revealed diminished strength bilaterally and inability to adduct lower extremities, without signs of trauma or deformities in the pelvic region. Lab values were significant for ESR 124, CRP 9, WBC 13.6. After preliminary examination, the cause of the insidious pain and weakness remained uncertain.

CT AP demonstrated erosive changes in the symphysis pubis with surrounding fluid collections concerning for septic arthritis. No urinary tract fistula was noted. The patient was admitted for joint aspiration.

Follow up MRI was requested by Interventional Radiology prior to aspiration which confirmed osteomyelitis of the pubic rami with concomitant septic arthritis of the pubic symphysis. Joint aspiration cultures produced pan-susceptible *Pseudomonas*.

The patient was discharged with a 6-week course of IV Cefepime. Upon follow-up after 2 weeks, the patient was noted to have progressed well and remained comfortable, afebrile, and stable. He continues to follow with outpatient Occupational Therapy and Urology.

IMPACT/DISCUSSION: Our patient's clinical presentation is consistent with osteomyelitis of the pubic rami and septic arthritis of the pubic symphysis. This diagnosis is uncommon and can clinically resemble Osteitis Pubis, a non-infectious cause of inflammation of the pubic symphysis. However, these conditions are independent entities which require unique diagnostic procedures and interventions.

Major risk factors of pubic ramus osteomyelitis include IV drug use, trauma during athletics, urogynecologic surgeries, and a history of pelvic malignancy. Of patients who present with a history of pelvic malignancy, prior studies often demonstrate concomitant lower urinary tract dysfunction. Considering our patient's absence of trauma, recent surgical intervention, IV drug use, and lower urinary tract fistula, this clinical presentation appears unique.

CONCLUSION: We present this case to increase awareness of pubic ramus osteomyelitis and septic arthritis in patients receiving treatment for prostate cancer. The development of lower extremity weakness predisposes patients to falls, which is especially important considering their age and vulnerability. This constellation of symptoms should be part of patient education following prostate cancer treatment. Physicians should also include this in the differential in an effort to prevent long term morbidity.

IODINE-INDUCED THYROTOXICOSIS: A CASE OF IATROGENIC JOD BASEDOW PHENOMENON

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LEARNING OBJECTIVE #1: Recognize a rare but potentially fatal sequelae of iodinated contrast exposure

LEARNING OBJECTIVE #2: Assess the need for iodinated contrast agents use for diagnostic imaging and interventional procedures in at risk populations

CASE: A 45-year-old woman presents with one-week of worsening left upper quadrant abdominal pain and high-grade fevers. Approximately 6 weeks ago, the patient presented to the ED with a similar episode of severe LUQ abdominal pain without gastrointestinal symptoms. At the time, the patient's exam was unrevealing and CT abdomen/pelvis with contrast was only notable for a small supraumbilical hernia. During this visit, the patient reports that in addition to LUQ abdominal pain, she has been experiencing new symptoms of high-grade fevers, palpitations and dyspnea on exertion when walking short distances. On exam the patient was noted to be afebrile, tachycardic (HR 121), hypertensive (BP 164/91 mm Hg) with a diffuse non-tender thyromegaly. A CT angiogram chest performed showed no evidence of pulmonary embolism but noted a mildly enlarged thyroid. Thyroid studies revealed low TSH <0.01 IU/ml, elevated free T4 4.7 ng/ml, elevated thyroid stimulating immunoglobulin and thyroperoxidase Ab 4122 U/ml. The patient was diagnosed with iodine-induced hyperthyroidism and started on methimazole, solumedrol, propranolol resulting in rapid improvement of their heart rate and blood pressure.

IMPACT/DISCUSSION: Over the past 2 decades there has been an increasing use of iodinated contrast agents (ICAs) to improve anatomic visualization for diagnostic imaging and interventional procedures. This case highlights iodine-induced thyrotoxicosis or Jod Basedow phenomenon, a rare and potentially fatal sequelae of contrast exposure occurring when subclinical hyperthyroid patients are exposed to a supraphysiologic iodine load. This typically occurs within 2-12 weeks of ICA exposure. Risk factors include advanced age, thyroid dysfunction (latent Grave's disease, multinodular goiter) and chronic iodine deficiency. Normal physiologic response (in euthyroid patients) to a large iodine load is increased intracellular transport of iodine into thyroid follicular cells by Na-I symporters (NIS). Increased intracellular iodine decreases NIS expression and inhibits thyroid peroxidase causing reduced iodine

organification and transient decrease in T3/T4 production. In iodine deficiency or partially autonomous thyroid tissue, this follicular cell autoregulatory mechanism (Wolff-Chaikoff effect) is dysregulated. Thus, in the presence of thyroid-stimulating Abs (enhance iodine uptake and thyroid hormonogenesis) or TSH-independent autonomous thyroid tissue – a large iodine load causes increased secretion of T3/T4.

CONCLUSION: Due to increasing ICA use in modern medicine, clinicians should recognize ICA- induced thyrotoxicosis, an iatrogenic syndrome with high in-hospital mortality. The necessity of ICA use in diagnostic imaging and interventional procedures should be actively assessed, especially in at- risk populations.

ISOLATED AMYLOIDOMA OF THE LUNG

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LEARNING OBJECTIVE #1: Recognize that benign pulmonary nodules can present similarly to cancerous lesions and isolated Amyloidomas can occur in the lungs.

LEARNING OBJECTIVE #2: Recognize that it is imperative to rule out systemic amyloidosis when amyloidoma is discovered.

CASE: 55-year-old male veteran with a history of smoking and asbestos exposure was referred to pulmonary for evaluation of a right lung nodule. The patient's was having dyspnea (shortness of breath) on exertion and a cough. ROS was negative for fever, chills, night sweats, syncope. PMH was significant for bradycardia and substance use disorder. He was not taking any medications. FH was significant for esophageal cancer, CHF and CAD.

On exam, his trachea was midline and his neck were supple with no masses. Cardiac exam showed S3. He had no cyanosis, clubbing or pretibial edema. Non-contrast chest computed tomography (CT) revealed a solitary pulmonary nodule in the lateral segment of the right middle lobe. Pulmonary function tests (PFTs) were within normal limits.

Lesion was not calcified. There was no hilar or mediastinal adenopathy. No infiltrate, pleural effusion or venous congestion. Finding was considered bronchogenic carcinoma until proven otherwise. PET scan showed increased activity. Transthoracic needle biopsy of the lung (TTNA) was conducted.

Biopsy was inconclusive so he was referred to thoracic surgery for resection. Lesion was found to be positive for amyloid deposition. Serum protein electrophoresis (SPEP) and urine protein electrophoresis (UPEP) were negative and cardiac MRI was negative for amyloid deposition.

IMPACT/DISCUSSION: Amyloidosis involves systemic deposition of misfolded proteins. Isolated amyloidosis of the respiratory tract is rare. When seen in the lung, it is known as amyloidoma, frequently misdiagnosed as bronchogenic carcinoma. This case illustrates the work up for diagnosing amyloidoma.

The patient presented with a cough and an extensive smoking history making his isolated nodule highly lung cancer until proven otherwise. Malignancy became higher on the differential when the PET scan showed increased activity. Further, classic causes of benign pulmonary nodules such as granulomas had a low index of suspicion due to lack of adenopathy, calcification and other systemic symptoms.

Further testing, revealed the deposition of amyloid in the nodule. As discussed earlier, isolated amyloidosis of the lung is rarely ever seen, so the next step was to determine the extent of systemic involvement.

MRI of the patient's heart showed no evidence of amyloidosis. Serum and urine protein electrophoresis were also negative. This patient had no evidence of systemic amyloidosis as defined by the aforementioned-diagnostic criteria. This is a rare case of an isolated Pulmonary Amyloidoma

CONCLUSION: In summary, Amyloidoma should not be ruled out as a potential lung lesion. Although rare, it can occur in the absence of systemic amyloidosis. Proper testing and thorough evaluation should be conducted to rule out malignant causes of solitary lung lesions.

IS STRESS GIVING YOU CARDIOMYOPATHY? TRY FOCUSED POCUS

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LEARNING OBJECTIVE #1: Recognize the diagnostic utility of bedside point-of-care ultrasound (POCUS) in acute respiratory failure

LEARNING OBJECTIVE #2: Identify the increased prevalence of stress cardiomyopathy in the setting of the COVID-19 pandemic

CASE: An 80-year-old Caucasian female with a past medical history of asthma and previous COVID-19 infection presents to the Emergency Department with the complaint of worsening shortness of breath. The patient was initially diagnosed with uncomplicated COVID-19 infection six weeks prior to this presentation. The patient's symptoms on presentation include worsening dyspnea, cough, and purulent sputum for the past two days. Initial lab work consisting of leukocytosis at 16.41 K/uL, respiratory acidosis with pH 7.13 and pCO₂ 60 mmHg, troponin 0.96 ng/ml, BNP 145 pg/ml, chest x- ray showing bibasilar airspace opacities, and EKG without ischemic changes. The patient's hypoxia then progressed requiring BiPAP administration with repeat troponins elevated at 14.59 ng/ml. Bedside POCUS was performed and showed an akinetic apical left ventricle with ballooning consistent with stress cardiomyopathy (SCM). Left heart catheterization showed nonobstructive coronary artery disease and ejection fraction (EF) of 37% supporting the diagnosis of SCM, likely secondary to previous COVID-19 infection. She was treated with aggressive diuresis, initiation of GDMT, and antibiotics for pneumonia coverage. Cardiac MRI performed 5 days later showed recovery of EF at 59%.

IMPACT/DISCUSSION: Medicine in the United States is rapidly evolving towards increased utilization of diagnostic testing to increase the speed and accuracy of diagnoses. Urgent and emergent situations require quickly narrowed differentials; POCUS is emerging as a diagnostic utility that all internists should become familiar with. And with the new concern of contaminating diagnostic areas such as CT and MRIs during the COVID pandemic, portable and simpler to decontaminate imaging modalities such as bedside ultrasounds are becoming increasingly vital. POCUS in our case was useful by ruling out other diagnoses on the differential, such as pericardial effusion, tamponade, aortic root dilation seen in dissection, or right ventricular strain seen in massive pulmonary embolism.

This case also highlights the increasing prevalence of SCM. The prevalence of SCM in patients presenting as ACS rule out has increased from 1.5-1.8% pre-pandemic to 7.8% since the COVID-19 pandemic (jabri et al). While COVID-19 infection itself can lead to SCM, as in this case, the increased psychosocial and economic stressors of this pandemic is likely a factor in this increased prevalence.

CONCLUSION: POCUS in the assessment of acute respiratory failure can expedite diagnosis by providing immediate multisystem assessment to improve accuracy and time to treatment.

Practitioners should have a lower threshold to consider stress cardiomyopathy with increasing prevalence during the COVID-19 pandemic.

ITP FLARE BROUGHT ON BY COVID-19 PNEUMONIA

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LEARNING OBJECTIVE #1: Recognize ITP as an early severe complication of COVID-19 infection.

LEARNING OBJECTIVE #2: Rapidly manage ITP in the setting COVID-19 infection.

CASE: A 50 year old female with past medical history of immune thrombocytopenic purpura, steroid- induced type 2 diabetes mellitus, morbid obesity s/p gastric banding with takedown, presented to the ER with a 10 day history of progressively worsening fever, cough, shortness of breath, malaise, myalgias,

watery non-bloody diarrhea, and abdominal cramping. She noticed development of non-traumatic abdominal purpura 2 days prior to presentation without hematochezia, melena, hematuria, vaginal bleeding, epistaxis, or hematemesis. Nasal swab NAA was positive for COVID-19. In regard to her ITP, she was diagnosed in 2018 while having a viral upper respiratory tract infection and was treated with steroids. She had another flare in 2019, again, from a viral upper respiratory tract infection and was treated with a prolonged steroid taper. On presentation she was hemodynamically stable with lab work significant for platelet count of less than 3 and stable hemoglobin. CT abdomen and pelvis did not show any hematomas but did reveal bilateral pulmonary peripheral consolidations consistent with COVID-19 pneumonia. CT head did not show any intracranial bleed. Hematology was consulted and per recommendations she was started on high-dose steroids (dexamethasone 40 mg IV daily) and IVIg 1 mg/kg. She was a Jehovah witness and thus did not consent to platelet transfusion. Platelet count improved rapidly during her hospital stay.

IMPACT/DISCUSSION: Several cases of patients presenting with new ITP secondary to COVID-19 infection have been reported. We present a case of ITP flare secondary to COVID-19 pneumonia in a patient with known ITP. This patient had a history of ITP flares secondary to viral infections. The pathophysiology of ITP is complex and poorly understood with a combination of humoral and cell-mediated attacks on platelets peripherally and megakaryocytes within bone marrow. The easiest model for understanding ITP pathophysiology involves opsonization of platelets by Anti-platelet autoantibodies resulting in their destruction within the spleen. The most common inciting event for ITP flares is infection. Common manifestations are purpura, fatigue, and hemorrhage. ITP remains a diagnosis of exclusion and most cases do not require treatment. Treatment is indicated for any severe bleeding (eg, intracranial, GI) and/or a platelet count <30,000/uL and consists of immediate platelet transfusion, IVIg, and high dose corticosteroids. Typically, prednisone or methylprednisolone are used, but since COVID was present dexamethasone was chosen. Anti-D immune globulin is an alternative treatment for patients with RhD positive RBCs and for refractory cases rituximab, thrombopoietin receptor agonists, or splenectomy may be indicated.

CONCLUSION: ITP is emerging as a complication of COVID-19 infection. Prompt diagnosis and early treatment is imperative in preventing serious complications.

K. THANKS. BYE. A CASE OF MULTIFACTORIAL HYPOKALEMIA

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LEARNING OBJECTIVE #1: Differentiate between renal and extrarenal losses of potassium while working up hypokalemia.

LEARNING OBJECTIVE #2: Describe the treatment of acute hypokalemia.

CASE: 65-year-old man with a history of adrenal insufficiency and chronic hypokalemia presented with altered mental status. He was found to have potassium of 1.6 mmol/L, for which our Nephrology service was consulted. Found to have urine electrolytes as follows: sodium <12 mmol/L, potassium 40 mmol/L, chloride <13 mmol/L, creatinine 100.9 mg/dl. He also had a metabolic alkalosis with bicarbonate of 43 mmol/L. His Transtubular Potassium Gradient (TTKG) was 19, denoting renal wasting of potassium.

Oral potassium supplementation and IV normal saline were initiated. Potassium responded to 4.3 mEq/L and bicarbonate decreased to 30 mEq/L. His altered mental status improved

IMPACT/DISCUSSION: Hypokalemia is commonly encountered by the general internist. The first step in work up is a urine potassium level. High urine potassium levels (>20 mmol/L) are consistent with renal losses causing hypokalemia. Conversely, in extrarenal losses, the urine potassium level will not be elevated. TTKG adjusts the urine potassium level based on the level of renal potassium conservation in the cortical collecting ducts. Here it helps the diagnosis but is somewhat flawed due to low urine sodium.

In this case, vomiting, diuretic use, steroid replacement therapy, and renal wasting of potassium contributed.

A patient taking furosemide and chronic steroids, he had renal loss of potassium at baseline. The gastrointestinal illness then caused acute-on-chronic renal loss and severe hypokalemia. Management of hypokalemia involves oral

repletion and correction of the underlying issue. In this case, that meant volume resuscitation with sodium chloride. Since normal saline has a low pH due to its chloride content, this also helps to correct metabolic alkalosis.

CONCLUSION: Hypokalemia is often multifactorial in a patient with multiple medical issues. Treat a chloride responsive metabolic alkalosis with normal saline for volume resuscitation

KAPOSI SARCOMA IN A YOUNG PATIENT WITH NEWLY DIAGNOSED HIV

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LEARNING OBJECTIVE #1: Diagnose Kaposi sarcoma in a patient who is in an atypical age range for the disease and has no associated skin findings.

LEARNING OBJECTIVE #2: Recognize when to do further workup for malignancies associated with HIV

CASE: This case report describes a 22-year-old African American MSM with no reported past medical history who presented to the ED with a one-week history of sore throat, fever, fatigue, diffuse cervical lymph node enlargement, and night sweats. The patient denied shortness of breath, chest pain, diarrhea, skin changes, and neurological symptoms. He didn't take any medications and had no reported family history. Social history was significant for mild alcohol use and sexual relationships with multiple male partners. Physical exam showed significant lymphadenopathy, but there was no evidence of any skin lesions, blotches, or tumors.

On admission, he had a platelet count of 10K and a hemoglobin of 4.9. Further workup indicated that the patient was positive for Epstein-Barr virus and HIV, with an initial CD4 count of 141. The patient was started on the antiretroviral Biktarvy in addition to atovaquone for PJP prophylaxis. CT of the neck soft tissue with IV contrast revealed enlargement of the palatine and lingual tonsils, in addition to extensive adenopathy in the anterior and posterior cervical regions and supraclavicular regions. CT of the chest, abdomen, and pelvis revealed splenomegaly at 16.7 cm. These findings raised suspicion for lymphoma, and bone marrow and lymph node biopsies were ordered. The bone marrow biopsy and flow cytometry were not significant for any leukemias or lymphomas. Flow cytometry of the left axillary lymph node was negative for any monoclonal B or T-cell proliferations. Surgical pathology of the lymph node confirmed the diagnosis of Kaposi sarcoma.

IMPACT/DISCUSSION: This case highlights a rare manifestation of HIV in younger patients, especially those in the United States. The patient also lacked many of the classical skin changes associated with Kaposi Sarcoma, which made the diagnosis less apparent in the differential. The major teaching point of this case is to be thorough during HIV workup to ensure proper identification and treatment for more uncommon associated malignancies/diseases.

-This case changed thinking because the suspicion for lymphoma required physicians to obtain additional tests and labs that are not routinely obtained during initial HIV and Epstein-Barr workup.

-A search of the literature shows that there are very few case studies regarding Kaposi Sarcoma in younger individuals, and this case provides context to physicians on when to suspect and workup lymphoma in younger patients with HIV.

CONCLUSION:- Rare diagnosis in a patient with a new HIV diagnosis who had not previously received any antiretroviral therapy.

- Young age on presentation and lack of classical skin findings makes this case unique

- Importance of HIV diagnosis to reduce complications and prevent HIV related comorbidities

KLEBSIELLA BACTEREMIA FROM STRONGYLOIDES HYPERINFECTIO

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LEARNING OBJECTIVE #1: Recognize *Strongyloides* infection as a potential cause of bacterial gut translocation

LEARNING OBJECTIVE #2: Identify immunosuppression as a common trigger for *Strongyloides* hyperinfection

CASE: A 45-year-old female with a history of breast cancer with brain metastases managed with dexamethasone presented to the emergency room with intractable nausea, vomiting, and diffuse abdominal pain. On admission, she had normal vital signs. A computed tomography (CT) scan of her abdomen found diffuse colonic wall thickening, concerning for colitis. On hospital day three, she developed tachycardia, tachypnea, and a new leukocytosis with neutrophil predominance. A chest x-ray revealed patchy infiltrates concerning for pneumonia, so she was started on ceftriaxone and azithromycin. Blood cultures grew *Klebsiella pneumoniae*. On hospital day six, her respiratory status declined further, requiring intubation. Sputum evaluation identified active, mobile larvae consistent with a diagnosis of *Strongyloides stercoralis* hyperinfection. She was thus treated with oral ivermectin and monitored with daily stool and sputum inspections. After ivermectin was initiated, the pathology from her colonoscopy, done on hospital day three, resulted, demonstrating *Strongyloides* organisms within the sigmoid colon and rectum. She improved rapidly with oral ivermectin, and was extubated on hospital day eight. Sputum and stool cleared of larvae within four days, and she was discharged on ceftriaxone and ivermectin.

IMPACT/DISCUSSION: *Strongyloides stercoralis* is an intestinal nematode that typically presents as a chronic, asymptomatic infection, during which organisms remain primarily within the gastrointestinal (GI) tract. Hyperinfection occurs when immunosuppression, such as the steroid administration in this case, leads to uncontrolled proliferation and multiorgan spread of the parasite, typically to the pulmonary system, with the hallmark of hyperinfection being the presence of the larvae in both the stool and sputum. When the larvae migrate out of the GI tract, they carry gut bacterial organisms with them into the bloodstream, causing bacteremia, such as the *Klebsiella* bacteremia in this presentation. Management of *Strongyloides* hyperinfection is also challenging as there are no set guidelines for the treatment of hyperinfection, but cases in the literature show success with ivermectin continued until stool studies remain negative for at least two weeks. Hyperinfection can be associated with high mortality rates when the parasitic infection is unrecognized and the bacteremia is treated late in the disease course.

CONCLUSION: *Strongyloides* hyperinfection occurs with immunosuppression and subsequent spread of the infection from the GI tract to the lungs, often with an accompanying gram-negative bacteremia from gut translocation. Maintaining a high clinical suspicion, particularly in patients from endemic regions, is critical for early detection and treatment.

KROKODIL: DRUG INDUCED SCALY SKIN

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LEARNING OBJECTIVE #1: Describe the street drug called Krokodil

LEARNING OBJECTIVE #2: Identify complication of using the Drug Krokodil

CASE: A 39 years old female presented to a community hospital complaining of multiple deep non-healing ulcers of both lower extremities. She has a long history of intravenous drug abuse. Following subcutaneous injection of krokodil 5 weeks earlier, she developed multiple ulcers on her lower extremities. Over the last 2 weeks, she began to experience severe burning pain over the wounds as they became deeper, malodorous, purulent, and necrotic. Physical examination showed she was tachycardic but afebrile and hemodynamically stable. Rest of her exam was unremarkable with the exception of multiple ulcerations measuring 4 mm to 15mm in size on both lower extremities. The ulcers were not well demarcated and several were necrotic with malodorous and purulent drainage. Her laboratory studies including CBC and CMP were unremarkable. Her toxicology screen was positive for opiates. She was treated with IV Vancomycin

followed by debridement of approximately 30% of the surface area of her legs.

IMPACT/DISCUSSION: Street drugs have been a longstanding problem in the United States. All the street drugs are modified and new drugs of abuse are introduced into the streets each year.

Krokodil is a street drug first introduced in Russia as inexpensive substitute for heroin. It contains synthetic desomorphine, hydrochloric acid, red phosphorus, iodine, gasoline and paint thinner (5). Krokodil derived its name from the reaction that occurs at site of injection, which becomes scaly with a green-black discoloration. The dermatologic findings are the result of the causative nature of the additives since gasoline and hydrochloric acid can cause ulceration and scaling. Iodine is known to cause muscle damage (1,2,3). Red phosphorus is responsible for cartilaginous tissue and bone damage (6). Due to the highly addictive nature of the drug, patients tend to continue its use despite the development of deep necrotic painful ulcers that require surgical debridement. Currently Krokodil related wound remain lower than heroin and cocaine, the failure of the physician to recognize and promptly treat can lead to destruction of the limb, systemic infection and mortality. The treatment for necrotizing fasciitis caused by krokodil is broad spectrum antibiotics including MRSA coverage, debridement, and skin grafts. If treatment is not received promptly, more extensive debridement or amputation may be required (4).

CONCLUSION: There needs to be more education about Krokodil and its complications since it is rapidly gaining popularity in the drug culture. Though Krokodil has a similar euphoric affect as heroin, it causes more severe skin reactions at the injection site leading to rapid tissue destruction and systemic infections.

LATE POST-CRANIOPLASTY AND ALLOPLASTIC SKULL IMPLANT COMPLICATIONS

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LEARNING OBJECTIVE #1: Highlight the presentation of late post-cranioplasty infections and cerebrovascular complications.

LEARNING OBJECTIVE #2: Identify risk factors that make patients more susceptible to post-cranioplasty complications.

CASE: We present a 59-year-old woman with a history of coronary artery disease, smoking, hypertension, and right hemorrhagic stroke in 2014 complicated by left-sided sensory and motor deficits. At the time she underwent craniectomy with placement of right temporal-parietal skull implant. Six years later she presented with a week history of progressive swelling, headache, and purulent drainage from her implant site. Upon admission, her blood pressure was high in the 140-60's/60-80's. She had two purulent, erythematous wounds on the right superior forehead with exposed plate underneath. Labs showed an elevated WBC of 19.6, Hb of 15.6, and Hct of 47.1. CRP and ESR were elevated. She was started on vancomycin, metronidazole, and cefepime to cover subdural empyema and meningitis pathogens.

Upon workup, CT of the head showed a mixed density hematoma, subgaleal fluid collection, and right cerebral encephalomalacia. Neurosurgery did an incision and drainage of the right parietal scalp with implant removal and craniectomy. She had a subdural hematoma and epidural abscess growing MSSA, which were evacuated. She was subsequently treated for MSSA bacteremia and suspected osteomyelitis with cephazolin. She was eventually transferred to a skilled nursing facility due to complex wound care and physical rehabilitation needs.

IMPACT/DISCUSSION: Infections and cerebrovascular complications contribute to most readmissions after intracranial hemorrhage, however most happen within a year of operation. Our patient is unique in that she developed a prosthetic infection six years after her operation. There are few reports discussing late infections from cranioplasties. A study from Japan observed 14 patients who had implant infection about 10.5 months after cranioplasty. Most infections were staphylococcus, consistent with our patient. Most patients had infection secondary to scratching, whereas our patient denied any scratching or head trauma.

A retrospective study showed that preexisting conditions such as older age, hypertension, diabetes, hemorrhagic stroke, postcranioplasty hydrocephalus,

and previous neurological deficits can predict infection in patients who undergo cranioplasty. Out of these risk factors, our patient had hypertension, a hemorrhagic stroke, and baseline neurological deficits. This has clinical implications because it allows us to target treatment of modifiable risk factors, such as blood pressure or diabetes, after a cranioplasty.

CONCLUSION: Post-operative complications in patients who undergo craniectomy with cranioplasty can happen later than previously noted. Baseline risk factors can predict the likelihood of these complications. It is important to examine more patients with these late-presenting complications to assess how we can better decrease long-term rates of infection.

LEVAMISOLE CONTAMINATED COCAINE INDUCED VASCULITIS

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LEARNING OBJECTIVE #1: Recognize the clinical features and laboratory findings associated with cocaine induced vasculitis.

LEARNING OBJECTIVE #2: Assess and perform a detailed social history to diagnose cocaine induced vasculitis

CASE: A 31 yo F with PMHx significant for SLE (on Plaquenil) and Hepatitis C (treated) presents with a 3 day history of fever, body aches, and diffuse rash. The rash started on her upper and lower extremities and later spread to her trunk and face. She described the rash as being “deep purple in color” with associated “burning pain.” Additionally, she endorsed fevers of 101F and generalized malaise. On physical exam, she was tachycardic, tachypneic and febrile. A diffuse violaceous nonblanching purpuric rash was noted over her bilateral lower extremities, buttocks, and trunk with some areas of bullae formation. Labs demonstrated a normal white count and baseline normocytic anemia. Her liver and kidney function were WNL. Her CRP and ESR were elevated to 128 and 49, respectively. CXR unremarkable. She was ultimately admitted for suspected sepsis vs SLE flare and was started on IVFs and broad-spectrum antibiotics. Further work-up revealed normal C3 and C4 levels and positive p-ANCA. Her hepatitis panel was non-reactive. Cryoglobulins negative. Blood and urine cultures negative, thus antibiotics were discontinued. A urine drug screen resulted positive for cocaine and cannabinoids. Upon further history taking, the patient admitted to smoking and snorting cocaine 24-36 hours prior to symptom onset. She was started on high dose IV steroids and was later transitioned to an oral prednisone taper. The patient’s rash and overall discomfort improved almost immediately with steroid initiation. The patient refused skin biopsy, but based on normal complement levels, negative infectious work-up, non-reactive hepatitis panel, positive p-ANCA and UDS positive for cocaine, the diagnosis of cocaine-induced vasculitis was made. During her 1 month follow-up appointment, patient was feeling well with almost complete resolution of her rash, she also remained drug free. Unfortunately, 2 months later, patient had recurrent skin manifestations after snorting cocaine.

IMPACT/DISCUSSION: Levamisole is marketed as an anti-helminthic agent but is also known to contaminate over 70% of cocaine as it potentiates cocaine’s stimulant effects. This case highlights the classic clinical and laboratory findings associated with cocaine induced vasculitis: recurrent purpuric/hemorrhagic rash, p-ANCA positivity, low complement levels and a positive urine drug screen. Making this diagnosis can be difficult as vasculitides cover a broad differential, especially in a patient with underlying autoimmune disease.

CONCLUSION: Diagnosing cocaine induced vasculitis can be difficult; however, having a general awareness of the disease as well as performing a detailed social history will aid in diagnosis. In most cases, supportive care and drug cessation lead to resolution of symptoms.

LOOK OUT! AN ISOLATED CASE OF OCULOMOTOR PALSY

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LEARNING OBJECTIVE #1: Assess patients presenting with diplopia.

LEARNING OBJECTIVE #2: Recognize and manage oculomotor palsies.

CASE: A 34-year-old male with a history of pre-diabetes and gastric bypass surgery presented to the emergency room with a two-day history of sudden onset binocular diplopia. The patient denied any headaches, numbness, fatigable ptosis, eye pain, antecedent trauma, urinary or fecal incontinence. On examination, his vital signs were stable. His pupils responded appropriately to light with no afferent pupillary defect, and no ptosis was present. Extraocular movements revealed impaired left-sided adduction and infraction. A dilated fundus exam was unremarkable. Initial imaging (CT head, CTA head/neck) was unremarkable. Additionally, MRI, MRV, MRA head and MRI orbits, showed no evidence of ischemia, aneurysm, demyelination, thrombosis, or masses. Laboratory studies were only remarkable for evidence of pre-diabetes (A1c, 5.9). CBC, CMP, TSH, lipid panel, and inflammatory markers were all within normal limits. Additional tests for HIV, syphilis, sarcoidosis, myasthenia gravis, and Lyme disease were also negative. Ultimately, the patient was discharged on aspirin and a statin with a presumed diagnosis of a pupil sparing, partial third-nerve palsy caused by ischemic injury.

IMPACT/DISCUSSION: This case illustrates the importance of a complete ocular exam and workup when evaluating any patient with diplopia. When approaching diplopia, the first step is to determine whether it is monocular or binocular. Binocular diplopia resolves when either eye is covered, which was the case in this patient. Binocular diplopia warrants immediate CNS imaging, whereas monocular diplopia is non-urgent, often caused by refractive error or dry eye. Once an isolated third nerve palsy causing binocular diplopia is identified, it is essential to evaluate for pupillary involvement. Pupillary involvement may indicate a compressive etiology, most commonly a posterior communication artery aneurysm. Less common etiologies include tumors, trauma, leukemias, pituitary apoplexy, or cavernous sinus mass. Given our patient’s reactive pupils and unremarkable imaging, compressive etiologies were excluded. The most common cause of a pupil-sparing, isolated third nerve palsy is ischemic microvascular disease from diabetes or hypertension. Less common etiologies include giant cell arteritis and cavernous sinus syndrome (CSS), which were also part of the diagnostic workup. Similar presentations of an isolated third nerve palsy with a completely negative workup have not been reported to the best of our knowledge. Given his pre-diabetes and obesity, we believe ischemic injury, undetectable on imaging, was the most likely culprit.

CONCLUSION: • Binocular diplopia resolves when either eye is covered and warrants an immediate workup.

• CN III palsies are most commonly caused by ischemic injury even if imaging is unremarkable.

LOSING LIMBS TO COVID-19; A SEVERE CASE OF SECONDARY HLH AND THROMBOTIC MICROANGIOPATHY

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LEARNING OBJECTIVE #1: Recognize hyper-inflammatory syndrome due to COVID-19

LEARNING OBJECTIVE #2: Differentiate secondary hemophagocytic lymphohistiocytosis (sHLH) and TMA from anti-phospholipid syndrome (APLS)

CASE: 46-year-old female presented with one-week of chest pain and shortness of breath. She had no history of thrombosis or miscarriages. **Physical** exam revealed non-pitting edema of extremities along with mildly cyanotic toes but normal pulses. Admission lab work revealed white count $31 \times 10^3/\mu\text{L}$, hemoglobin 10.2 g/dL and platelet count $142 \times 10^3/\mu\text{L}$. Other lab abnormalities included acute kidney injury (AKI), lactic acidosis and D-dimer greater than 1700 FEUng/mL.

Patient refused a COVID-19 swab. CT chest showed bilateral interstitial infiltrates along with diffuse axillary, supraclavicular and mediastinal lymphadenopathy. She was empirically treated with broad-spectrum antibiotics. The next day, her mental status deteriorated and she had to be intubated for airway protection. MRI brain showed acute/sub-acute infarcts in the central pons. A subsequent viral panel returned positive for COVID-19. Later, her hemoglobin

acutely dropped to 7.0 g/dL and platelet count to $50 \times 10^3/\mu\text{L}$ in the absence of overt bleeding. She required vasopressor support. Further work-up revealed ferritin 8000 MCG/L and fibrinogen 82 mg/dL. Coagulation profile was concerning for disseminated intravascular coagulation (DIC). She received packed red cells and cryoprecipitate transfusions. Soluble interleukin-2 (IL-2) receptor levels was elevated at 17798 and triglycerides were 707 mg/dL. She received pulse dose steroids, IVIG and plasmapheresis for suspected cytokine storm.

Hypercoagulability testing revealed mildly positive anti-cardiolipin IgM at 17 MPL but otherwise unremarkable.

She underwent supra-clavicular lymph node biopsy that showed hemophagocytosis. She was started on methylprednisolone and etoposide for COVID-19 related hemophagocytic lymphohistiocytosis but was unable to tolerate chemotherapy beyond the first dose. She received 25 cycles of hyperbaric oxygen for gangrenous fingertips and toes since but declined amputation
IMPACT/DISCUSSION: The pathogenesis and clinical characteristics of severe SARS-CoV-2 infection are reminiscent of secondary HLH or a similar hyperinflammatory syndrome that's leads to aberrant activation of T cells, natural killer (NK) cells, and macrophages causing overproduction of inflammatory cytokines (i.e., the cytokine storm) and hemophagocytosis. These patients may also have transient elevations in anti-phospholipid antibodies of unclear significance that return to baseline on repeat testing, as was the case in our patient. Thrombotic microangiopathy leading to ischemic stroke and digit gangrene has been reported.

CONCLUSION: As a Hospitalist caring for COVID-19 patients, it is important to identify severe cases early who are at risk of decompensation and might be candidates for higher dose of steroids, IVIG, tocilizumab or other novel therapies to reduce hyper-inflammation and improve both morbidity and mortality

MAY-THURNER SYNDROME: A COMMON ANATOMIC VARIANT CAUSING AN UNCOMMON CASE OF BILATERAL DVT AND PHLEGMASIA ALBA DOLENS

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LEARNING OBJECTIVE #1: Recognize May-Thurner syndrome (MTS), or iliac vein compression syndrome, as an underdiagnosed cause of left iliofemoral deep venous thrombosis (DVT)

LEARNING OBJECTIVE #2: Understand the diagnosis and treatment of MTS

CASE: A 58-year-old male, never smoker, presented with 10 hours of sudden onset severe left leg and groin pain, radiating to the left foot. He had numbness, white blanching skin without cyanosis, and diminished distal pulses, which is classic for phlegmasia alba dolens. His only risk factor for DVT was a febrile illness attributed to pneumonia 10 days prior to presentation. He denied any other symptoms and vitals were normal. Ultrasound showed extensive occlusive DVT of left common femoral vein extending to the posterior femoral vein. Chest CT angiography showed left-sided distal PE. He was started on heparin. Venogram revealed the thrombosis of the bilateral iliac veins and severe stenosis of left common Iliac vein, confirming MTS. Angioplasty and stent placement in both common iliac veins with the confluence of the stent in the IVC, improved blood flow. The patient's symptoms resolved, and he was discharged on aspirin and rivaroxaban.

IMPACT/DISCUSSION: In MTS, the left common iliac vein is compressed against the 5th lumbar vertebrae by the right common iliac artery, causing stenosis and leading to thrombosis. This anatomic variant, along with a high aortic bifurcation, can lead to MTS and has an incidence of 22-24%. While most individuals with MTS anatomy are asymptomatic, the chronic pulsatile compression of left common iliac vein by the right common iliac artery may cause intimal thickening, fibrosis, and "venous spur" formation, eventually leading to venous stenosis and subsequently, DVT. MTS can present with left leg DVT (77%), chronic left leg swelling, venous insufficiency skin changes, and thrombophlebitis. Few cases are reported with acute PE, right-sided DVT, bilateral DVTs (2%- 5%), priapism, iliac vein rupture, or cryptogenic stroke with patent foramen ovale. Very few cases reported MTS-related DVT with

phlegmasia cerulea dolens. Apart from DVT risk factors, MTS-related DVT is associated with febrile illness, scoliosis, and amyotrophic lateral sclerosis. MTS-related DVT is classically seen in young females with isolated left lower extremity DVT. Our patient had an interesting presentation with no risk factors, bilateral DVTs, and phlegmasia alba dolens. Venography is the gold standard diagnostic test for MTS. The mainstay of treatment is thrombectomy, repair of the anatomical defect with stent placement and anticoagulation for at least 6-12 months.

CONCLUSION: MTS is an underrecognized clinical condition in primary care medicine and it is crucial to consider it in patients with left lower extremity DVT. Failure to detect MTS in symptomatic patients can lead to recurrent DVT, PE, post-thrombotic syndrome, and iliac vein rupture with significant morbidity and mortality.

MECHANICAL BOWEL OBSTRUCTION DUE TO FECALITH

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LEARNING OBJECTIVE #1: Usually considered a benign condition, enlarging fecaliths may lead to severe bowel obstruction, requiring urgent endoscopic or surgical removal.

LEARNING OBJECTIVE #2: Timely recognition and prompt treatment are crucial to prevent life-threatening complications like bowel wall ischemia and perforation.

CASE: A 44-year-old man with type 2 diabetes mellitus and chronic constipation, presented to the emergency department with cramping abdominal pain, profuse watery diarrhea, and vomiting for 1 day. He had been having intermittent diarrhea for several weeks and had not passed any well-formed stool in over a month. On physical examination, abdomen was soft, distended and diffusely tender with increased bowel sounds. Laboratory findings were unremarkable.

Computed tomography (CT) of the abdomen showed large calcified mass in the rectum, measuring about 8x8x9 cm. There was associated colonic obstruction with dilated sigmoid and descending colon, thickening of bowel wall consistent with stercoral colitis, and markedly distended urinary bladder. A rectoscopic examination under general anesthesia showed a rock hard fecalith, causing near-complete obstruction of rectal lumen. The fecalith was fractured manually and extracted in a piecemeal fashion. Patient did well post-operatively and was discharged 2 days later with a bowel regimen.

IMPACT/DISCUSSION: Fecaliths, accumulation of hardened stool, are uncommon in general population, but frequently reported in patients with diseases of enteric nervous system (e.g., Hirschsprung's disease, Chaga's disease), inflammatory bowel disease, chronic constipation, neuropsychiatric diseases and elderly patients. Patients may present with fecal incontinence, abdominal distention and pain, paradoxical diarrhea and stercoral ulceration. Severely enlarging fecaliths may lead to bowel obstruction and extra-luminal compression leading to obstructive uropathy. Most common sites of involvement include descending colon and rectum. Prolonged and progressively worsening obstruction may lead to life-threatening complications like bowel wall ischemia and perforation.

Nearly one-fourth of fecaliths are identified as radio-opaque on CT, and appear as smooth, rounded mass with intact mucosal markings, often simulating a neoplasm. Initial management of fecaliths include conservative measures like laxatives, enemas, low-residue diet and digital impaction. If conservative measures are unsuccessful, fecalith is broken down through colonoscopic methods such as water jet and mechanical lithotripsy, prior to their endoscopic or surgical removal. Fragmentation is performed to prevent injury to the anal sphincter due to removal of giant fecalith in one piece. Electrohydraulic lithotripsy has also been recommended as an effective and safe adjunctive procedure for removal of large calcified fecaliths.

CONCLUSION: Fecaliths, usually benign, can lead to severe obstructive and compressive symptoms. Early recognition and treatment can help prevent life-threatening complications like bowel ischemia and perforation.

MEDIASTINAL HEMATOMA, A COMPLICATION OF CENTRAL VENOUS CATHETERIZATION

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LEARNING OBJECTIVE #1: Recognizing rare complications of central venous catheter placement like mediastinal hematoma

LEARNING OBJECTIVE #2: Knowing about management options and prognosis of mediastinal hematoma.

CASE: A 63-year-old African American male with decompensated liver cirrhosis due to acute alcohol intoxication presented to the hospital with new onset seizures and shock. Patient was intubated on presentation. He was managed for acute decompensated liver cirrhosis, associated thrombocytopenia and hepatorenal syndrome. Initially during the hospital course, patient required ventilatory and vasopressor support, for which a central venous line (CVL) was placed without complications. After a few days, patient showed improvement and the CVL was removed. But he decompensated again after a couple of days, with worsening hepatorenal syndrome, complicated by infection and encephalopathy. Patient was reintubated and needed an urgent central venous access. Platelet were at 16000/ uL(normal range 140000-400000/ uL) before the procedure. A central venous catheter was successfully placed but an immediate post-procedure chest x-ray showed a widened mediastinum. A CT scan of the chest without contrast showed a mediastinal hematoma with no tracheal compression. The CVL was promptly removed and vascular surgery recommended close monitoring of the hematoma with daily chest x-rays and hemoglobin. No further expansion of the hematoma was noticed in the days to follow but given his overall worsening prognosis, comfort measures were opted by the patient's family and he soon passed away.

IMPACT/DISCUSSION: CVL placement is a common hospital procedure associated with multiple complications like infection, bleeding from insertion site, misplacement into neighboring vessels, thrombosis, arterial injuries and pneumothorax. Mediastinal hematoma is a rare complication, which is usually iatrogenic, especially in the setting of urgent access. Most likely injured vessel is the jugular or subclavian vein, and occasionally at the junction of superior vena cava. Our patient had previous central line placement at the same site, severe thrombocytopenia, multiple comorbidities with end stage kidney and liver disease which are all considered risk factors for a mediastinal hematoma. Urgent diagnostic imaging and immediate stabilization with mechanical ventilation, blood products, vasopressors are essential to improve overall prognosis. Mediastinal hematoma can be managed conservatively, or with surgical interventions like arterial coil embolization or thoracotomy depending on the severity. Mediastinal hematoma needs immediate assessment as it is associated with a poor prognosis.

CONCLUSION: Our case provides evidence that although CVL placement is necessary for patient survival it can rarely cause life-threatening complications that can further deteriorate patient's condition and overall prognosis, regardless of existing comorbidities.

MICROSCOPIC POLYANGIITIS WITH RENAL, PULMONARY AND CARDIAC INVOLVEMENT

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LEARNING OBJECTIVE #1: Evaluate the use of diagnostic criteria for MPA

LEARNING OBJECTIVE #2: Recognize the clinical manifestations of MPA

CASE: A 60 year-old female with history of hypertension and hospitalization for pneumonia two months prior to presentation, presented with a 1-day history of altered mentation and slurred speech. The patient was accompanied by her son who said her last known normal was the evening prior. On arrival to the hospital, her physical examination was significant for mild hypertension, tachycardia, aphasia and dry crackles in bilateral lung bases. Brain imaging

was negative and laboratory data showed a hemoglobin of 9.0 g/dL, creatinine of 3.54 mg/dL (baseline 1.3), BUN of 98 mg/dL, a troponin of 0.122 ng/mL. Chest x-ray demonstrated diffuse patchy interstitial coarsening, honeycombing and extensive chronic lung disease and ECG showed ST elevations in inferior lateral leads. Cardiac catheterization was performed which did not demonstrate acute coronary occlusion and source of ST elevation and troponin rise was believed to be uremic pericarditis. The patient underwent hemodialysis with resolution of encephalopathy. The patient also reported odynophagia, dyspnea, wrist pain and swelling. Autoimmune serologies were positive for anti-RO 53 and ANCA Ig G 1:2560. ANA titer was < 1:40 and C3/C4 were normal. Creatinine showed improvement to 2.32 mg/dL and patient underwent renal biopsy confirming pauci-immune glomerulonephritis with cellular crescents and segmental scarring. She was started on high-dose steroids and rituximab with transient improvement of symptoms.

IMPACT/DISCUSSION: Microscopic polyangiitis (MPA) is an ANCA-associated vasculitis referring to a blood protein that attacks self-tissue, characterized by inflammation of the blood vessels and damage to vital organs. A review of literature identifies a wide range of clinical presentations commonly involving cutaneous, pulmonary and renal findings. Our case demonstrated an acute presentation of MPA with altered mental status and uremic pericarditis. Using the latest recommendations, autoimmune serologies and histopathological findings were utilized for diagnosis. Although the patient did not relate a history of pulmonary or renal disease, the patient had recently been admitted for pneumonia and didn't appear to have had evaluation for the chronic pulmonary findings on imaging. Early diagnosis and treatment are required for favorable prognosis of MPA. Treatment is divided into induction and maintenance with combination of corticosteroids and immunosuppressants such as rituximab or cyclophosphamide.

Upon confirmation of diagnosis, our patient was initiated on treatment with improvement of symptoms.

CONCLUSION: The recognition of autoimmune vasculitis and timely specific treatment are essential to prevent multiorgan failure. This case demonstrates the rapid presentation of symptoms and extensive destruction of pulmonary and renal function commonly found in MPA.

MPGN: AN EXTRAGLANDULAR MANIFESTATION OF PRIMARY SJÖGREN'S SYNDROME

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LEARNING OBJECTIVE #1: Recognize Primary Sjögren's syndrome as non-HCV related cause of MPGN with mixed cryoglobulinemia

LEARNING OBJECTIVE #2: Consider Rituximab and high-dose steroids as treatment for MPGN with mixed cryoglobulinemia secondary to Primary Sjögren's syndrome

CASE: A 62-year-old Caucasian female with hypertension and Primary Sjogren's syndrome presents for work-up of oliguric acute kidney injury (AKI) and new onset heart failure with reduced ejection fraction (HFrEF). The patient's clinical course began with fever up to 102.7 F, fatigue, nausea, shortness of breath and productive cough, prompting admission to a local hospital for presumed acute bronchitis and treated with levofloxacin. She was readmitted to local hospital with worsening symptoms found to have uptrending Cr from 1.4 g/dL to 2.6 g/dL, proteinuria. Chest CT with ground glass opacities and patchy infiltrates, unrevealing renal ultrasound, and echocardiogram with ejection fraction of 20-30%, indicating a new diagnosis of HFrEF. Despite diuresis and antibiotics, she worsened and was transferred for renal biopsy.

On transfer admission, she was hemodynamically stable. Labs with worsening Cr 3.4 mg/dl, hematuria and nephrotic range proteinuria, hypocomplementemia. Other infectious and immunologic workup negative. Renal biopsy revealed MPGN morphology with cryoglobulinemic morphological features secondary to Sjogren's syndrome and evidence of acute interstitial nephritis, although serum cryoglobulins negative. She was treated with mini-pulse dose steroids and Rituximab. Over the course of her treatment, renal function recovered and EF normalized.

IMPACT/DISCUSSION: Membranoproliferative glomerulonephritis (MPGN) describes a glomerular pattern of injury characterized by proliferation of mesangial cells with thickening of the glomerular capillary wall. MPGN may be complement or immune-complex mediated. MPGN generally occurs secondary to chronic infection, most commonly hepatitis C virus (HCV) and less so, autoimmune conditions. Primary Sjögren's syndrome, an inflammatory autoimmune condition characterized by chronic lymphocytic infiltration of exocrine glands, may have extra glandular involvement in a small percentage of patients (3-4%), including MPGN. Current treatment guidelines for cryoglobulinemic glomerulonephritis include steroids and/or cytotoxic agents. However, Rituximab, a chimeric monoclonal antibody against the CD20 antigen on B cells, has been emerging as a treatment option for autoimmune conditions, such as this one.

CONCLUSION: Primary Sjögren's syndrome is well known to impact quality of life by its effect on exocrine glands, however some extraglandular manifestations exist, including MPGN. When a patient with Primary Sjögren's syndrome presents with a clinical picture concerning for glomerulonephritis, consider MPGN and obtain a renal biopsy. Rituximab and steroids are reasonable therapeutic agents for MPGN with mixed cryoglobulemia secondary to Primary Sjögren's syndrome.

MUSCLE CRAMPS, DYSPHAGIA, AND VITAMIN DEFICIENCIES; AN UNUSUAL PRESENTATION OF MONONEURITIS MULTIPLEX DUE TO MICROSCOPIC POLYANGIITIS

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LEARNING OBJECTIVE #1: Recognize the complex presentation of mononeuritis multiplex, including cranial nerve and oral involvement, in association with antineutrophil cytoplasmic antibody (ANCA) associated vasculitis (AAV)

LEARNING OBJECTIVE #2: Investigate vitamin deficiencies in the work up of AAV

CASE: A 79-year-old woman with a past medical history of hypothyroidism, hypertension, hyperlipidemia, and carotid artery disease, presented with a 3-month history of lower extremity weakness with gait instability, dysphagia, change in tongue sensation, and 15-pound weight loss. She was trialed on corticosteroids for presumed polymyalgia rheumatica, and her statin was discontinued for potential myopathy. Neither intervention provided symptomatic relief. She underwent workup for dysphagia with oral sensory changes including endoscopy, laryngoscopy, and allergy testing without notable findings, and was admitted for further evaluation. On physical exam, she had diminished proprioception and light touch sensation in her right foot, migratory muscle pain, and dysarthria. Workup demonstrated elevated inflammatory markers, polyclonal gammopathy on SPEP, hypoalbuminemia and proteinuria. She was found to have vitamin A, B1, B6, B9, C and D deficiencies. Further workup was significant for the detection of MPO-ANCA. Sural nerve and gastrocnemius muscle biopsies confirmed a diagnosis of microscopic polyangiitis (MPA). She was started on high dose corticosteroids and rituximab with mild improvement.

IMPACT/DISCUSSION: Weakness and dysphagia are common symptoms encountered by internists. Understanding the diverse etiologies is helpful for clinical practice. Peripheral nervous system involvement is a common feature of AAV and present in ~40% of cases, most often presenting as mononeuritis multiplex. CNS involvement, with cranial nerve palsy, is seen in only 4.7-6% of patients with granulomatosis with polyangiitis (GPA), a type of AAV. This most commonly affects CN II, VI, and VII. Lower cranial nerve involvement (CN IX-XII) is extremely rare. It has been described in a case report of GPA that presented with dysphagia. Our patient's early symptoms of dysphagia and dysarthria are concerning for AAV-related pathologic changes and would be one of the first times lower cranial nerve involvement was observed in MPA. Additionally, our patient was found to have numerous vitamin deficiencies. The protective effect of vitamin D levels in AAVs has been previously demonstrated. However, there is a dearth of literature on other vitamin deficiencies and association with AAVs.

CONCLUSION: 1) Diagnose the complex and varied presentation of mononeuritis multiplex in association with antineutrophil cytoplasmic antibody (ANCA) associated vasculitis (AAV)

2) Recognize the presentation of cranial nerve and oral involvement in the diagnosis of mononeuritis multiplex

3) Investigate vitamin deficiencies in the work up of AAV

MYELOID SARCOMA: AN UNUSUAL PRESENTATION OF A RARE DISEASE THAT CAN MIMIC COMMON ENTITIES

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LEARNING OBJECTIVE #1: Myeloid sarcoma is an important diagnostic consideration for patients with existing acute myeloid leukemia, myelodysplastic syndrome, and myeloproliferative disorders with a secondary tumor mass.

LEARNING OBJECTIVE #2: Myeloid sarcoma is a rare disease that can have highly variable presentation and organ involvements.

CASE: A 73-year-old man with history of myelodysplastic syndrome complicated by chronic pancytopenia presented with dyspnea on exertion, productive cough, and night sweats for three weeks. He was prescribed empiric levofloxacin two weeks prior to admission without improvement of his symptoms. His vital signs and physical exam on admission were within normal limits. Basic laboratory work up revealed baseline pancytopenia. Bone marrow biopsy immediately prior to presentation revealed 17% blasts. Computed tomography of the chest showed multifocal areas of nodularity with surrounding ground glass opacity. Extensive infectious work up including bronchoscopy failed to isolate any pathogens. Lung biopsy with wedge resection ultimately revealed myeloid sarcoma on histopathologic examination. A diagnosis of transformation to acute myeloid leukemia was made and he was started on targeted chemotherapy.

IMPACT/DISCUSSION: Myeloid sarcoma is an extramedullary tumor mass consisting of myeloid blasts. It is believed to be a rare variant of acute myeloid leukemia and can be de novo or secondary with antecedent hematologic malignancy such as myelodysplastic syndrome or myeloproliferative neoplasm. The most common sites include skin and soft tissue, lymphatic system, the gastrointestinal genitourinary system and the nervous system. Pulmonary involvement such as in our patient is exceedingly rare. In our patient, because his subacute but progressive symptoms as well as abnormal chest imaging findings were deemed consistent with opportunistic infections of fungal or mycobacterial origin, much of the initial work up was focused on isolating a pathogen. Myeloid sarcoma was not suspected until the histopathological result was available from the diagnostic surgical procedure. Because of its rarity, most of the available literature remain case studies and small case series. The diagnosis of myeloid sarcoma is challenging and often require a high level of suspicion and recognition that it is an entity with variable presentations especially when it involves atypical or multiple sites. While there are no large studies analyzing prognostic factors in patients with myeloid sarcoma, recognition for the need to identify biomarkers of prognostic and therapeutic significance is rising.

CONCLUSION: Myeloid sarcoma is an entity that is rare and challenging to diagnose. It is an important diagnostic consideration for patients with existing acute myeloid leukemia, myelodysplastic syndrome, and myeloproliferative disorders with a secondary tumor mass.

MYSTERY OF THE DISAPPEARING CHANNELS: A RARE PRESENTATION OF DRUG INDUCED LIVER INJURY

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LEARNING OBJECTIVE #1: Identify drug induced liver injury and culprit medications, and interpret patterns of abnormal liver function tests (LFTs) to order appropriate work-up.

LEARNING OBJECTIVE #2: Describe and diagnose vanishing bile duct syndrome

CASE: 50-year-old male with stage 3 melanoma stopped pembrolizumab after 5 cycles due to severe autoimmune proctitis. He started prednisone and infliximab for the proctitis. 3 weeks later he developed pruritus, fatigue, and mixed pattern elevated LFTs: AST 21 U/L, ALT 25 U/L, ALP 73 U/L and total bilirubin 1.8 mg/dL when infliximab was started; AST 627 U/L, ALT 1408 U/L, ALP 579 U/L and total bilirubin 16.1 mg/dL after 3 weeks. Viral and autoimmune hepatitis panels were normal, and MRCP showed normal liver and bile ducts. Liver biopsy showed hepatocellular injury plus loss of > 50% of bile ducts, diagnostic of vanishing bile duct syndrome (VBDS), likely drug induced liver injury (DILI) from infliximab or pembrolizumab. Despite initial improvement in LFTs off infliximab, his alkaline phosphatase rose again while on high dose prednisone, and patient unsuccessfully sought evaluation for liver transplant.

IMPACT/DISCUSSION: DILI is a diagnosis of exclusion, and can mimic virtually any form of liver disease - acute/chronic hepatitis, cirrhosis and/or biliary obstruction. It usually results in a massive rise in LFTs, the etiology of which can often be confused with ischemic, viral, and autoimmune hepatitis. Some of the most common culprit drugs include antibiotics, allopurinol, statins, and anti-epileptics. VBDS is a rare presentation of DILI, and very few cases are reported with infliximab or immune checkpoint inhibitors like pembrolizumab. It results in destruction of the biliary tree, leading to severe cholestasis days to months after exposure of the offending agent. Although it often presents with pruritus and fatigue, seldom, immunologic features may be present, including fever, facial edema, and eosinophilia. Diagnosis is made by liver biopsy with loss of more than half of bile ducts in ≥ 10 visualized portal triads. Emergent management includes steroids +/- mycophenolate and ursodiol. Prognosis is dependent on the degree of epithelial regeneration; if the disease progresses despite adequate treatment, liver transplant is the ultimate option.

CONCLUSION: DILI is the leading cause of acute liver failure in the US, and an increasingly common cause of hospital admissions; and one should be vigilant of the common causes of acute liver injury, including viral and ischemic hepatitis, and drug overdose. An uncommon subtype of DILI, VBDS is a rare but serious side effect of drugs like infliximab and pembrolizumab, presenting with elevated LFTs and cholestasis from widespread ductal destruction. With the growing literature citing more cases of DILI from these agents, it is crucial that these cases be written up and shared to enhance awareness.

NECROTIZING PNEUMONIA CAUSED BY STREPTOCOCCUS CONSTELLATUS IN A MALE PATIENT WITH POOR DENTITION

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LEARNING OBJECTIVE #1: Manage a patient with necrotizing pneumonia caused by a *Streptococcus milleri* group member

LEARNING OBJECTIVE #2: Identify the importance of dental hygiene in disease prevention **CASE:** Our patient was a 55-year-old male with history of hypertension, COPD & tobacco use who presented with 3 weeks of shortness of breath & dry cough. He also complained of fever, chills & 6 months of unintentional weight loss. Concerns around COVID delayed presentation.

On presentation, he was tachycardic, febrile & mildly hypoxic requiring supplemental oxygen. He had marked leukocytosis, elevated lactate & procalcitonin with negative blood cultures. Chest xray showed pneumonia with possible empyema. CT PE showed complex multiloculated masslike consolidation replacing the left lower lobe with areas of cavitation suspicious for infectious versus neoplastic process.

Extensive smoking history & substantial weight loss placed neoplastic process high on the differential. He also reported exposure to asbestos & refrigeration materials implicated in lung disease. He denied prior incarceration, TB exposure, significant travel, recreational activity or HIV.

Initial antibiotic regimen included ceftriaxone, metronidazole & azithromycin. Bronchoscopy was attempted, though worsening desaturation prevented completion. Though there was insufficient sample for cytology, culture showed *S.constellatus*. He admitted to poor dental

hygiene, confirmed on pantomogram. Induced sputum cultures showed no malignant cells.

He continued produce cement-like secretions & had difficulty weaning from oxygen. Vancomycin was added on day 4 for MRSA coverage, then discontinued on day 10. A chest tube was placed days 7-9 after repeat CT showed minimal improvement. Ceftriaxone/metronidazole/azithromycin was changed to ampicillin/sulbactam on day 9. He improved clinically & was discharged with 4 weeks of ertapenem on day 11.

CT scan 5 weeks post-discharge showed improvement, but not resolution, of pneumonia. After an ertapenem course, 14 days of amoxicillin/clavulanate was added. Six weeks post-discharge in the outpatient clinic symptoms had resolved, he had gained weight & reduced smoking. He was also actively seeking a dentist.

IMPACT/DISCUSSION: *S. constellatus*, *S. intermedius* & *S. anginosus* are anaerobes belonging to the *Streptococcus milleri* group, also known as the *S. anginosus* group. These are often contaminants rather than pathogenic organisms. Deep in the respiratory tract, however, their penchant to form abscess & empyema make them difficult to treat & drainage is often necessary, as seen in this patient. Surgery may be needed to unroof lesions for source control. *S. constellatus* has been implicated in odontogenic & intra-abdominal diseases and has worst outcomes in males with multiple comorbidities.

CONCLUSION: - Pneumonia caused by members of the *S. milleri* group are likely to form abscesses or deep infections that often require prolonged antibiotics courses & drainage - Good dental hygiene is important in preventing such infections

NITROFURANTOIN-INDUCED AUTOIMMUNE HEPATITIS

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LEARNING OBJECTIVE #1: Assess subacute to acute hepatocellular liver injury

LEARNING OBJECTIVE #2: Diagnose autoimmune hepatitis (AIH) and autoimmune-like drug-induced liver injury (AI-DILI)

CASE: A 37-year-old woman presented with a 10-day history of epigastric pain and jaundice. She also developed diffuse maculopapular rash 5 days prior to the presentation that rapidly resolved with diphenhydramine. Her past medical history was only significant for frequent urinary tract infections for which she took postcoital nitrofurantoin for the past 3 years. She denied alcohol or illicit drug use. Her lab showed ALT and AST >1000uL, total/direct bilirubin 12.0/7.8mg/dL, normal alkaline phosphatase. Abdominal ultrasound and CT showed a heterogenous liver without other abnormalities. Viral hepatitis and HIV serology, EBV and CMV PCR, blood acetaminophen and ethanol level, and celiac disease serology were negative. Ceruloplasmin level and a1-antitrypsin level were normal. Iron study showed Fe 242, TIBC 336, Fe saturation 72%, ferritin 2096. HFE gene mutation was negative. Autoimmune workup showed ANA 1:320 with homogenous pattern and slightly elevated total IgM, but otherwise unremarkable (negative c-ANCA, p-ANCA, Anti-smooth muscle Ab, Anti-M2 mitochondrial Ab, Liver/Kidney Microsomal Ab, and Soluble Liver Ag, normal IgA and IgG level). Liver biopsy showed diffuse lymphoplasmacytic inflammatory infiltrate and areas of bridging and acinar necrosis, consistent with subacute, severely active autoimmune hepatitis with early fibrosis. The final diagnosis was AIH, likely induced by nitrofurantoin. Nitrofurantoin was stopped. She was treated with high-dose prednisone (1mg/kg/day) with taper. Her liver enzyme down-trended close to normal 1 week after initiation of treatment.

IMPACT/DISCUSSION: This case describes liver injury secondary to AIH. Her chronic exposure to nitrofurantoin, concomitant maculopapular rash, and rapidly improved liver function tests after the discontinuation of nitrofurantoin make AI-DILI more likely than de novo AIH. Differentiating AI-DILI from de novo AIH is challenging due to their similar clinical presentation, autoimmune profile, and pathological features. Hence, a thorough history and medication review are pivotal for recognizing the inciting agent and making the diagnosis. It is also important to recognize the elevated ferritin as an acute phase reactant in the setting of active inflammation, as opposed to falsely diagnosing the patient with hemochromatosis which may prematurely block further diagnostic

workups and appropriate treatment. In addition to discontinuation of the offending agent, early start of high-dose steroid is essential in preventing disease progression and liver failure.

CONCLUSION: AI-DILI is a rare disease that causes liver injury and it is challenging to distinguish from de novo AIH. Careful history taking is essential for diagnosis. The offending medication should be discontinued, and steroids should be promptly given to prevent acute liver failure.

NON-PARANEOPlastic LIMBIC ENCEPHALITIS MASQUERADING AS HERPES ENCEPHALITIS

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LEARNING OBJECTIVE #1: The association between the Herpes Simplex Virus infection and Non-Paraneoplastic limbic encephalitis.

LEARNING OBJECTIVE #2: To emphasize on early work up for Autoimmune encephalitis in a healthy individual when presented with altered mental status.

CASE: A 46-year-old hardworking Caucasian male presented with fever of 103F and altered mental status. Examination revealed no other focal neurological deficits except for confusion and slight disorientation. Initial Brain imaging revealed abnormal signal within the medial temporal lobe concerning for herpes encephalopathy. CSF studies revealed an elevated protein of 59 mg/dl, RBCs with lymphocytic pleocytosis and positive HSV-1 PCR confirming the diagnosis of HSV encephalitis and High dose IV Acyclovir immediately. During four weeks of the initial treatment phase, the patient showed signs of positive response in the form of mild improvement with confusion, but when there is a sign of new symptom – short term memory loss, the uncommon possibilities were taken into account. Repeat MRI showed increased abnormal signal involving bilateral mesial temporal lobes and cingulate cortices with some developing encephalomalacia. With CSF studies unveiling Anti-NMDA receptor antibodies this time, the diagnosis of Limbic encephalitis is obvious directing to more specific therapy with high dose steroids and plasmapheresis for 5 sessions. Meanwhile, the patient underwent multiple diagnostics ruling out solid malignancy. There have been some improvements in terms of better memory during the 4 weeks follow up.

IMPACT/DISCUSSION: The mechanisms of Limbic encephalitis were known to be either idiopathic or paraneoplastic. There have been proven associations of certain malignancy like teratoma, small cell lung carcinoma with this disease. As per literature, the idiopathic type most often was tested positive of HSV encephalitis in the early stages along with brain imaging revealing abnormality involving temporal lobes, which again characteristic of HSV encephalitis. Even CSF analysis are inconclusive to differentiate between both in terms of elevated protein and lymphocytic pleocytosis unless the autoimmune antibodies like Anti-Hu, Anti-NMDA, Anti- Ma2 were specifically looked for. The treatment for Limbic encephalitis focuses on slowing down the pathological process and filtering the causal antibodies out of the circulation. High dose steroids are the initial step, but plasmapheresis is a more focused therapy. Other options include Rituximab and cyclophosphamide which are immunomodulators to decrease the production of such antibodies. If treatment is initiated in the early stages, there have been reports stating complete resolution of symptoms within two years. However, there have been some reported unfortunate situations with irreversible brain damage reported in the literature.

CONCLUSION: This case highlights the importance of early diagnosis and treatment which ultimately led to better recovery which is not appreciated in many other cases where the damage becomes irreversible.

NON-TRAUMATIC RUPTURE OF THE BLADDER POST-EMBOlIZATION: AN UNUSUAL CASE

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LEARNING OBJECTIVE #1: Diagnose urinary bladder rupture post embolization

LEARNING OBJECTIVE #2: Recognize the difference in the management of extraperitoneal and intraperitoneal bladder rupture

CASE: A 75-year-old female with a history of coronary artery disease, aortic valve replacement on warfarin, and congestive heart failure (CHF) was initially admitted for acute CHF exacerbation. She was anemic with hemoglobin (Hb) of 7.5 g/dL, which led to exacerbation of underlying CHF. Her International Normalized Ratio (INR) was 5.7 and the hemocult test was positive. Thus, warfarin was discontinued and vitamin K was administered. Colonoscopy revealed diverticulosis and mucosal ulceration. Heparin was later initiated, in view of the mechanical valve, to bridge to therapeutic warfarin. Within a few days, she developed severe abdominal pain and her Hb dropped from 8.8 g/dL to 7.3 g/dL with a concurrent drop in blood pressure, concerning for hemorrhagic shock. Computed Tomography Angiography (CTA) Abdomen/Pelvis revealed an interconnected rectus sheath and pelvic hematoma with active extravasation from the right corona mortis artery and right inferior epigastric artery. She underwent embolization of both the arteries. The next day, she developed worsening abdominal pain with difficulty voiding and new-onset gross hematuria. Despite Foley catheter placement, hematuria worsened, therefore CT Cystogram was done, which showed extravasation of the contrast and free air, consistent with extraperitoneal bladder rupture. The Foley catheter was upsized to destress the bladder, which led to eventual resolution of hematoma confirmed by repeat imaging. Her warfarin was restarted after complete resolution of hematuria.

IMPACT/DISCUSSION: Urinary bladder ruptures usually result from blunt/penetrating trauma or iatrogenic causes, like surgery. Non-traumatic, or spontaneous, bladder ruptures are extremely rare. There are a few case reports on spontaneous intraperitoneal rupture of the bladder as a result of radiotherapy and atheroembolism. However extraperitoneal bladder rupture in the setting of arterial embolization is extremely rare. Direct pressure and consequent vascular compromise from a large hematoma to the weakest part of the bladder, ischemia secondary to the embolizing agent escaping to arterial branches supplying a localized area of the bladder, or a combination of both are possible explanations in our case. Common symptoms include abdominal pain, distention, and voiding difficulty. Diagnosis can be challenging, as routine CT scans often miss the diagnosis, with CT Cystogram considered the gold standard for imaging. Intraperitoneal rupture is treated with surgical exploration and repair while extraperitoneal is usually managed conservatively by catheter placement, as seen in our case.

CONCLUSION: Although spontaneous rupture of the urinary bladder is rare and difficult to diagnose, high clinical suspicion is warranted as a delay in diagnosis can lead to severe complications such as sepsis and eventual death.

NORMOCALCEMIC NORMOMAGNESEMIC TETANY FOLLOWING THYROIDECTOMY RESOLVED BY CALCIUM INFUSION

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LEARNING OBJECTIVE #1: Recognize tetany despite normal serum and ionized calcium levels in a post-thyroidectomy patient.

LEARNING OBJECTIVE #2: Recognize clinicians' limitations in accurately measuring functionally active intracellular calcium.

CASE: A 28 year old man with a recent diagnosis of metastatic papillary thyroid cancer s/p total thyroidectomy and bilateral central neck dissection presented on post-op day 2 with perioral numbness, nausea, and weakness. His presenting physical exam was positive for Chvostek sign and Trousseau sign, both indicative of hypocalcemia. Serum calcium was found to be normal at 10.4 mg/dL. Ionized calcium was also found to be normal at 1.15 mmol/L. His serum magnesium was normal at 1.8, and his venous pH was normal at 7.40. Parathyroid hormone (PTH) was found to be low at 9.5 pg/mL, compared to a value of 18 pg/mL prior to discharge post-surgery. Repeat labs the next day showed a lower PTH value of 5.1 pg/mL, however, the patient's calcium levels

continued to be within normal range with a serum value of 10.0 mg/dL and an ionized value of 1.33 mmol/L. The patient's symptoms completely resolved after being given 2 grams of intravenous calcium, and he was subsequently discharged from the hospital. There was no recurrence of tetany during the follow up period of 1 year.

IMPACT/DISCUSSION: Tetany is usually caused by hypocalcemia, hypomagnesemia, and alkalosis. Our patient had clinical signs of tetany despite normal serum and ionized calcium, as well as normal serum magnesium levels and no respiratory alkalosis. Tetany resolved with intravenous calcium replacement.

Intracellular calcium is a crucial regulator of cellular functions including neuromuscular contraction. Total body calcium can be divided into 3 main reservoirs: 40% is the protein bound, biologically inactive fraction, 10% is in ionic complex form such as citrate and bicarbonate, and the remaining 50% is the ionized, biologically active form. Extracellular calcium provides a steady source for intracellular, biologically active calcium, and PTH has been shown to elevate intracellular calcium. However, the converse is also true. A study involving 15 patients with hyperparathyroidism, 9 of whom underwent parathyroidectomy, showed that there was a sharp decrease in intracellular calcium after parathyroidectomy which was strongly correlated with the decrease in PTH levels, but not with the decrease in total serum calcium.

We hypothesize that the drop in PTH levels following parathyroidectomy in our patient led to intracellular hypocalcemia, resulting in increased neuromuscular excitability; a condition called normocalcemic tetany.

CONCLUSION: Clinicians should be vigilant of symptomatic hypocalcemia in patients with recent thyroidectomy despite having normal serum and ionized calcium. PTH acts as a facilitator of calcium entry into cells, and in a hypoparathyroid state, this may result in intracellular hypocalcemia leading to increased neuromuscular excitability and tetany.

NOT ALL VOLUME OVERLOAD IS HEART, LIVER, RENAL FAILURE

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LEARNING OBJECTIVE #1: Recognize that volume overload is not limited to heart, liver, or renal failure.

LEARNING OBJECTIVE #2: Diagnosis of protein-losing enteropathy requires specific stool and serum samples.

CASE: A 68-year-old man with morbid obesity, hypertension, diabetes mellitus presented with dyspnea on exertion for one week and bilateral lower extremity edema for two weeks. He denied a precipitating event, change of medications, or sick contacts. Given his risk factors and poor echo showing normal left ventricular function and size, he was treated for a working diagnosis of heart failure with preserved ejection fraction.

One month later, he presented with worsening volume overload with new ascites, refractory to Lasix 40mg twice daily. On re-admission, pertinent labs were BNP 119, albumin < 2, protein/creatinine ratio 565mg/g, and normal LFTs. CT abdomen/pelvis without contrast showed ascites, bilateral pleural effusions, and unremarkable liver. Liver biopsy showed no evidence of cirrhosis. Given the non-nephrotic range proteinuria, normal cardiac and liver findings, patient was evaluated for gastrointestinal losses of albumin. A 24-hour stool alpha 1-antitrypsin (A1A) sample was elevated at 320 mg/dl (ref range: < 55 mg/dL). He was lost to follow up before a diagnosis of protein-losing enteropathy could be confirmed.

IMPACT/DISCUSSION: Protein-losing enteropathy (PLE) is a diagnosis that should be considered for patients who present with gross edema in the absence of signs of heart, renal, or liver failure. [1] It is an umbrella term for any gastrointestinal process that causes gut loss of protein large enough to reduce serum albumin. There are three main groups of disease processes: erosive (e.g. Crohn's), non-erosive (e.g. Celiac) or lymphatic obstructive (intestinal lymphangiectasia), though none have strong associations. Patients present with variable symptoms, depending on the underlying cause. Patients will always be edematous due to severe protein loss. There are no clinical signs specific to the diagnosis. Diarrhea, constipation, or abdominal pain may not be present.

By convention, the diagnosis is made through collection of a 24-hour stool sample to quantify A1A with simultaneous serum measurement of A1A. Volume of stool is important to document in order to calculate the clearance rate of A1A, with more than 13mL/day being increased clearance. A grossly elevated A1A stool level is suggestive of PLE, but does not fulfill the consensus diagnosing criteria.

In our patient, we needed volume of stool sample and A1A serum level. However, his extensive negative work up for other processes suggests PLE as the underlying cause of his edema.

CONCLUSION: In a patient with sudden onset volume overload symptoms such as peripheral edema and ascites, protein-losing enteropathy should be included on the differential, in addition to the common etiologies of cardiac, renal, or liver.

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NOT A MISSED HIT: A CASE OF VTE AFTER COVID-19 RECOVERY COMPLICATED BY HEPARIN-INDUCED THROMBOCYTOPENIA

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LEARNING OBJECTIVE #1: Recognize COVID-19's thrombotic sequelae
LEARNING OBJECTIVE #2: Diagnose heparin-induced thrombocytopenia (HIT)

CASE: A 50-year-old-male with COVID-19 infection seven months prior presented after one month of erythema and violaceous skin changes below his left knee and one week of recurrent right-sided abdominal pain. Imaging revealed a left lower extremity deep venous thrombosis (DVT) and portal vein thrombosis.

Heparin was started, and hypercoagulability workup was negative. Contrasted CT on hospital day 3 showed right portal, superior mesenteric and splenic vein thromboses. Suction thrombectomy and transjugular intrahepatic portosystemic shunt placement was performed on hospital day 7. These thrombi were viscous and difficult to remove, suggesting them to be subacute to chronic. He developed severe abdominal pain within 24 hours of restarting heparin postoperatively. Imaging identified new left portal vein thrombosis. IV argatroban was started given 42% fall in platelets from admission and a 4T score of 6 suggesting high probability of heparin-induced thrombocytopenia (HIT). However, a platelet factor 4 antibody (PF4) test and serotonin release assay (SRA) were negative.

The patient was restarted on heparin. After 4 days, he developed chest pain and unilateral lower extremity swelling. Workup revealed new pulmonary embolism (PE) and DVT, 43% decline in platelets, and a 4T score of 6. We started IV bivalirudin and empirically administered IVIG for HIT. Repeat PF4 and SRA returned positive, confirming HIT.

IMPACT/DISCUSSION: This case illustrates a unique presentation of venous thromboembolism (VTE) months after initial COVID-19 infection. COVID-19 has been associated with hypercoagulability through an unclear mechanism¹, with a case series reporting a PE prevalence as high as 18% in similar populations². We suspect our patient initially developed intra-abdominal thromboses during acute infection and then later developed his DVT, prompting his presentation.

HIT, a rare but important cause of thrombocytopenia and arteriovenous thrombosis in hospitalized patients, can present up to 1-3 week after initial heparin exposure. Fluctuating PF4 and SRA positivity further complicated diagnosis of in-hospital VTE. False-negative PF4 and SRA is unlikely given the high sensitivity of PF4 antibody seroconversion prior to HIT's clinical manifestations^{3,4}. While data is sparse, case reports suggest a link between COVID-19 and HIT^{5,6}. Although impossible to confirm, we attribute early in-hospital VTE to COVID-related hypercoagulability and later VTE to HIT. HIT must be considered when

new VTE occur in currently or recently hospitalized patients due to significant morbidity.

CONCLUSION: 1. Clinicians should be aware of coagulation abnormalities related to COVID-19.

2. Thrombocytopenia and VTE coinciding with heparin administration should prompt workup for HIT, even if initial serologic tests are negative.

OCULAR SYPHILIS IN A 45-YEAR-OLD WOMAN

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LEARNING OBJECTIVE #1: Recognize clinical features of ocular syphilis and concurrent neurosyphilis (ACGME Competency 1)

LEARNING OBJECTIVE #2: Discuss management of ocular syphilis and common treatment reactions (ACGME Competency 2)

CASE: A 44-year-old woman with systemic lupus erythematosus presented with one week of painless vision loss. Exam was notable for patchy “moth-eaten” alopecia. She was diagnosed with bilateral anterior uveitis and given atropine and prednisolone eyedrops. Ophthalmology identified syphilitic placoid chorioretinitis of her left eye. Her treponemal and non-treponemal tests for syphilis returned positive. She endorsed an unprotected sexual encounter four months prior. She also endorsed a prior rash with crusting on her palms and soles of her feet. Infectious disease raised concern for neurosyphilis and she was admitted to the hospital for IV penicillin and further workup.

Cerebrospinal fluid (CSF) showed elevated protein 68 mg/dL, nucleated cells 37/mcL, 90% lymphocytes, and positive CSF VDRL titers consistent with neurosyphilis. HIV was negative. She was monitored during initiation of IV penicillin, and tolerated treatment well, with no concern for a Jarisch–Herxheimer reaction (JHR). She completed two weeks of continuous penicillin infusion and experienced vision improvement. Infectious disease recommended follow up CSF evaluation in 3 months to confirm eradication.

IMPACT/DISCUSSION: Syphilis is difficult to diagnose due to its range of clinical presentations and inability to culture easily. Ocular syphilis is one manifestation and can affect almost any structure of the eye. It may cause vision loss, eye pain, photophobia, or floaters. It typically does not manifest with the primary stage, except as cutaneous lesions of the eyelid or conjunctiva. It is extremely rare, and causes less than one percent of uveitis cases,^{1,2} but is sight threatening if not treated.

CONCLUSION: • Maintain a high clinical suspicion for syphilis in at-risk individuals to prevent complications occurring in secondary and tertiary stages of disease.^{1,2}

• Closely monitor for JHR which occurs in 10-35% of cases, within the first 24 hours, and presents with fever, hypotension, and rash.^{3,4}

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OH THE PLACES WE’LL GO

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LEARNING OBJECTIVE #1: Recognize the incidence of Posttransplant Kaposi Sarcoma and possible visceral involvement as a possible cause of renal allograft dysfunction.

LEARNING OBJECTIVE #2: Recognize the importance of obtaining pathology in Posttransplant Kaposi Sarcoma with allograft dysfunction.

CASE: A 69-year-old man with a history of end-stage renal disease secondary to diabetes mellitus and kidney transplantation in 2018 maintained on Tacrolimus and Mycophenolate Mofetil, was admitted to the hospital with generalized weakness and AKI requiring hemodialysis. He was diagnosed with Non-AIDs Kaposi Sarcoma at an outside facility prior to presentation with elevated HHSV-8 PCR on skin biopsy. A renal biopsy was performed to elucidate the cause of his allograft dysfunction.

The evaluation revealed bland urine sediment, renal ultrasound concerning for transplant dysfunction, and mild hydronephrosis. Serum donor-specific antibodies were negative. Serum Tacrolimus trough level was slightly elevated above the target (10.1 ng/ml, target 5-7 ng/ml). Serum PCR for viruses, including Cytomegalovirus, Epstein–Barr virus, and BK virus, was negative. Renal biopsy showed infiltration of the kidney by spindle cell lesions with vascular-appearing channels, suspicious for kidney involvement by Kaposi’s sarcoma. This was strongly supported by diffuse positive HHV-8 staining of tumor nuclei of the invaded renal tissue.

IMPACT/DISCUSSION: The differential diagnosis of allograft dysfunction changes with the time of presentation after transplantation. This patient presented more than 3 months after transplantation after a recent diagnosis of Kaposi Sarcoma. Possible causes of allograft dysfunction in this scenario include but is not limited to acute rejection, CNI toxicity, Recurrent or De Novo Glomerular disease, Viral Infection, CAN (chronic allograft nephropathy), and less commonly, malignancy. The chronic use of immunosuppressive agents in renal transplant recipients increases the long-term risk of malignancy compared with that of the general population. Cancer remains the second most common cause of mortality after transplantation, after cardiovascular disease. Kidney cancers arising in the renal allograft comprise approximately 10% of the total kidney cancers in transplant recipients. KS is a common type of cancer that can develop after kidney transplantation. Involvement of the renal allograft is quite rare, however. In the setting of KS and renal allograft dysfunction, in the absence of common causes of acute allograft dysfunction, being mindful of possible involvement of the renal allograft by KS is vital, and may need to be pursued by renal allograft biopsy and staining for HHV-8. Here we report a rare case of KS involving the transplanted kidney and causing allograft dysfunction.

CONCLUSION: Kaposi sarcoma (KS) is an angioproliferative tumor associated with human herpesvirus 8 (HHV-8) infection, as well as immunosuppressive medications. KS can present with skin or visceral organ involvement.

ONCOLOGIC EMERGENCY- NEW KID ON THE BLOCK

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LEARNING OBJECTIVE #1: Diagnose a rare life-threatening complication of Atezolizumab causing acute renal failure requiring emergent hemodialysis.

LEARNING OBJECTIVE #2: Recognize that immune-related adverse events (irAEs) are highly variable.

CASE: Immune checkpoint inhibitors (ICIs) are a novel class of drugs used to treat a broad spectrum of CA (e.g., metastatic melanoma, non-small lung CA, and renal cell CA). However, immune related adverse effects (irAE) have complicated the overall survival benefits for some.

A 72-y.o. F w/ a h/o small cell lung CA, HTN and atrial fibrillation, presented for a 3rd round of chemotherapy. At that time: Creatinine = 17; BUN = 136; 2 weeks earlier, Creatinine = 1.4; Hgb = 6.1. U/A was significant for 3+ blood/ 3+ protein/ elevated RBCs. She was admitted for further evaluation. She c/o decreased appetite and oral intake for one week, nausea/vomiting for 3 days, and a metallic taste. She reported normal urine output and foamy urine. No NSAID use. PMH was notable for nephrolithiasis that resolved w/o intervention. Medication list was reviewed. She had received two cycles of

chemotherapy with carboplatin/VP-16. With her 2nd cycle, she also received Atezolizumab, which had been given approximately 10 days earlier. After admission, she was seen by nephrology; a vascath was placed for emergent hemodialysis (HD). After one HD session, her CR decreased from 17 to 9. There were no signs of further renal recovery. She was started on IV steroids for possible immunotherapy mediated renal failure with little improvement. Renal U/S showed echogenic kidneys but no hydronephrosis. She later received 2 additional HD treatments which improved her creatinine to 2, close to her baseline. A renal biopsy was recommended, but the patient declined. Her urine output remained normal throughout the stay; she was discharged home to continue hemodialysis as an outpatient.

IMPACT/DISCUSSION: Immunotherapy is a CA treatment modality that uses the patients' own immune system to fight malignant cells. Atezolizumab (Tecentriq) is a check point inhibitor (CPI); these checkpoints are a normal part of the immune system and modulate the immune response. Blocking a CPI allows immune cells to respond more strongly to cancer cells. Specifically, atezolizumab is a PD-L1 inhibitor and its toxicity profile has been mostly favorable. AKI was more with ipilimumab (2%), nivolumab (1.9%), pembrolizumab (1.4%).

CONCLUSION: Nephrotoxicity is rarely reported with Atezolizumab. While no clear cause has been identified, some theories suggest autoantibodies against specific tissue that may normally express checkpoint receptors that then bind to anti-CPI antibodies, triggering an immune reaction against that tissue. Our patient presented with an emergent situation where she had to undergo immediate HD. Early diagnosis and awareness of the variability of the irAE is the key in treatment. This case demonstrates a cancer treatment causing acute renal failure after one cycle of treatment which has been rarely reported.

OUT OF MIND, OUT OF SIGHT: DIURETIC RESISTANT HEART FAILURE EXACERBATION FOUND TO BE SECONDARY TO HYDRALAZINE-INDUCED LUPUS.

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LEARNING OBJECTIVE #1: Describe how premature closure delays re-evaluation of a case even in the presence of discordant data.

LEARNING OBJECTIVE #2: Recognize Hydralazine as a high-risk drug for causing drug-induced lupus.

CASE: A 73-year-old female, with past medical history of heart failure with preserved ejection fraction (HFpEF), and HTN, presented with progressive exertional dyspnea for a week. Given her history of HFpEF and past admissions for exacerbations, she was started on aggressive diuresis. She was also noted to have large bilateral pleural effusions on admission and underwent thoracentesis twice with rapid re-accumulation of the transudative effusions. The patient developed an acute kidney injury (AKI), and diuresis was stopped. On day 13 of admission, she developed hypoxic respiratory failure requiring intubation and required transfer to the cardiac ICU. Given her continued hypoxia, a right-sided chest tube was placed. An extensive workup was initiated to evaluate her AKI. It revealed nephrotic range proteinuria, a positive anti-nuclear (ANA), anti-histone antibody, and negative double-stranded DNA antibody (Anti-dsDNA). A review of her medications revealed that she had been receiving hydralazine since admission and it was stopped. Over the next few days, the patient had decreased chest tube output and improvement in hypoxia. She was successfully extubated after 15 days of intubation.

IMPACT/DISCUSSION: Heart failure exacerbations are commonly managed on general medicine floors. There is an algorithmic approach to managing this condition, which involves institution of IV diuresis and goal-directed medical therapy. Although the patient received the standard of care in management, this approach proved harmful in this patient as premature closure delayed the correct diagnosis. The lack of improvement in the first week should have fueled a discussion of alternative diagnoses. After transfer to the ICU, the rapid re-accumulation of the pleural effusions, the worsening kidney function, and hypoxia finally triggered a re-evaluation of the clinical scenario which provided the unexpected diagnosis of hydralazine-induced lupus. In fact, the

hypoxia and rapid re-accumulation of pleural effusions were due to serositis and nephrotic range proteinuria. Discontinuing hydralazine improved the patient's condition, despite its initial goal of treating her heart failure.

Hydralazine is rated as a high-risk drug for drug-induced lupus, with about 5-10% incidence per year at doses as low as 100mg/day. The diagnosis is established when a patient has a positive ANA and anti-histone antibody, but negative anti-dsDNA to differentiate it from idiopathic SLE.

CONCLUSION: Premature closure can lead to prolonged hospital stay and patient morbidity. Consideration of the clinical scenario as a whole can help guide further workup in a timely manner when discordant data arises. The use of hydralazine should be exercised with caution whilst remaining aware of the possible complications that may result from the use of this drug.

OXYTOCIN INDUCED RIGHT VENTRICULAR OUTFLOW TRACT VENTRICULAR TACHYCARDIA IN A PATIENT WITH UNKNOWN LONG QT SYNDROME

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LEARNING OBJECTIVE #1: Recognizing Right Ventricular Outflow Tract Ventricular Tachycardia (RVOTVT) is mostly a benign electrocardiographic finding

LEARNING OBJECTIVE #2: Treatment modalities of RVOTVT include beta blockers and radiofrequency ablation in severe cases

CASE: A 21 year old female with no medical history presented to obstetrics unit for induction of labor. Vital signs and physical examination on presentation were normal. The patient was initiated on an oxytocin infusion and was noted to develop tachycardia with heart rates between 100 and 120 beats per minute (bpm), without shortness of breath or chest pain. Electrocardiography showed Right Ventricular Outflow Tract Ventricular Tachycardia (RVOTVT) at rate 98 bpm, QTc was 517.

Subsequent transthoracic echocardiography (TTE) demonstrated an ejection fraction 45 to 50%, moderately dilated left ventricular cavity, no wall motion abnormalities. The patient delivered vaginally without complications, but remained in VT post partum. Suppressive beta blocker therapy was initiated. Cardiac Magnetic Resonance Imaging showed mildly dilated left ventricle with normal function. The patient was discharged on Propranolol. Six weeks post partum, the patient was off Propranolol and doing well.

IMPACT/DISCUSSION: RVOTVT is one of the most common types of monomorphic VT that arises in patients without structural heart disease. Typically, RVOTVT is diagnosed based on ECG showing wide QRS complex, left bundle block morphology and a rightward/inferior axis near +90 degrees. Although patients with RVOTVT usually remain hemodynamically stable, this type of tachyarrhythmia can induce left ventricular dysfunction and ventricular fibrillation in rare instances. Oxytocin is a uterotonic agent used in a variety of obstetrical circumstances, one being induction of labor. Just a handful of cases have reported the arrhythmogenic propensity of oxytocin and its ability to induce RVOTVT in women with known long QT syndrome (LQTS). In the case, we describe a rare instance of Oxytocin induced RVOTVT in a patient undergoing induction of labor, unknown to have LQTS. Oxytocin intravenous bolus was noticed to induce a large and transient QTc interval prolongation, suggesting that it may lead to proarrhythmia. However, the mechanism causing RVOTVT remains uncertain. The clinical course of patients with RVOTVT has almost uniformly been described as benign, making it hard to advocate for any particular treatment. Aside from removing the offending agent, beta-blockers are traditionally employed to control ventricular rates. Catheter ablation does not cure RVOTVT, but radiofrequency ablation should be recommended early, rather than late, for patients with high-risk characteristics, such as syncope, very fast VT (>230 beats/min associated with polymorphic VT), and extremely frequent ectopy (>20,000 extrasystoles/day).

CONCLUSION: RVOTVT is a unique electrocardiographic finding associated with Oxytocin use.

Understanding its benign nature can prevent unnecessary investigations and invasive treatments.

PANCYTOPENIA ACQUIRED THROUGH SOCIAL DISTANCING IN SUMMER WOODS: A CASE OF BABESIOSIS

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LEARNING OBJECTIVE #1: Recognize that babesiosis can present with new-onset pancytopenia.

LEARNING OBJECTIVE #2: Assess co-infection with anaplasmosis and Lyme disease when treating babesiosis

CASE: A 72-year-old man with a history of Crohn's disease and hypertension presented with one month of worsening fatigue, anorexia with weight loss, and headaches. The patient also noted intermittent fever of one week's duration. One month prior, the patient had returned to NYC from upstate NY in the Catskill Mountains where he had stayed for 5 months from March to August. During his stay, he remained active with many outdoor activities. He denied any insect or tick bite. Three weeks prior, he was seen by his primary care physician. At the time laboratory results showed normal blood counts and kidney and liver function. The day before presentation, repeat blood tests at the primary care office revealed new pancytopenia, for which he was sent to the emergency department and admitted to the hospital for further evaluation. On exam, vital signs were normal. There was hepatosplenomegaly, and no rash was seen throughout his body. Laboratory testing revealed pancytopenia with leukocyte count of $2.7 \times 10^9/L$, Hgb of 10.1 g/dL, and platelet count of $36 \times 10^9/L$, AKI, transaminitis, and elevated CRP. Additional blood tests showed elevated LDH and undetectable haptoglobin, which were suggestive of hemolytic anemia. Giemsa-stained blood smear showed the ring forms of *Babesia* spp. with 1.5% parasitemia. *Babesia microti* was confirmed by PCR. IgG titer was 1:320. Infectious serology testing was positive for Lyme EIA subsequently confirmed with Western blot, but otherwise negative for Anaplasmosis. He was treated with a 10-day course of atovaquone and azithromycin, as well as amoxicillin for Lyme infection as he is allergic to doxycycline. He responded well with no detectable parasitemia on discharge. At the outpatient follow-up visit, repeat CBC showed the resolution of pancytopenia.

IMPACT/DISCUSSION: This case illustrates the hematologic manifestations of babesiosis, which are characterized by hemolytic anemia and splenomegaly. Anemia is caused by the rupture of RBCs during egress of *Babesia* and by nonhemolytic mechanisms such as the clearance of uninfected RBCs. This non-autoimmune hemolysis due to babesiosis is known to resolve with antibiotic treatment and clearing of parasitemia. Thrombocytopenia is common and leukopenia may occur. In our case, splenomegaly secondary to babesiosis likely contributed to the development of pancytopenia. In this case, concurrent Lyme disease was present. In the northeastern part of the US, babesiosis is typically caused by *B. microti* which is transmitted by the tick, *Ixodes scapularis*. This is the same tick vector responsible for transmission of anaplasmosis and Lyme disease. Co-infection with *Anaplasma phagocytophilum* and *Borrelia burgdorferi* should always be considered when treating babesiosis.

CONCLUSION: Babesiosis should be suspected in febrile patients with hemolytic anemia in the setting of epidemiologic risks.

PANDEMIC ROAD BLOCKS AND POTT'S HOLES

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LEARNING OBJECTIVE #1: Discuss diagnostic bias and premature closure during pandemics

LEARNING OBJECTIVE #2: Expanding differentials to include Tuberculosis in elderly patients with back pain

CASE: An 87-year-old Russian female with a known T11 wedge fracture from a fall six months prior presented to the emergency department with worsening back pain. She was found to be febrile to 102 °F and COVID-19 nasopharyngeal swab was negative. Initial lab results were unremarkable and blood cultures were negative. CT thoracic/lumbar spine showed a compression

fracture of T11, a new compression fracture of T10, destructive changes in the vertebral bodies, interval decrease in lung nodules suggesting an infectious/inflammatory etiology, and several foci of mucous plugging and tree-in-bud nodules in the right middle/upper lobe suggesting bronchiolitis. Chest x-ray showed coarsened interstitial markings bilaterally with hyperinflated lungs, superimposed edema or multifocal pneumonia.

Of note, the patient had a visit with pulmonology prior given an abnormal chest CT 3 months prior where there was concern for an infectious bronchiolitis although doubted tuberculosis but had planned for additional workup as outpatient.

On day two of hospitalization an MRI of the lumbar/thoracic spine was obtained showing T10-T11 discitis and osteomyelitis and bilateral paraspinal plegmon with a small left paraspinal abscess. CT-guided needle biopsy was obtained with 16s ribosomal testing, TSPOT negative, CRP 10.9, ESR 69, and she was started on cefazolin. By day six the patient was discharged home. Four days later results returned positive for tuberculosis via 16s ribosomal testing.

IMPACT/DISCUSSION: Despite her spinal imaging localizing the infection to the thoracic region, the most common location for spinal Tb, elevated inflammatory markers and her several risk factors for the spinal tb including older age, kyphotic changes, and coming from an endemic country her diagnosis was delayed. Even her highly sensitive TSPOT returned negative, leading to premature elimination of Tb as a diagnosis. Given her older age it is important to note TSPOTs have higher false positives.

Concerning lung findings were overlooked because of chronicity, her negative COVID-19 PCR swab, and planned outpatient follow-up. In retrospect, these were related to an active Tb lung infection and further work-up would have made the diagnosis sooner while minimizing exposure to patients and staff. Given that she presented during the height of the first wave of SARS-CoV-2 with a negative COVID-19 PCR swab premature closure occurred. It is important to stress that even during pandemics patients present with other highly communicable diseases and one must remain vigilant with broad differentials to ensure a thorough work up is completed.

CONCLUSION: Pandemics put stress on healthcare systems and can cause diagnostic bias given limited resources causing healthcare providers to triage and discharge patients to help decompress health systems and in doing so causing rapid burnout and decision fatigue.

PAPILLARY FIBROELASTOMA UNUSUAL STROKE ETIOLOGY

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LEARNING OBJECTIVE #1: Recognize Papillary Fibroelastoma as a potential etiology for recurrent stroke

LEARNING OBJECTIVE #2: Assess for a suspected valvular tumor with TEE even when TTE is negative

CASE: A 52-yr male with a past medical history of hypertension (HTN), hypersensitivity lung disease (HLD), and three prior documented cerebrovascular accidents (CVA) was admitted with multiple infarcts assumed to be secondary to small vessel disease. Prior to stroke onset, the patient was compliant in taking dual antiplatelet therapy (DAPT). Transcranial Doppler & computed tomography angiography (CTA) did not show etiology for suspected embolic stroke. Transthoracic echocardiogram (TTE) and electrocardiogram (ECG) were unremarkable. Transesophageal echocardiogram (TEE) on the other hand, showed a 5x7 mm soft tissue density on aortic valve without regurgitation. Resection/CABG was performed, the mass was excised from left cusp of aortic valve. Papillary fibroelastoma was diagnosed by pathology report. No change in LV or RV systolic function was observed post operatively and there were no new regional wall or valvular abnormalities.

IMPACT/DISCUSSION: Papillary fibroelastoma is the most common primary valvular tumor and one of the most common primary benign cardiac tumors. Morbidity is high for patients with papillary fibroelastomas due to the tumor's friability and its ability to form thrombi around itself both leading to frequent embolization. Currently echocardiography remains the best way to identify these masses in suspected patients.

CONCLUSION: In patients with recurrent CVA, TEE may be indicated to rule out valvular tumor etiology. While this etiology is uncommon, morbidity is increased for this subset of patients due to high probability of recurrent stroke. Additionally, patients with papillary fibroelastoma treated with definitive surgical resection and anticoagulation show excellent postoperative prognosis making finding these rare tumors particularly important.

PARVOVIRUS-B19-INDUCED CARDIOMYOPATHY IN AN IMMUNOCOMPETENT PATIENT REQUIRING CARDIAC TRANSPLANTATION

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LEARNING OBJECTIVE #1: Obtain a thorough history of a patient with prolonged flu-like symptoms.

LEARNING OBJECTIVE #2: Recognize signs of virally-associated imminent heart failure.

CASE: A 33-year-old male with no significant past medical history presented from his primary care physician's (PCP) office with worsening myalgia, cough, and dyspnea. He had an onset of unremitting generalized myalgia a month prior and started to experience flu-like symptoms recently with new-onset increasing dyspnea on exertion, poor appetite, and urinary retention. He was seen at multiple outpatient clinics and the symptoms were attributed to a viral illness. Upon presentation to the emergency department, he was noted to be in atrial fibrillation with rapid ventricular rate and laboratory findings significant for leukocytosis ($16.2 \times 10^9/L$), transaminitis (AST/ALT 163/308 U/L) with hyperbilirubinemia (4.6 mg/dL), elevated INR 1.74, elevated BNP (1524 pg/mL), and elevated lactate (4.79 mg/dL). EKG was significant for low amplitudes and troponin was <0.01 . A chest x-ray demonstrated a large right pleural effusion. A bedside echo was significant for an ejection fraction of 10%. He was placed on a diltiazem drip and a thoracentesis removed 1.5L of transudative fluid. En route to the ICU, he suddenly went into pulseless electrical activity requiring ACLS intervention, intubation, and ultimately vasopressor support (epinephrine and dopamine). He was transferred to an outside facility for extracorporeal membrane oxygenation (ECMO)/impella placement and two days following admission he had a heart transplant. Histology of the endomyocardial biopsy was significant borderline myocarditis and the viral PCR detected PVB19 without detection of other cardiotropic viruses.

IMPACT/DISCUSSION: Historically adenovirus and enterovirus were more common causes of inflammatory heart disease; however, PVB19 has been linked with greater events recently. The presence of the virus does not lead to cardiomyopathy but, rather, it has been postulated that high viral loads and coinfection with other cardiotropic viruses may be responsible. Moreover, it has been speculated that within the intramyocardial arterioles, PVB19 increases pro-inflammatory cytokines resulting in disruption of the myocardial microcirculation and myocardiocyte necrosis.

This rare case highlights the need for a thorough history of patients presenting with prolonged (~2 month) viral symptoms as well as consideration of other review of systems that will aid in prompt recognition of signs of heart failure.

CONCLUSION: Although fulminant heart failure due to parvovirus B19 is rare and occur through an unknown mechanism, its prevalence is increasing. This case highlights the need for a thorough history of a patient presenting with prolonged viral symptoms and prompt recognition of signs of virally-associated imminent heart failure.

PECOMA: A RARE CASE OF SARCOMA IN A PATIENT WITH LYNCH SYNDROME

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LEARNING OBJECTIVE #1: Recognize the rare clinical presentation of perivascular epithelioid cell differentiation (PEComas), a subset of Sarcomas, in patients with Lynch Syndrome.

LEARNING OBJECTIVE #2: Identify the possible role of immunotherapy as a treatment option for PEComa in patients with Lynch syndrome.

CASE: Our patient is a 30-year-old morbidly obese woman with a history of Lynch syndrome, who presented with complaints of lower back pain and subjective fevers. Six months prior to presentation she was diagnosed with a large lower paraspinal hematoma treated at that time with interventional radiology (IR)-guided embolization and gel foam implantation. Upon presentation to our hospital, vital signs were within normal limits. Physical exam was significant for tenderness in her right lumbar and iliac regions. Laboratory work was remarkable for a hemoglobin of 9.5 gm/dL. CT scan of the abdomen and pelvis with intravenous contrast showed intermediate attenuation in the right paraspinal region, which was suggestive of a mass with an overlying hematoma. Further imaging with MRI of her lumbar spine showed a 16.3 x 13.2 x 18.4 cm heterogeneous mass along the right lumbosacral paraspinal musculature, which was concerning for a sarcoma. Additional staging with a CT chest was done, which showed a 7 mm right lower lobe solitary nodule. CT guided biopsy of the paraspinal mass revealed histopathology consistent with a malignant perivascular epithelioid cell neoplasm. Morphologically, tumor cells displayed characteristics of poorly differentiated carcinoma. Further characterization with immunohistochemical staining confirmed epithelial tissue with EMA (epithelial membrane antigen), desmin (confirming muscle origin), HMB45 and melan A (confirming melanocytic origin) and SMA (smooth muscle actin) which is compatible with a diagnosis of PEComa. Further staining revealed loss of function of mismatch repair proteins MSH2 and MSH6, which was suggestive of Lynch syndrome. Unfortunately, less than 1% of her tumor showed staining associated with PDL-1 immune cell staining, thereby making her a poor candidate for immunotherapy. She was subsequently started on neoadjuvant therapy with everolimus (mTOR inhibitor), which she has been tolerating well. She is scheduled to undergo surgical resection of the tumor in the upcoming months.

IMPACT/DISCUSSION: PEComas are neoplasms with perivascular epithelioid-cell differentiation. Mismatch repair protein deficiency is not a common characteristic amongst these sarcomas. In one study only seven cases (2.3%) out of 447 were found to have microsatellite instability of this type, only one of which had a diagnosis of Lynch syndrome. While current treatment options include surgery and use of mTOR inhibitors, this rare presentation suggests a possible role of immunotherapy as a treatment option for Lynch syndrome patients with PEComa.

CONCLUSION: Knowledge and identification of mismatch repair deficiencies in sarcomas plays an important role in exploring immunotherapy as a potential treatment option in these patients.

PERSISTENTLY ELEVATED INR IN A COVID-19 PATIENT ON WARFARIN

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LEARNING OBJECTIVE #1: Recognize that supratherapeutic INR may be associated with covid-19 infection despite previously therapeutic INR and no other clear explanation for the elevation.

LEARNING OBJECTIVE #2: Recognize unusual effects of covid-19 as they emerge and possible effects on coagulation profile.

CASE: An 85-year-old Caucasian male with past medical history of known covid-19, atrial fibrillation on warfarin, congestive heart failure, coronary artery disease, coronary artery bypass surgery, hypertension, admitted for respiratory distress, hypoxia and mental status change. Vital signs: temperature 36 Celsius, heart rate 102 beats per minute, respiratory rate 23, oxygen saturation 96% on 3 liters nasal cannula. Pertinent physical exam findings: no acute distress, bibasilar crackles and wheezing, tachycardia, no murmurs/rubs/gallops, abdominal exam unremarkable, no lower extremity edema, awake but confused, no focal neurologic deficits. Labs: white blood cell count 9.4K/UL, hemoglobin 9.3g/dL, platelets 233K/UL, international normalized

ratio (INR) 5.3, prothrombin time 60.2seconds, partial thromboplastin time 42seconds. BUN 45mg/dL, creatinine 1.40mg/dL, CRP 127.4mg/L, D-dimer 933ng/mL, ferritin 243ng/mL, procalcitonin 0.22ng/mL, B-type natriuretic peptide 189pg/mL. Liver function tests and remaining labs were unremarkable. Chest x-ray: pulmonary vascular congestion; bibasilar predominant opacities. Brain computed tomography scan: no acute intracranial abnormality. Warfarin was held, full dose enoxaparin and dexamethasone were started. Remdesivir was not given due to covid-19 diagnosis > 7 days before admission. INR increased to 8.6, 2 doses of vitamin K were given and INR decreased to 1.1. On day 7 he became hypoxic on bilevel positive airway pressure and unresponsive. He was intubated and placed on mechanical ventilation. Respiratory cultures: positive for methicillin-sensitive staphylococcus aureus (MSSA), haemophilus influenza. Cefazolin was started. Septic shock occurred from MSSA pneumonia. Pressors was started. Encephalopathy persisted and he later developed melena. Pantoprazole was started and enoxaparin held. Hemoglobin remained above threshold for transfusion. Due to poor prognosis, inability to wean off ventilator support and no improvement in mental status, his family declined further workup for possible gastrointestinal bleed and decided to withdraw care. Patient expired on day 14.

IMPACT/DISCUSSION: Covid-19 continues to have unexpected consequences. With reports of liver dysfunction and limited data regarding elevated INR on warfarin, clinicians are in precarious situations as covid-19 is associated with increased risk of clotting events. However with elevated INR, they are also at risk of bleeding, especially with anticoagulant use.

CONCLUSION: We present a case of persistently elevated INR in the setting of covid-19 infection. With no recent change in warfarin dose, and previous therapeutic INR levels, it is possible an elevated INR may be related to covid-19 infection.

PREPOSTEROUS PLATELETS: A RARE CASE OF REACTIVE THROMBOCYTOSIS DUE TO ROMIPLOSTIM

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LEARNING OBJECTIVE #1: Diagnose romiplostim-induced reactive thrombocytosis which could increase the risk of thrombotic/thromboembolic events.

LEARNING OBJECTIVE #2: Recognize that periodic monitoring of platelet count during romiplostim therapy is essential to identify thrombocytosis and prevent catastrophic sequelae

CASE: A 63-year-old male presented with acute onset of exertional dyspnea and non-radiating, substernal chest pain. His past medical history was significant for hypertension, hyperlipidemia and chronic refractory immune thrombocytopenic purpura (ITP). The patient denied orthopnea, paroxysmal nocturnal dyspnea, leg swelling, cough, recent immobilization, and sick contacts. On admission, his vital signs were stable and his physical examination was unremarkable. Blood work was notable for thrombocythemia with a platelet count of 950,000/ μ L. D-dimer was within normal limits.

Cardiac enzymes were negative and there were no acute changes on the electrocardiogram. Echocardiogram showed left ventricular hypertrophy with a normal ejection fraction. Despite undergoing splenectomy years ago, the patient had several relapses of thrombocytopenia requiring treatment with corticosteroids, intravenous immunoglobulins and rituximab. A month prior to this hospitalization, his platelet count had dropped to 5000/ μ L, and treatment with romiplostim injections was initiated. In the absence of other plausible etiology, the reactive thrombocytosis was attributed to romiplostim. Thereafter, the drug was discontinued and the patient underwent plateletpheresis. Subsequently, the platelet count decreased to 190,000/ μ L, and the patient's symptoms had resolved with conservative management.

IMPACT/DISCUSSION: ITP is an autoimmune disease characterized by thrombocytopenia secondary to autoimmune destruction of platelets and impaired megakaryocytopoiesis due to increased clearance of thrombopoietin (TPO). Romiplostim is a novel TPO-mimetic agent used for the treatment of ITP that is unresponsive to traditional therapeutic modalities. It binds to the

thrombopoietin receptor and activates intracellular transcriptional pathways which lead to megakaryocytopoiesis. Common side effects of romiplostim include headache, fatigue, myalgias, dizziness, and nausea. Rare but life-threatening thrombotic/thromboembolic events including myocardial infarction and stroke in the setting of reactive thrombocytosis have also been reported. The incidence of these events was found to be higher in patients with platelet counts greater than 200,000/ μ L. Although our patient did not experience any demonstrable thrombotic event, the degree of her thrombocytosis placed her at risk of such an adverse outcome.

CONCLUSION: Romiplostim is now being widely used for the treatment of ITP hence physicians should be cognizant of its rare side effects like reactive thrombocytosis for prompt diagnosis and treatment.

PROXIMAL JOINT PAIN, TEMPORAL HEADACHE, AND A PROTEIN GAP: WHEN THE SHOE DOESN'T QUITE FIT

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LEARNING OBJECTIVE #1: Describe the clinical features and work up of giant cell arteritis and polymyalgia rheumatica

LEARNING OBJECTIVE #2: Recognize the rare but potential relationship between paraproteinemia and inflammatory vasculopathy

CASE: 89-year-old female presented with a left temporal headache radiating to her neck and shoulders as well as severe scapula and hip pain. On arrival she was hypertensive and anemic (Hgb 9.5 g/dL) with normal renal function. ESR was over 130mm/hr, CRP normal, total protein 10 g/dL, and albumin 3.7 g/dL, yielding a protein gap of 6.3 g/dL.

Given concern for giant cell arteritis (GCA) and polymyalgia rheumatica (PMR) prednisone was started with subsequent pain reduction. Protein gap workup included serum protein electrophoresis (SPEP) with 2.91g/dL beta-globulin (high) and 0.33g/dL gamma-globulin (low). Immunofixation electrophoresis showed high IgA at 2,990 mg/dL and low IgG and IgM. Serum free light chains showed kappa/lambda ratio 59, consistent with a monoclonal IgA-type kappa gammopathy. Temporal artery biopsy showed amyloid deposition on Congo Red stain with apple green birefringence. Bone marrow biopsy showed plasma cell myeloma with kappa light chain restriction. She was ultimately diagnosed with multiple myeloma-associated amyloidosis.

IMPACT/DISCUSSION: GCA is an inflammatory vasculopathy of medium and large arteries. GCA typically manifests as a new headache and may lead to ischemic complications such as vision loss. PMR causes axial stiffness and pain. GCA and PMR have pathogenic aberrancies in common, including elevations in ESR and CRP. Temporal artery biopsy with mononuclear infiltrates and multi-nucleated giant cells in the vessel wall is the gold standard for GCA diagnosis.

Patients with symptoms of GCA or PMR do not typically present with elevated ESR and normal CRP. There are reports of patients who presented as such ultimately diagnosed with multiple myeloma (MM). An elevated protein gap should prompt workup for paraproteinemia. Testing serum and urine protein electrophoresis and immunofixation with serum free light chains yields a 98% sensitivity for M proteins. Some experts recommend serum immunoglobulin quantification to detect low levels of M protein. CBC, serum creatinine, and calcium can detect end-organ damage that may suggest MM as opposed to a premalignant condition (e.g. monoclonal gammopathy of undetermined significance (MGUS)). Bone marrow biopsy can confirm the diagnosis of MM.

Amyloid deposits can be found in the temporal arteries of patients with GCA symptoms, such as jaw claudication and temporal headache, due to inflammation from amyloid deposition and disrupted internal lamina. GCA symptoms often precede MM diagnosis in such cases.

CONCLUSION: GCA can be challenging to diagnose, as it can present similarly to PMR and occasionally the disorders can coexist. Clinicians should maintain a high index of suspicion for concomitant lymphoproliferative disorders such as multiple myeloma and amyloidosis in patients with discordant ESR and CRP with an elevated protein gap.

RAPIDLY PROGRESSIVE DEMENTIA DUE TO PROBABLE SPORADIC CREUTZFELDT-JACOB DISEASE IN AN IMMUNOCOMPROMISED HOST

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LEARNING OBJECTIVE #1: Develop a differential and initiate a workup for rapidly progressive dementia

LEARNING OBJECTIVE #2: Identify the diagnostic criteria and proactively coordinate laboratory resources to perform CSF studies in a patient with suspect CJD

CASE: A 75 year-old previously independent man with bullous pemphigoid on low dose prednisone and mycophenolate, ischemic cardiomyopathy, hypertension, atrial fibrillation and achalasia presented to the hospital with 3 weeks of progressive confusion and visual hallucinations. Further history was notable for hunting wild elk and bear. On exam, he had no focal neurologic deficits, was walking with a walker and following 2 step commands. He had saccadic eye movements, rigid posture with mild myoclonus and impaired attention with generally intact memory. Initial labs including UA, CBC, CMP were normal. A broad workup for rapidly progressive dementia was initiated and he was empirically treated with high dose thiamine. Reversible causes were ruled out with normal TSH, B12, folate, vitamin D, heavy metals, and negative HIV and RPR. Brain imaging showed cortical ribboning of right fronto-temporal lobes and EEG demonstrated right-sided periodic spike wave complexes. Lumbar puncture had mildly elevated protein of 59 with normal glucose and cell count. A broad molecular workup was negative for paraneoplastic, autoimmune, and infectious etiologies. Over the course of 3 weeks inpatient, he continued to decline and progressed akinetic mutism, stopped eating and became bed bound. Based on clinical features, EEG and imaging findings he was diagnosed with probable sporadic Creutzfeldt-Jacob disease with still pending CSF 14-3-3 and RT-QuC studies. His family elected to pursue comfort focused care and he was transitioned to hospice.

IMPACT/DISCUSSION: Rapidly progressive dementia (RPD) is dementia with an onset over weeks to months. Etiologies include vascular lesions, infections, malignancy, toxic/metabolic, neurodegenerative, iatrogenic and inflammatory/autoimmune processes. Given the high risk of mortality and reversibility of many RPDs, it is critical to perform an extensive and rapid evaluation for the underlying cause. This includes a comprehensive lab work-up, brain MRI with/without contrast, EEG, lumbar puncture with CSF studies. Prion disease is a rare etiology for RPD, and most commonly due to sporadic CJD (sCJD). Definitive diagnosis of sCJD is confirmed on autopsy. Probable diagnosis of sCJD can be established with 1) neuropsychiatric disorder and a positive RT-QuC in CSF, or 2) RPD on physical exam and lab/imaging workup consistent with CJD. CSF associated with CJD is an infectious biohazard and requires special handling in the lab and caution when running other diagnostic studies.

CONCLUSION: Rapidly progressive dementia requires a comprehensive workup to ensure that all reversible causes of dementia are evaluated. If CJD is suspected the workup must include coordination with the clinical laboratory to ensure the safety of their staff and integrity of the laboratory environment.

RARE CASE REPORT OF SUSPECTED COVID-19 INDUCED CARDIOMYOPATHY

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LEARNING OBJECTIVE #1: Diagnose late sequelae of Covid-19 related heart complications in individuals with no pre-existing conditions

LEARNING OBJECTIVE #2: Manage asymptomatic or mildly symptomatic heart failure with severely reduced ejection fraction

CASE: 56 y/o Caucasian male with no significant past medical history presented on account of reduced LVEF of 20 percent on Echocardiogram. Prior to this he had pedal swelling for 2 weeks, which was mildly reduced with daily Lasix of 20mg. There was associated mild dyspnea on mild exertion, he denied chest pain, palpitations, orthopnea, PND, cough, heat/cold intolerance.

Patient had symptomatic Covid 19 about 6 weeks prior to presentation but was negative for Covid-19 on admission Chronic smoker, Drinks two beers per day, On examination he was tachycardic at 131, BP:140/106 mmHg, other vitals were stable Pulses were full and regular and there was bilateral pitting pedal edema up to the knees. Laboratory investigations were remarkable for mild transaminitis, with up trending Troponinemia 0.079, 0.131 and 0.120, BNP 7710.

Chest x-ray done showed severe cardiomegaly without overt pulmonary edema. EKG showed sinus tachycardia Echocardiography showed severe left ventricular enlargement with severe diffuse hypokinesis and resting sinus tachycardia. LVEF was estimated at 15 percent, Mild Pulmonary hypertension and minimal posterior pericardial effusion Patient also had heart catheterization with angiography which showed Severe LV systolic dysfunction with ejection fraction of 10% to 15% and large apical mural thrombus. Borderline compensated left-sided congestive heart failure with pulmonary capillary wedge pressure of mean 24 and PA pressure of 41 mmHg systolic and Normal coronary arteries.

Patient was started on IV heparin, sacubitril/valsartan, carvedilol, furosemide and transferred to a tertiary center for evaluation for possible cardiac transplantation with a life vest

IMPACT/DISCUSSION: The importance of this case is to highlight the possible severe cardiac complications and the late presentation of Covid-19 illness sequelae.

Covid-19 has a myriad of cardiac complications ranging from Myocarditis, Heart failure, Cardiogenic shock, STEMI, NSTEMI, Cardiac arrhythmias and new onset cardiomyopathy.

Mechanisms of Covid-19 involvement of the heart can be direct or indirect. However, most of the reported cardiac involvement of Covid-19 have been in the acute phase. This patient however presented 6 weeks following acute resolution of his Covid-19 illness.

He did not have any known pre-existing heart conditions, neither did he have any significant respiratory distress except during the acute phase of his Covid-19 illness

CONCLUSION: Novel Coronavirus SARS-COV2 has had a large impact on patients worldwide with pulmonary manifestations being by far the most common, extra pulmonary manifestations have been increasingly reported. It is of utmost importance to have a high index of suspicion for these extrapulmonary manifestations and be able to promptly diagnose and manage them

RECURRENT INTENTIONAL FOREIGN BODY INGESTIONS: A HARD PILL TO SWALLOW

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LEARNING OBJECTIVE #1: Identify the key features and risk factors of recurrent intentional foreign body (RIFB) ingestion

LEARNING OBJECTIVE #2: Recognize how to manage and prevent RIFB ingestions

CASE: A 23-year-old Caucasian inmate with a history of bipolar I disorder, schizophrenia and borderline personality disorder required multiple hospital admissions for intentional foreign body ingestions. In one calendar year, the patient was admitted six times, underwent nine endoscopic procedures that retrieved a total of 64 objects. Items removed included razor blades, pens, batteries, screws, wires, shower curtain hook, electrocardiogram clip, toothbrush and eating utensils. The patient typically presented with diffuse abdominal pain and nausea. Vital signs and laboratory studies were within reference range. The primary imaging modalities were abdominal X-ray and contrast-enhanced computed tomography (CT) scan of the abdomen and pelvis. Patient was managed with endoscopy and, in two cases, with observation alone. Serial abdominal exams and abdominal X-rays were used to monitor the progress of foreign bodies that were difficult to retrieve. A bowel regimen with polyethylene glycol facilitated the passage of the objects. The patient never required surgical intervention. The mean length of stay was 4.17 days. Patient endorsed family stress as a possible trigger for ingestion. The psychiatrist at the prison reported that the recurrent ingestions may be related to compulsions. Patient continued to follow-up closely with psychiatry.

IMPACT/DISCUSSION: Recurrent intentional foreign body (RIFB) ingestion is commonly reported among the prisoner population. Items that are ingested are small and readily available such as pens, razor blades, eating utensils and paper clips. The frequency of ingestion and the number of objects ingested may escalate over time in some patients. Risk factors for recurrent ingestion include male sex, incarceration and the presence of a psychiatric disorder. RIFB ingestion may represent a form of self-injurious or impulsive behavior due to an undiagnosed or undertreated psychiatric condition. Most cases are typically managed with observation and endoscopy. Surgery is reserved for incidences with gastrointestinal perforation or obstruction. Interdisciplinary collaboration is often required to provide optimal care. Literature on preventative strategies is scarce. Identification of high-risk patients, early psychiatric intervention and specialized prison units for close monitoring may be beneficial in limiting recurrence.

CONCLUSION: RIFB ingestion is a complex and costly issue among prisoners and psychiatric patients. Most cases are typically managed with observation and endoscopy. A multidisciplinary approach involving gastroenterologists and psychiatrists is paramount in formulating effective treatment plans. Identification of high-risk patients, early psychiatric intervention and specialized prison environments may help to prevent recurrence.

RHEUMATOID VASCULITIS: A RARE BUT DEADLY ZEBRA

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LEARNING OBJECTIVE #1: Recognize mesenteric ischemia as a complication of rheumatoid vasculitis in patients with longstanding RA presenting with abdominal pain

LEARNING OBJECTIVE #2: Prevent rheumatoid vasculitis by advocating for medication adherence in poorly controlled rheumatoid arthritis

CASE: A 74 year old male with rheumatoid arthritis on hydroxychloroquine, ITP, and treated hepatitis C presented with 4 weeks of abdominal pain. He appeared ill with abdominal tenderness, bilateral hand and knee arthropathy, but no skin rashes or ulcers. He had a WBC of 27K with 25% eosinophils, hemoglobin of 9.5, platelets of 291, RF titer of 1:32, CCP >250, ESR of 44 and CRP of 17.1. Contrast abdominal CT showed no clear etiology for his abdominal pain. Antibiotics were started for suspected intraabdominal infection but discontinued once cultures were negative.

Endoscopy and colonoscopy appeared grossly normal without *H. pylori* or eosinophilic infiltrates on biopsy. Bone marrow biopsy was normocellular with eosinophilia. Given concern for a myeloproliferative neoplasm, steroids were started. His clinical course worsened on day 15 with hemoglobin <7, abdominal pain, and elevated lactate. A CT angiogram revealed innumerate aneurysms in the mesentery suggestive of vasculitis and mesenteric hemorrhage. Despite attempts to coil the aneurysms, the patient passed away on day 16. Autopsy showed diffuse, marked vasculitis with transmural inflammation and fibrinoid necrosis of medium-sized blood vessels, most consistent with polyarteritis nodosa (PAN). However, given his history of RA, rheumatoid vasculitis was favored.

IMPACT/DISCUSSION: This case illustrates the importance of considering mesenteric ischemia secondary to rheumatoid vasculitis in RA patients with unexplained abdominal pain. Rheumatoid vasculitis, an inflammatory process affecting small/medium sized blood vessels, is a rare (3.9 per million), but serious complication of RA, with a high mortality rate (26% over 5 years). Triggers for development of rheumatoid vasculitis are unclear, but patients with longstanding RA (average 10-15 years), especially when poorly controlled, appear to be higher risk. The differential includes polyarteritis nodosa, Churg-Strauss, microscopic polyangiitis, and mesenteric ischemia. These vasculitides can also be associated with eosinophilia.

There are no randomized controlled trials for optimal treatment of rheumatoid vasculitis, but case studies involving GI manifestations have included immunosuppression with steroids and cyclophosphamide, anticoagulation, and surgical intervention. Prompt treatment is challenging due to difficulty distinguishing rheumatoid vasculitis from a wide differential. Although the final diagnosis remains an unsolved mystery, it is important to consider this

rare but deadly zebra as part of a diagnostic schema for abdominal pain in patients with long-standing RA.

CONCLUSION: Rheumatoid vasculitis is a rare but deadly complication of longstanding RA

Adequate control of RA may prevent development of rheumatoid vasculitis

RIGHT VENTRICULAR THROMBUS IN-TRANSIT IN A 35-YEAR-OLD MALE 3 WEEKS AFTER SARS-COV-2 INFECTION

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LEARNING OBJECTIVE #1: Diagnose severe thromboembolic disease in patients with prior SARS-CoV-2 infection

LEARNING OBJECTIVE #2: Recognize the risk of thrombotic sequelae weeks after diagnosis of COVID-19 pneumonia in young patients

CASE: A 35-year-old obese male presented 20 days after diagnosis of COVID-19 pneumonia with dyspnea, fevers, cough, pleuritic chest pain, and hemoptysis. He was tachycardic, tachypneic, hypertensive, hypoxic (SpO₂ of 78% on room air) but afebrile. Objective data were notable for leukocytosis (19.2 k/uL), negative SARS-CoV-2 test, mild right axis deviation on EKG and bilateral infiltrates on chest X-ray. The patient was admitted for acute hypoxic respiratory failure with possible sepsis. In addition, risk stratification scoring indicated an intermediate risk of pulmonary embolism (PE) prompting acquisition of a CT-PE protocol. This study showed an extensive right lower lobar PE with segmental/subsegmental extension. Despite a negative troponin and hemodynamic stability, there was concern for possible right heart strain based on the initial EKG. Therefore, a transthoracic echocardiogram was obtained, showing severe right ventricular (RV) dilation with reduced systolic function, flattening of the interventricular septum and an RV thrombus in-transit. The patient was transferred to the Medical ICU unit for emergent systemic thrombolysis. Symptoms resolved and he was discharged three days later.

IMPACT/DISCUSSION: SARS-CoV-2 infection is associated with an increased risk of developing venous thromboembolism (VTE). However, our case differs from the majority of COVID-19-associated VTE cases in several ways. Firstly, the vast majority of COVID-19 patients who develop VTE require ICU-level care and have laboratory findings consistent with coagulopathy at the time of COVID-19 diagnosis. The patient presented here did not require ICU level care and had no evidence of coagulopathy during his initial diagnosis. In addition, the majority of cases describing COVID-19-associated PE occur in older individuals (average age 65) and are diagnosed during acute SARS-CoV-2 infection. In contrast, our case describes a 35-years-old found to have a right lower lobar PE complicated by an RV thrombus in-transit 20 days after his initial diagnosis of COVID-19. Outside the context of COVID-19, the diagnosis of right heart thrombi carries a very high mortality rate of 27-45% as compared to PE alone (~2.5%). However, few case reports have documented patients with RV thrombi in-transit in the setting of COVID-19, therefore the relative mortality rate within this context remains unknown.

CONCLUSION: These findings indicating that a high degree of suspicion for severe coagulopathy and a low threshold for VTE imaging should be maintained even in young patients, without severe SARS-CoV-2 infection or prior findings of coagulopathy for several weeks after the initial diagnosis of COVID-19 pneumonia.

SARS-COV-2 COMPLICATED BY SILENT MAJOR ARTERY THROMBOSES: A CASE REPORT

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LEARNING OBJECTIVE #1: Describe the clinical presentation and outcome of a case of COVID-19 complicated by extensive arterial thrombosis.

LEARNING OBJECTIVE #2: Utility of CT for the detection of silent arterial thrombosis.

CASE: A 65-year-old man with hypertension and diabetes mellitus type II presented with severe COVID-19 pneumonia after three days of asthenia and anorexia. Home medications were aspirin, atenolol, lisinopril, glipizide, and metformin.

At presentation he had a dry cough, fever to 100.2 F, tachycardia at 118 BPM, respiratory rate of 16, and SpO₂ of 85% while breathing ambient air. Notable tests were elevated d-dimer, fibrinogen, and CRP with low platelets at 125 K/L. Serum creatinine was 0.83 mg/dL. Urinalysis (UA) showed proteinuria and glycosuria. Initial treatment was supportive with O₂ via nasal canula (NC) followed by prophylactic anticoagulation with heparin (Day 1-24), hydroxychloroquine (Day 2-5), azithromycin (Day 2-4), dexamethasone (Day 4-15) and tocilizumab (Day 10).

The patient remained hypoxic with SpO₂ of <90% on 8 L of O₂ via NC. With the use of a nonbreather mask, the SpO₂ was stable at rest at 96% on 15 L but dropped to <90% and he "felt winded" with mild exertion. Due to persistent hypoxia, a CTA of the chest and a CT of the abdomen and pelvis were performed on Day 24. Findings were bilateral pulmonary embolism with wedge consolidation consistent with a left lower lobe infarct; right renal infarction areas involving approximately 70% of the parenchyma with right renal branch artery filling defects/thrombi; and a thrombus within the proximal right profunda femoris artery. There were no intracardiac, aortic, or lower extremity thrombi. Serum creatinine had remained normal. UA was not repeated. ECG showed normal sinus rhythm. He was then treated with therapeutic dose of enoxaparin followed by apixaban.

The patient was transferred to the Medical Intensive Care Unit (MICU) for acute respiratory failure and was subsequently intubated. The patient's MICU course was complicated by septic shock, NSTEMI, and AKI requiring initiation of hemodialysis on Day 43. The patient's condition gradually deteriorated during the remainder of the hospitalization and he expired on Day 51.

IMPACT/DISCUSSION: This report highlights a case of severe COVID-19 complicated by vascular thrombosis at several sites despite prophylactic anticoagulation. The absence of focal clinical findings despite extensive renal involvement and right profunda femoris artery thrombosis is notable. While subtle clinical findings could be missed in severely ill patients, such incidental discovery of arterial thrombosis with COVID-19 has been previously reported. Absence of an embolic focus could suggest in-situ thrombosis and may lead to consideration of revascularization.

CONCLUSION: Clinical deterioration in severe COVID-19 may be associated with silent arterial thrombosis. Clinicians need to maintain a high index of suspicion with timely utilization of CT when clinical response is slow or atypical for isolated COVID-19 disease.

SARS-COV-2 REINFECTION PRESENTING AS ACUTE CEREBELLITIS: AN UNCOMMON PRESENTATION

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LEARNING OBJECTIVE #1: Explore different etiologies of acute cerebellitis

LEARNING OBJECTIVE #2: Diagnose COVID-19 reinfection in a patient w/ multiple documented negative interval tests

CASE: 49-y.o. F with a h/o morbid obesity, SLE, MS (wheelchair bound) was dx'ed w/ COVID-19 in April 2020 after only GI symptoms. Diarrhea persisted for several months; she had multiple f/u (-) COVID tests, C. diff tests, stool cultures, EGD, colonoscopy, and CT scans; 4 mo later, she was admitted for SBO from adhesions, which required a partial resection, c/b post-op surgical wound infection and sepsis. COVID test was again (-); 2 months later, she p/w confusion, incoherent speech, and 5 days of poor oral intake. She was alert, oriented only to self, had tachycardia and L cervical lymphadenopathy. Neuro exam was notable for: severe bulbar dysarthria, vertical nystagmus, upper limb ataxia (L>R), decreased B arm strength (4/5) and leg strength (1/5), symmetric hypoaactive reflexes and grossly abnormal finger-nose-finger (bilateral). O/w, her exam was normal.

Head CT showed B cerebellar hypodensities. MRI brain revealed diffuse restricted diffusion compatible with cytotoxic edema w/ the cerebellum and effacement of the fourth ventricle, consistent with acute cerebellitis (AC). CT C/A/P: notable for L cervical lymphadenopathy. COVID test (+) at this time (confirmed by PCR). Other abnormal labs included Hb 7.1, CRP 2.4, Ferritin 1249, low Vitamin B1, B6 levels. CSF: increased protein w/o monoclonal bands, but was otherwise normal. She was Rx'ed with IV high dose B1 and B6. Tachycardia, mental status change, and dysarthria persisted; a repeat MRI was again c/w AC; restricted diffusion resolved. IV solumedrol 1 mg/kg QD was given for 5 days w/ symptom improvement, though dysarthria persisted. COVID-associated cerebellitis 2/2 reinfection and post-COVID cerebellitis were possible causes. Given multiple negative COVID tests over the previous four months, followed by two consecutive (+) tests and an otherwise (-) workup, COVID reinfection was the likely diagnosis.

IMPACT/DISCUSSION: Acute cerebellitis (AC) is a rare inflammatory syndrome characterized by rapid onset cerebellar dysfunction. Viruses (VZV, EBV, CMV) and bacteria (S. typhi, M. pneumoniae) have been associated w/ AC, occurring either as a 1o infectious or postinfectious process. MRI is the diagnostic modality of choice. AC from SARS-CoV-2, reported only once in the literature, can affect nervous system through direct infection, hypoxia, ACE-2, or the immune system. Prompt dx is important to avoid hydrocephalus and tonsillar herniation. If available, genomic sequencing of SARS-CoV-2 could identify reinfections. More studies are needed to identify various presentations of COVID-19.

CONCLUSION: 1) Infection by SARS-CoV-2 can manifest as acute cerebellitis.

2) SARS-CoV-2 is one of several viruses that can cause acute cerebellitis.

3) COVID reinfection should be considered in patients who have tested negative for more than 3 months and then convert to positive.

SAY YES TO THE DRESS—DRUG REACTION WITH EOSINOPHILIA AND SYSTEMIC SYMPTOMS SYNDROME ASSOCIATED WITH ALLOPURINOL

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LEARNING OBJECTIVE #1: Diagnose DRESS in patients with hematologic aberrancies

LEARNING OBJECTIVE #2: Recognize the association of HLA-B*58:01 with allopurinol hypersensitivity reactions

CASE: A 66 year-old Filipino woman with a history of chronic lymphocytic leukemia presented to the hospital for evaluation of fever and rash. Her symptoms began two days prior to admission with a localized, pruritic rash on her forearm. It subsequently spread across much of her body, sparing the mucous membranes, palms, and soles. She denied any recent illness, sick contacts, or new medications. Exam was consistent with a morbilliform rash. Labs were notable for a lymphocytic predominant leukocytosis without eosinophilia, and a mild transaminitis. A basic infectious workup was negative and she remained afebrile. She was treated with topical steroids with rapid improvement of her rash and discharged with a diagnosis of viral exanthem. Five days later, she returned with fever, worsening rash, and syncope. She was hypotensive on presentation, and exam now revealed a coalescing papular rash with areas of purpura. Detailed medication history revealed that allopurinol had in fact been initiated about a month prior to presentation. Labs showed interval development of peripheral eosinophilia and recurrent transaminitis. A diagnosis of DRESS was made, allopurinol was discontinued, and she was treated with aggressive fluid resuscitation and systemic steroids. Skin biopsy ultimately returned consistent with a hypersensitivity reaction.

IMPACT/DISCUSSION: DRESS is a rare, potentially life-threatening, drug-induced hypersensitivity reaction that can have a wide ranging presentation including skin eruption, eosinophilia, lymphadenopathy, and internal organ involvement. Diagnosis is particularly challenging in those with underlying hematologic malignancy as there are often confounding or masked findings. Although skin biopsy may prove helpful in diagnosis, treatment decisions often must be made on the clinical picture alone, and clinicians must maintain a high index of suspicion.

Allopurinol is a common culprit in a number of severe cutaneous reactions, including DRESS and SJS- TENS. Patients carrying the HLA-B*58:01 allele are particularly at risk. This allele is most prevalent in those of Han Chinese, Thai, and Korean descent, and current American College of Rheumatology guidelines recommend screening these populations for the allele prior to initiation of allopurinol.

CONCLUSION: Diagnosis of DRESS in patients with hematologic malignancy requires a high clinical suspicion as many classic findings may be masked or confounded.

Allopurinol is a frequent culprit medication in DRESS and other severe hypersensitivity reactions. At risk populations should be screened for the HLA-B*58:01 allele prior to initiating allopurinol.

SEVERE PRIMARY PULMONARY COCCIDIOIDOMYCOSIS IN AN IMMUNOCOMPETENT PATIENT WITH HEAVY ELECTRONIC CIGARETTE USE

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LEARNING OBJECTIVE #1: Recognition of vaping as a potential risk factor for severe coccidioidomycosis

LEARNING OBJECTIVE #2: Establishing a relationship between vaping and severe coccidioidomycosis can increase recognition and ensure early, appropriate treatment.

CASE: 20-year-old previously healthy male presented with fever, shortness of breath, productive cough with white sputum, and pleuritic chest pain for two weeks duration. He reported current tobacco use, including 1-2 pipe tobacco cigars daily, and electronic cigarette use, consuming a cartridge every couple of days. On presentation, patient was febrile, tachypneic, tachycardic, and hypoxic requiring O₂ supplementation. Physical exam showed diminished breath sounds in the left lung field. Labs revealed leukocytosis, thrombocytosis and eosinophilia, elevated CRP and procalcitonin. Chest x-ray demonstrated a large, left-sided hydropneumothorax with rightward mediastinal shift. He underwent emergent chest tube placement with studies suggestive of exudative fluid. CT chest showed persistent hydropneumothorax with left basilar consolidation and patchy opacities in the right middle and lower lobes. He was started on empiric therapy with vancomycin, piperacillin/tazobactam, and fluconazole. COVID-19, pneumocystis antigen, HIV, ANA, MPO, PR3 were all negative. Coccidioides IgM and IgG antibodies were positive, with complement fixation antibody titers positive to 1:32. Antimicrobials were narrowed to fluconazole at an increased dosage, and piperacillin/tazobactam for superimposed bacterial pneumonia. Given minimal improvement of pneumothorax, fibrinolytics were instilled in the chest tube. Repeat CT chest showed persistent left pneumothorax and bronchopleural fistula. He subsequently underwent left video-assisted thoracoscopic surgery with complete decortication, wedge resection of left upper lobe nodule, and mechanical pleurodesis. He is doing well post-operatively and is being managed with fluconazole, with signs of clinical improvement.

IMPACT/DISCUSSION: Based on extensive lung involvement, duration of symptoms, and high CF antibody titers, our patient met criteria for severe coccidioidomycosis. Although a clear relationship between electronic cigarette use and severe coccidioidomycosis is yet to be established, we propose that this was a potential risk factor in our patient who lacked any of the known risks for developing severe disease. In patients with history of electronic cigarette use, there have been reports of increased susceptibility to pulmonary disease. Proposed mechanisms of pathogenesis include induction of the pulmonary inflammatory response and oxidative stress by compounds in the vaping products, ultimately leading to tissue damage. E-cigarette or vaping product-associated lung injury (EVALI) has been associated with various pulmonary sequelae, such as acute respiratory distress syndrome, hypersensitivity pneumonitis, and diffuse alveolar hemorrhage.

CONCLUSION: Given the increasing prevalence of e-cigarette use, this warrants further research.

SPLENIC INFARCTION IN SICKLE CELL TRAIT AT LOW ALTITUDE

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LEARNING OBJECTIVE #1: Recognize that splenic infarction can occur in patients with sickle cell trait.

LEARNING OBJECTIVE #2: Recognize that, though risk of infarction is more at higher altitudes, it can rarely happen at low altitudes.

CASE: A 21 year old African -American female with known history of sickle cell trait presented to the emergency department with sharp left upper abdominal pain that worsened with inspiration. She is a resident of Florence, Alabama (which is 550 feet above sea level). She denied any history of medical problems or use of home medications, herbal supplements or illicit drug use, no travel to higher altitudes, trauma or vigorous exercise in the recent past. She did report being diagnosed with COVID 19 about 2 months ago. She didn't have any prior similar complaint and has never been hospitalized with sickle cell complications. She is a current every day smoker for past two years.

On physical examination, left upper quadrant of the abdomen was tender. CT abdomen and pelvis showed large well demarcated area of splenic infarction with enlarged spleen. The hemoglobin at presentation was 13.1, hematocrit 37.5, platelets 133,000 and white cell count 9000. The peripheral smear was normal and blood cultures were negative. Urine analysis showed a specific gravity of 1.016. Covid PCR was negative.

She was treated with intravenous fluids and ketorolac. She was discharged after two days with significant improvement in abdominal pain. By end of two weeks she was pain free.

IMPACT/DISCUSSION: Splenic infarction is a rare manifestation in sickle cell trait patients and most reported cases are from occurrence at a high altitude due to hypoxemia causing sickling and thereby leading to autoinfarction. There are 14 reported cases of splenic infarction occurring at low altitude with first one reported in 1970. In 2015 Seegars et al summarized the reports of splenic infarction at altitude lower than 5000 feet. The commonest patient profile was that of a male patient with co-morbidities leading to infarction. Of the fourteen patients reported, eight had co-morbidities which contributed towards the patient's susceptibility and six patients lacked predisposing factors at low altitude. Our patient in discussion demonstrates no co-existing risks. This affirms that sickle cell trait without the risk of high altitude travel or comorbid conditions should still be considered as a risk factor for splenic infarction. This patient had no previous manifestations of sickle cell crisis making splenic infarction as the first manifestation of sickle cell trait. Thus patients presenting with splenic infarction with no clear etiology should be evaluated for sickle cell trait in the right clinical context.

CONCLUSION: Sickle cell trait can cause splenic infarction in patients without any comorbidities and residing at low altitudes. Splenic infarction in such patients can present for first time in adulthood without any prior history of sickle cell crisis in childhood.

SPONTANEOUS CORONARY ARTERY DISSECTION IN AN OLDER WOMAN WITH UNCONTROLLED HYPERTENSION

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LEARNING OBJECTIVE #1: To recognize spontaneous coronary artery dissection (SCAD) as a cause of nonatherosclerotic myocardial infarction (MI)

LEARNING OBJECTIVE #2: To distinguish between acute management of SCAD and atherosclerotic MI

CASE: A 63-year-old woman with history of breast cancer, hypertension, and hyperlipidemia presented with acute non-exertional chest pain. She recalled a night of decadent food, wine, and marijuana that led to vomiting. This triggered substernal chest pain without dyspnea. Recent nuclear stress test and transthoracic echocardiogram were unremarkable. The patient's medications included

anastrozole, carvedilol, high-intensity statin, and recent course of oral budesonide for microscopic colitis. She denied family history of early myocardial infarction (MI).

On initial evaluation, the patient's blood pressure was 199/97, which improved with carvedilol. Cardiac auscultation was normal, and her chest pain had resolved. ECG showed sinus rhythm and right bundle branch block with T wave inversions in V1-3 consistent from prior. Initial troponin I was 0.2 ng/mL and peaked at 5.3 ng/mL without ECG changes. She was started on medical management for non-ST-elevation MI. Subsequently, coronary angiogram showed severe stenosis of the apical left anterior descending artery (LAD) without significant atherosclerosis. This was presumed to be a spontaneous coronary artery dissection (SCAD) based on its angiographic appearance and the lack of response to intracoronary nitroglycerin. The patient was discharged in stable condition on dual-antiplatelet therapy (DAPT) and increased carvedilol dose.

IMPACT/DISCUSSION: SCAD is a tear in the coronary artery wall that is not related to atherosclerosis or trauma. While SCAD accounts for less than 4% of acute MI, about 90% of cases occur in women, presenting as chest pain. This case highlights presenting features of SCAD. Inciting triggers include emotional or physical stressors that increase arterial shear stress. Over 50% of patients recall a precipitating factor, including vomiting, Valsalva, and recreational drugs.

Diagnosing acute MI due to SCAD is important because its acute management differs from atherosclerotic MI. As in this case, SCAD most commonly affects the LAD. Medical management is preferred to revascularization in stable patients since most lesions will heal spontaneously. Further, revascularization does not prevent recurrent SCAD, which can affect 17% of patients over 3 years. After diagnosis, anticoagulation is stopped and aspirin or DAPT can be continued, though no standard of care yet exists. Beta-blockers have been found to reduce recurrent SCAD by 64% over 3 years, likely from decreasing arterial shear stress. For similar patients with hypertension, beta-blockers with alpha-receptor activity, like carvedilol, may be preferred for management of blood pressure.

CONCLUSION: MI due to SCAD primarily occurs in women, often with precipitating stressors.

Medical management is preferred for acute MI due to SCAD including antiplatelet therapy and beta-blockers.

STATIN-INDUCED MYOPATHY AND HEPATITIS AFTER TICAGRELOR INITIATION

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LEARNING OBJECTIVE #1: Know the possible drug interactions of HMG CoA reductase inhibitor (statin) and commonly used antiplatelet agents

LEARNING OBJECTIVE #2: Understand options for statin therapy in people with statin induced myopathy

CASE: A 75-year-old man presented to his primary care physician (PCP) with two weeks of progressively worsening bilateral anterior thigh pain causing difficulty with ambulation.

One month prior to presentation, he had been hospitalized for non-ST elevation myocardial infarction and in-stent thrombosis after he self-discontinued aspirin therapy. Upon discharge, he was switched to ticagrelor after he was found to be a non-responder to clopidogrel on platelet function tests.

One day prior to admission his PCP discovered AST and ALT elevations to over 400 U/L (normal ranges 11-39 U/L and 11-35 U/L) and instructed the patient to present to the emergency room for further workup. In the emergency room (ED), the patient reported his symptoms started after he started taking ticagrelor, and he denied alcohol use. Past medical history includes hypertension and coronary artery disease treated with five drug eluting stents. He reported adherence medication regimen, which consisted of aspirin, ticagrelor, atorvastatin, amlodipine, hydrochlorothiazide, losartan, and metoprolol. He denied shortness of breath, dyspnea on exertion, abdominal pain, and leg edema. Vital signs were normal. Physical exam was most notable for tenderness to palpation of the thighs bilaterally. AST and ALT were 228 U/L and 158 U/L respectively, and CK was 4600 U/L (normal range: 45-245 U/L).

Urinalysis revealed small blood with 0-4 red blood cells; urine culture produced no growth. Liver ultrasound found a normal liver and biliary tree. Hepatitis B and C serologies were negative. Troponin I was 0.07 ng/mL (normal range: <0.06 ng/mL), though there were no EKG changes from his prior admission. Once admitted to the floor, his atorvastatin was discontinued. The next day his AST and ALT decreased to 57 U/L and 121 U/L, and his CK fell to 715 U/L.

IMPACT/DISCUSSION: Both myopathy and hepatitis occurred in this patient after initiation of ticagrelor, which is a known inhibitor of CYP P450 3A4. The levels of atorvastatin, which is metabolized by CYP P450 3A4, likely increased and caused a dose dependent toxicity, causing the patient's symptoms and lab abnormalities. He was subsequently discharged with improvement of thigh pain.

CONCLUSION: The drug-drug interaction of atorvastatin and ticagrelor has been established. This submission focuses on increasing knowledge of this common interaction. In this case, atorvastatin was discontinued and rosuvastatin was started as it is not metabolized by CYP P450 3A4. This combination is often better tolerated when combined with ticagrelor. The patient returned for outpatient follow-up and was started on rosuvastatin 5 mg with repeat liver function tests ordered with plans titrate as tolerated.

STENOTROPHOMONAS PNEUMONIA IN A CRITICALLY ILL COVID-19 POSITIVE PATIENT

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LEARNING OBJECTIVE #1: It is important to identify etiologic pathogens in cases of VAP. Stenotrophomonas should be considered in immunosuppressed and chronically ill patients and those with COVID-19 infection.

LEARNING OBJECTIVE #2: Levofloxacin provides proper coverage for the treatment of stenotrophomonas, but prognosis remains guarded.

CASE: We present a 70 year-old woman with a history of hypertension, peripheral artery disease, and chronic obstructive pulmonary disease with a chief complaint of dyspnea, fever, and diarrhea. On arrival she was tachypneic and hypoxemic requiring emergent intubation. Initial labs revealed mild leukocytosis (13.2 K/uL), lymphocytopenia (16.2%), and elevated lactate dehydrogenase (LDH 613 U/L). Chest X-ray showed diffuse bilateral infiltrates. She was transferred to the MICU and started on a five-day course of hydroxychloroquine. COVID-19 testing returned positive. Due to elevated inflammatory markers (CRP 50.8mg/dL, Ferritin 1834ng/mL, IL6 82pg/mL) she received one dose of sarilumab. With ongoing hypoxemia (PaO₂/FiO₂ of 130), she was started on a proning protocol and placed on airway pressure release ventilation (APRV). On day 11 post intubation, the patient was noted to have a new fever (101.8 F), leukocytosis (22.0 K/uL), and increased respiratory secretions. Respiratory cultures grew pansensitive E.coli for which she completed a 7-day course of ceftriaxone.

Despite antibiotic therapy, she remained febrile. Repeat respiratory cultures grew S.maltophilia on day 18 so she was started on a 7 day course of levofloxacin. The patient was extubated to high flow nasal cannula on hospital day 25 with ongoing clinical improvement.

IMPACT/DISCUSSION: S.maltophilia is an emerging aerobic, non-fermentative, gram negative bacillus. It is usually a nosocomial multi-drug resistant infection associated with high morbidity and mortality, especially in the immunocompromised. Studies found it creates a biofilm in water systems like Pseudomonas aeruginosa. COVID-19 infected individuals have low immunologic responses making them high risk for mechanical ventilation. In our patient, the bacteria was identified and treated early which is key to reducing morbidity and mortality.

CONCLUSION: It is important to identify etiologic pathogens in cases of VAP. Stenotrophomonas should be considered in immunosuppressed and chronically ill patients with COVID-19 infection. Levofloxacin provides proper coverage, but prognosis remains guarded.

STREPTOCOCCUS AGALACTIAE MITRAL VALVE ENDOCARDITIS

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LEARNING OBJECTIVE #1: Diagnose the invasive manifestations of *S.agalactiae*.

LEARNING OBJECTIVE #2: Recognize the complications of *S.agalactiae* endocarditis and manage them.

CASE: Patient is a 42-year-old female was admitted with worsening shortness of breath, cough productive and fever/chills She was in the ER few days earlier to the admission then she was given antibiotics in the ER and sent home as patient had blood cultures positive for Streptococcus agalactiae which is pansensitive. She developed worsening shortness of breath, fever with chills after going home. A few months earlier she had dental caries but no intervention has been done. She has a known history of COPD with ongoing tobacco use, hypertension, & type 2 diabetes mellitus. Significant Labs on admission: WBC 12.6, platelet count 62, troponin 0.032, VBG showed 7.48/30 0.2/60 1/22.3 on 3 L nasal cannula, lactic acid 3.1. EKG showed sinus tachycardia.

Chest x-ray: bilateral pulmonary infiltrates suggestive of pneumonitis. Vital signs temperature 103.2 °F, heart rate 146, respirations 26, blood pressure in the range of 131/74 mmHg, oxygen saturation 97% on 3 L.

Blood cultures grew *S. agalactiae* and transthoracic echocardiography showed Echogenic density on the anterior mitral valve leaflet suggestive of myxoma or vegetation with moderate. On day 2 of admission she developed shock, oxygen saturation was desaturating and increased to 5 L, but patient was afebrile. She was treated for COVID-19 initially but discontinuation of all the COVID medications once the test is negative.

Patient had transesophageal echocardiogram which showed perforation of anterior mitral leaflet and there was an echogenic density appearing to be cystic in nature. The echo density moved between the left ventricle and the left atrium with systole. Due to positive blood cultures, large vegetation on her mitral valve and impending shock she underwent mitral valve replacement with mechanical prosthesis. Pathology of Mitral valve with vegetation showed extensive necrosis with adherent fibrinoid debris and acute inflammatory exudate, indicative of severe acute bacterial valvulitis/ endocarditis. Postoperatively, she did quite really and discharged home on antibiotics for 6 weeks and anticoagulation.

IMPACT/DISCUSSION: The incidence of invasive infection caused by *S.agalactiae* has increased during recent years. Infective endocarditis (IE) is an uncommon manifestation of *S. agalactiae* invasive disease. The most common clinical presentations of *S. agalactiae* infection include bacteremia without a focus and soft tissue infections. *S. agalactiae* endocarditis is an aggressive disease with a significant complications including embolization, heart failure, and significant mortality.

CONCLUSION: Even though this organism is highly sensitive to penicillin and cephalosporins, cardiac surgery may be necessary for treatment because of the rapid destruction of the valves. Early surgery should be considered, especially in those with large vegetations > 1 cm, embolization, heart failure, and failure of medical treatment.

STROKE IN YOUNG- TIME TO CONSIDER OTHER CAUSES

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LEARNING OBJECTIVE #1: Identify risk factors for stroke in young adults

LEARNING OBJECTIVE #2: Discuss a possible link between pre-workout supplements, cannabis and ischemic stroke

CASE: A healthy, active 38-y.o. male presented to the ED with sudden onset left face and arm weakness and slurred speech that began the previous evening. Past medical history was notable for sickle cell trait and possibly hypertension without a formal diagnosis. He smoked marijuana a few times a week but denied tobacco and alcohol use. He used workout supplements including C4

and “Beyond Raw” to enhance his performance. Family history was significant for hypertension. On exam, he was a young, well-built male who was alert and oriented. BP = 178/110; vital signs were otherwise normal. Neurological exam was significant for L facial droop, mild LUE pronator drift, decreased L hand grip, decreased LUE and LLE sensation and ataxia. Labs including TSH, HbA1C, RPR, ESR, ANA, Homocysteine, PT, INR, HIV were normal. ECHO and ECG were normal. Urine tox screen was positive for THC. CT/CTA head and neck were normal. MRI brain showed 1 cm acute or early subacute lacunar type infarction of the posterior right striatocapsular region extending into the ventral aspect of the right thalamus. He was outside the time window for TPA. He was started on aspirin, clopidogrel, statin and low dose lisinopril. BP was in 130s and symptoms resolved at discharge.

IMPACT/DISCUSSION: Ischemic strokes are fairly rare in young adults. Lacunar infarcts are usually due to arteriolar occlusion or loss of autoregulation associated with variations in systemic blood pressure of the deep penetrating arteries. We suspect our patient’s elevated blood pressure on admit was secondary to stroke. The resolution of hypertension at discharge makes long standing uncontrolled hypertension unlikely, and other causes of stroke such as drug misuse should be considered. Preworkout supplements are popular among young adults but some of the stimulants, including caffeine, exceed daily recommended doses especially when combined with other supplements. They are known to produce cardiac arrhythmias, raise blood pressure, and reduce blood flow by contracting vascular smooth muscle and altering cerebral metabolism. Several case reports illustrate dangerous side effects related to supplement use including hemorrhagic stroke, myocardial infarction and death. This case report also explores Cannabis use as an adjunct to his diagnosis as studies have associated Cannabis with stroke. Cannabis, one of the most widely used illicit drugs, is known to cause tachycardia, hypertension, postural hypotension, and vasospasm. Physicians need to be aware of this possible link between pre-workout supplement use, Cannabis and ischemic stroke and consider supplement use and toxicology screening on admit.

CONCLUSION: Stroke in young requires wider work up to exclude infectious, autoimmune, hypercoagulable, and toxin associated causes. Explore pre-workout supplement and cannabis use when work up negative for common causes.

SUSTAINED ELEVATION IN LACTATE FOLLOWING AN EPISODE OF UNRESPONSIVENESS IN AN ACUTELY PARANOID PATIENT: A CASE REPORT

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LEARNING OBJECTIVE #1: Recognize causes of elevated lactate

LEARNING OBJECTIVE #2: Identify need for communication modification in patients with underlying psychiatric illness

CASE: A 21-year-old male with no past medical or psychiatric history was brought to the ED after being found unresponsive and refractory to naloxone. After fluid initiation, he became alert but resistant to questioning. Collateral information was provided by his mother who reported increasing isolation and inability to care for himself adequately over the past few months. He was tachycardic to 112 with otherwise stable vital signs. Physical exam showed restrictive affect. Labs were notable for a WBC of 18.3, creatinine of 1.4, anion gap of 25.0, lactate of 5.9, urinalysis significant for 2+ ketones, and negative UDS and BAL. ECG showed sinus tachycardia. CT of the head, chest, abdomen, and pelvis were unremarkable. Throughout his stay, he remained resistant to questioning and exhibited paranoia, requesting his door remain closed. Psychiatry concluded that he lacked capacity and his mother was made surrogate decision maker. Syncopal workup with EEG, serial ECGs, TTE, and CTA chest was negative, as was a malignancy and infectious work up. Nephrology recommended work up with VBG, β-hydroxybutyrate, cortisol, and d-lactate, which was unrevealing. Psychiatry requested HIV, RPR, ANA, heavy metal, MMA, and Lyme titer levels, which were negative. On day 16, a nurse entered the room to the patient doing pushups. Questioning revealed he was exercising prior to lab draws and was counseled to refrain. His elevated lactate resolved. It was concluded that his elevated lactate was due to the

coinciding timing of his lab draws and exercise, which was overlooked due to his paranoia. He was reevaluated by psychiatry and provided with outpatient follow up.

IMPACT/DISCUSSION: Two distinct casual states of elevated lactate have been identified: those related to tissue hypoxia/hypoperfusion (type A) which include hypovolemia, sepsis, cardiopulmonary arrest, or cardiac failure, and those not related to tissue hypoxia/hypoperfusion (type B) which include drugs or toxins, seizures, malignancy, alcoholism, HIV infection, beta-adrenergic agonist use, thiamine deficiency, or mitochondrial dysfunction [1-3]. Elevations in type B stem from either a dysfunction in metabolism or an overproduction from increased metabolism. The latter can be seen with muscular exercise as a result of processes related to anaerobic oxidative phosphorylation and serves as a vital carbohydrate source in increased energy demand [4,5].

CONCLUSION: This case highlights the fact that elevated lactate is not always pathologic. With this patient, who presented acutely paranoid, asking about exercise habits may have revealed the etiology of his persistently elevated lactate earlier. This serves as a reminder that the fundamentals must not be overlooked when work up yields no pathology, especially in cases where psychiatric illness may play a role in a patient presentation.

TAKING A PAGE OUT OF THE SECONDARY HYPERTENSION WORKUP: A CASE OF LIVER METASTASES CAUSING PAGE KIDNEY PHENOMENON

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LEARNING OBJECTIVE #1: Recognize when to initiate a secondary hypertension workup

LEARNING OBJECTIVE #2: Understand the mechanisms that drive hyperreninemic hypertension

CASE: Page kidney phenomenon is a rare condition caused by external compression of the renal parenchyma. This compression causes microvascular ischemia, thereby activating the Renin- Angiotensin-Aldosterone System (RAAS), resulting in hyperreninemic hypertension. The phenomenon is typically reported in trauma or post- surgical cases. Here we describe an atypical case in a woman with colon adenocarcinoma and liver metastases.

A 63-year-old woman with an unknown past medical history presented to the emergency department for 3-4 weeks of abdominal pain, unintended 9-pound weight loss, fatigue, and weakness. Her vital signs were notable for a blood pressure of 211/129 mm Hg and a BMI of 14.7 kg/m². Physical exam was notable for hepatomegaly and the absence of carotid or abdominal bruit. Her labs were remarkable for a potassium of 2.3 mEq/L. An abdominal CT scan showed innumerable hepatic lesions and wall thickening of the mid sigmoid colon. Colon and liver biopsies showed moderately differentiated sigmoid adenocarcinoma. During this workup, she was persistently hypertensive and hypokalemic, despite treatment with escalating doses of amlodipine, labetalol, and spironolactone. As she failed treatment with three antihypertensives, including a diuretic, and had persistent hypokalemia, we initiated a secondary hypertension workup. The workup revealed a renin activity of 65.36 ng/mL/h (normal < 5.82 ng/mL/h), aldosterone of 52 ng/dL (normal < 16 ng/dL), and an aldosterone-to-renin ratio of 0.79, suggesting secondary hyperaldosteronism driven by excess renin production. Her abdominal CT scan showed a liver span of 17.6 cm (female average 14.9 cm) with the right kidney measuring 7.25 cm by 4.8 cm (average length 10.9 cm). There were no renal or adrenal gland lesions or masses. Renal vascular ultrasound revealed no abnormalities. The elevated renin activity was attributed to external compression from substantial liver metastasis, causing Page kidney phenomenon. She was transitioned to lisinopril, an Angiotensin Converting Enzyme (ACE) inhibitor, to target RAAS activation. Her blood pressure and potassium normalized after starting lisinopril, and she was discharged with close outpatient follow-up.

IMPACT/DISCUSSION: This case illustrates the importance of working up resistant hypertension and understanding the underlying biochemistry. Page kidney phenomenon caused by external compression from tumor burden is a rare but treatable cause of elevated renin and RAAS activation. By targeting

RAAS activation with an ACE inhibitor and reducing tumor burden with chemotherapy, hypertension can be controlled.

CONCLUSION: Consider a secondary hypertension workup when a patient is on three antihypertensives and has other physical exam or lab findings suggestive of a secondary cause.

The downstream effects of excessive renin can be effectively mitigated with an ACE inhibitor.

THE CHALLENGE OF MULTIPLE RING-ENHANCING LESIONS

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LEARNING OBJECTIVE #1: Review a patient's history as well as non-invasive and minimally invasive modalities when assessing multiple ring-enhancing lesions.

LEARNING OBJECTIVE #2: Early rehabilitation after stroke lead to marked improvement of the patient-reported disease burden.

CASE: A middle-age male with uncontrolled hypertension, hyperlipidemia, and diabetes mellitus type 2 presented with new-onset dizziness, blurred vision bilaterally, headache, ataxia with right sided leaning, and right-sided tinnitus. He denied fevers, chills, night sweats, and weight loss. General workup was only significant for a hemoglobin A_{1c} of 11.8%. Imaging including MRI of the brain demonstrated multiple thin ring-enhancing lesions (1.2-3.0 cm) throughout the cerebral hemispheres bilaterally, right thalamus, and the cerebellum. Cerebrospinal fluid analysis was unremarkable. A suboccipital biopsy was performed which resulted in a cortex with reactive gliosis and multiple well- defined areas with sharp demarcations between the foci and normal parenchyma, consistent with a vascular insult with an infarct. There was no evidence of neoplasm and no atypical lymphocytes to suggest lymphoma. Early rehabilitation was implemented with medication optimization.

A follow up MRI approximately three weeks later showed resolution of diffusion restriction in the multifocal lesions supporting subacute stroke. At his six month follow up with neurology, his gait had markedly improved.

IMPACT/DISCUSSION: Neuroimaging of stroke patients commonly demonstrate edema, loss of grey/white matter differentiation, and hypoattenuations; however, patients may also present with ring-enhancing lesions. A timely evaluation is paramount as there is a wide differential diagnosis that includes neoplasm, infection, demyelinating disease, or infarction. As there are no pathognomonic findings on neuroimaging, a thorough patient history and noninvasive workup in conjunction with neuroimaging is needed.

The challenge practitioners may experience is that preliminary non-invasive and minimally invasive workup may be equivocal, hence a histopathological analysis should be considered. Knowing when to pursue a biopsy is challenging as specific guidelines have not been established by the American Academy of Neurology for immunocompetent patients. However, it was shown that when the following features were present, a brain biopsy is more commonly pursued: motor deficit, confusion/coma, single lesion, >3 cm lesions, midline shift, and complete ring enhancement.

CONCLUSION: The current case highlights the need for a thorough review of a patient's history and review of the non-invasive and minimally invasive modalities when assessing multiple ring-enhancing lesions because guidelines have not been established for when to pursue brain biopsy. Furthermore, a critical part of stroke management is the goal of improving quality of life. Although the patient's diagnosis was initially unclear, rehabilitation was initiated shortly after biopsy and led to marked improvement of the patient-reported disease burden.

THE IMPACT OF PYRUVATE KINASE DEFICIENCY IN A PATIENT WITH COVID-19 PNEUMONIA

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LEARNING OBJECTIVE #1: Recognize the clinical features of pyruvate kinase deficiency (PKD) in a patient infected with coronavirus disease 2019 (COVID-19) pneumonia

LEARNING OBJECTIVE #2: Assess the role of highly efficient oxygen transport in PKD

CASE: A 35-year-old G4P2 pregnant woman at 28 weeks of gestational age with a history of chronic anemia due to PKD status post splenectomy at age 5, distant blood transfusions, and pre-eclampsia presented with chills, exertional dyspnea, and frontal headache for 2 days. Vitals on initial presentation: temperature 99.1°F, blood pressure 118/58 mm Hg, heart rate 122 beats per minute, respiratory rate 22 breaths per minute, and oxygen saturation (SaO₂) 98% on room air. On exam, she was noted to be tachycardic and mildly tachypneic with bibasilar crackles on auscultation. She was tested positive for COVID-19 via rapid antigen testing. Chest x-ray shown bilateral patchy infiltrates. Labs were remarkable for white blood count 16,000, hemoglobin 6.5 (at baseline for the patient), ferritin 686, D-dimer 2740, and C-reactive protein 1.1. Given the complexity of the case, a multidisciplinary team was assembled and approved the following regimen: dexamethasone, ceftriaxone, azithromycin, remdesivir, high-dose enoxaparin and famotidine. Despite her chronic severe anemia and new COVID-19 pneumonia, interestingly she never developed hypoxia with SaO₂ ranged 94-99% during her hospital stay. No supplemental oxygen or blood transfusion was required. Eventually, she was safely discharged home after finishing a 5-day course of remdesivir.

IMPACT/DISCUSSION: PKD is the most common cause of chronic hereditary non-spherocytic hemolytic anemia. The severity of anemia ranges from fully compensated forms in adults to life-threatening neonatal anemia requiring exchange transfusions. A deficiency in red cell pyruvate and ATP leads to a compensating increase in 2,3-diphosphoglycerate, which subsequently shifts the oxyhemoglobin dissociation curve (ODC) to the right, facilitates oxygen unloading, and results in highly efficient delivery of oxygen to the tissues. People with PKD exhibit greater tolerance to increasing oxygen demand. Studies have shown COVID-19 infection results in increased oxygen demand and dyspnea in 29% of the infected population. Pregnancy also causes increased oxygen demand due to elevated oxygen consumption. Despite her COVID-19 pneumonia, pregnancy status, and chronically severe anemia, interestingly the patient's SaO₂ was well maintained above 94% in the setting of PKD possibly as part of a protective compensatory mechanism. In any similar case, the decision to provide supplemental oxygen or transfuse blood is often nuanced and therefore should be relied on the patient's overall clinical picture rather than SaO₂ or hemoglobin thresholds alone.

CONCLUSION: The rightward shift of the ODC in PKD prevented significant dropping of SaO₂ in a patient with COVID-19 pneumonia. The need for supplemental oxygen or blood transfusion in patients with PKD and COVID-19 pneumonia should be symptom-directed.

THE LIVER LOSES: A CASE OF RAPID-ONSET AUGMENTIN-INDUCED HEPATOTOXICITY

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LEARNING OBJECTIVE #1: Identify risks and benefits of antibiotic use before treating for symptoms

LEARNING OBJECTIVE #2: Recognize features of drug-induced hepatotoxicity

CASE: 78 year old M with PMH of SDH, afib, CHF, HTN, and HLD presenting with urinary retention. He was admitted 1 week ago for a SDH. Since then, he has had difficulty passing urine, resulting in his return to the ED. His medications include Keppra, Coreg, Entresto, Spironolactone, and Simvastatin. He takes Tylenol for back pain. No allergies. No pertinent family history. Rare alcohol use, former smoker 25 years ago, and no other drug use. ROS positive for diarrhea, left back pain. Negative for fever, cough, dyspnea, chest or abdominal pain.

PE

HEENT: Surgical scar on R head

Heart: Normal, no LE edema

Lungs: Normal

Abdomen: No suprapubic or RUQ pain, no flank pain

Labs with unremarkable CMP and CBC

CT A/P- possible cystitis

UA- unremarkable

C diff- positive

Hospital course included consulting urology and starting PO Vanc on day 2. On day 3, he sustained a fever to 101.2 without symptoms. Fever workup significant for CXR with L retrocardiac opacity, likely atelectasis but could not exclude infection. Augmentin was started on day 3. On day 4, his normal LFTs increased to T bili 1.5, Alk phos 444, AST 416, ALT 416. AST/ALT downtrended on day 5 but alk phos uptrended until day 8, max 656. No symptoms of jaundice, pruritus, RUQ pain, etc. Viral serologies were unremarkable. Hepatology consulted- LFT pattern most consistent with Augmentin-induced hepatotoxicity, although such acute injury after 1 day of antibiotics was unusual. Other possibilities included NASH (RUQ U/S without steatosis) vs portal venous congestion (echo unremarkable) vs other DILI (from Tylenol, statin). Tylenol, statin, and Augmentin were stopped, and his liver labs normalized on follow-up 1 month later.

IMPACT/DISCUSSION: This case reinforces that even the most common medications, such as Augmentin, can have serious side effects. While it can be a reflex to treat any radiologic sign of infection, particularly in the setting of a fever, providers should remember that any antibiotic carries risks.

Additionally, this case highlights various patterns of DILI. This patient's liver injury was consistent with a cholestatic pattern, with a more predominant increase in alk phos than in AST/ALT. This is typical of Augmentin. He was also taking Tylenol, (typically a hepatocellular pattern with higher AST/ALT) and simvastatin (statins may cause both patterns).

Lastly, this case is interesting due to the rapid onset of liver injury, within 24 hours of starting Augmentin rather than the usual days to weeks. One possible explanation is previous exposure to the drug, resulting in a more acute rise in liver enzymes.

CONCLUSION: - There are different patterns of DILI - cholestatic, hepatocellular, or mixed. Some medications are associated with one pattern over another.

- While most DILI takes days to weeks to occur, previous drug exposures can result in more acute responses.

THE MILKY TAP: A CASE OF PANCREATIC NEUROENDOCRINE TUMOR PRESENTING AS CHYLOUS ASCITES

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LEARNING OBJECTIVE #1: Manage workup of neuroendocrine tumor.

LEARNING OBJECTIVE #2: Recognize complications of neuroendocrine tumor.

CASE: A 75 year-old man with 1-year history of diarrhea presented with 2 weeks of progressive dyspnea. He was afebrile with BP 110/60 and SaO₂ 94% on room air. On physical exam, he was cachectic, with dullness at both lung bases, abdomen distension with fluid wave, and 3+ lower extremity edema. Stool pathogen studies were negative. CT and MRI of chest, abdomen, and pelvis revealed multiple pulmonary emboli, large pleural effusions and ascites, enhancement of the pancreatic head, and peripancreatic lymphadenopathy. He received therapeutic anticoagulation and diuresis. Diagnostic paracentesis yielded exudative fluid samples negative for infection or malignancy. Endoscopic ultrasonography revealed a supra-pancreatic 25mm mass compressing the common bile duct. Biopsy of the mass was positive for synaptophysin, a neuroendocrine tumor (NET) marker. Gallium-68 DOTATATE Positron Emission Tomography/Computer Tomography (PET/CT) staging revealed metastases to the uncinate process, and para-aortic and para-esophageal lymph nodes. 24-hour urinary 5-HIAA (5-hydroxy-indole acetic acid) and chromogranin levels were 11.5mg (normal <6) and 483ng/mL (normal <140), respectively. Large volume paracentesis yielded 4L of milky, non-malignant fluid with triglyceride of 318 mg/dL, which was negative for 5-HIAA or chromogranin. Octreotide led to clinical improvement.

IMPACT/DISCUSSION: Pancreatic NET are rare, indolent tumors with clinical presentation dependent on type of hormone production. With a serotonin-secreting NET, carcinoid syndrome may also be present, with diarrhea, wheezing, and elevated levels of urinary serotonin metabolite 5-HIAA. Chylous ascites in our patient is an exceptional complication of pancreatic NET caused by local lymphatic compression by tumor. Metastasis may occur to liver or peritoneum, the disease-specific survival being worse with peritoneal spread (HR 2.9). Our case illustrates the importance of aggressive staging as findings of metastases can impact management and prognosis. In addition to traditional CT, MRI, and EUS imaging modalities, we also pursued complete analysis of ascitic fluid and utilized a specialized, NET-somatostatin receptor targeted whole body scan. Somatostatin analogue-labeled (Ga-68 DOTATATE) PET/CT is highly sensitive and specific for diagnosis and localization of NET, but is not widely available. Treatment of NET is targeted at the tumor itself and consequences of excess hormone. Pancreatic NET and chylous ascites are remarkably responsive to dietary modification, diuretics, and somatostatin.

CONCLUSION: - Prognosis and management of NET depends on extent of metastases and type of hormone secreted.

- Chylous ascites from mechanical compression of lymphatics is a rare complication of NET.

- Thorough physical examination, urine and ascitic fluid studies, biopsy of tumor, and NET-targeted functional imaging can expedite diagnosis and treatment.

THERAPEUTIC CONUNDRUM: MASSIVE PULMONARY EMBOLISM (PE) COMPLICATED BY INTRA-ABDOMINAL HEMORRHAGE

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LEARNING OBJECTIVE #1: Recognize right ventricular RV failure complicating PE

LEARNING OBJECTIVE #2: Describe the role of Extracorporeal Membrane Oxygenation (ECMO) in management of PE in unstable patients

CASE: 55 year old female with history of hypertension presented with dizziness and dyspnea since 5 days. She reported 35 pounds weight gain, increase in abdominal girth along with irregular menses over last 6 months. Admission vitals: pulse 110 bpm, BP 90/48 mmHg, respiratory rate 20/min and saturation 97% on 2 L nasal cannula oxygen. Physical exam was significant for abdominal distension.

Lab findings: Hb 6 g/dl, platelet 150 k/mm³. CT scan of chest, abdomen and pelvis showed bilateral PE with massive clot burden and RV distention and a large 30 cm intra-abdominal mass. TTE confirmed RV strain with flattening of interventricular septum and McConnell's sign with RV free wall akinesis. US Doppler of lower extremities showed thrombus in left popliteal vein. Given patient's anemia, thrombocytopenia and tumor, initial decision was made to treat the PE conservatively with heparin drip however after 2 days patient became unstable. Repeat imaging showed large volume of intra-abdominal bleeding. Patient required emergency laparotomy for intra-abdominal bleed. Due to concerns of RV dysfunction combined with an acute bleed with hemodynamic disturbances of general anesthesia and large volume resuscitation, peripheral veno-arterial extra-corporeal membrane oxygenation (VA-ECMO) was initiated immediately prior to emergency laparotomy to stabilize the patient's RV dysfunction. During laparotomy, a 35 cm pelvic tumor with 5 L of bloody fluid was removed with total abdominal hysterectomy and bilateral salpingo-oophorectomy. She was started on low dose heparin on post-operative day (POD) 1. Daily TTEs showed gradual improvement of RV function. On POD 6, ECMO was discontinued. Embolectomy was not done as RV function improved. Patient remained hemodynamically stable, transitioned to oral anticoagulation (AC) and discharged after 2 weeks. Tumor pathology was granulosa cell tumor of ovary.

IMPACT/DISCUSSION: Treatment modalities for unstable PEs: Systemic AC has varying effects on RV support in acute period. Systemic thrombolysis has relatively high bleeding, stroke risk and little immediate RV support. Catheter based therapies are not efficacious in unstable patients with

questionable immediate RV support. Surgical embolectomy is effective for immediate and long term RV recovery and survival but requires AC for cardiopulmonary bypass which in setting of acute bleed could prove catastrophic. ECMO has been shown to be safe and effective means of supporting RV in setting of acute PE, especially in unstable patients. ECMO decompresses RV and provides mechanical circulatory support permitting clot resolution and RV recovery.

CONCLUSION: This case highlights successful use of ECMO to treat RV failure caused by acute PE in setting of life threatening intra-abdominal bleed when thrombolytic therapy or surgical embolectomy are not feasible.

THE SHOCKING TRUTH: A CASE OF PERSISTENT ATRIAL FIBRILLATION CARIOVERSION WITH DOMESTIC ELECTRICAL SHOCK

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LEARNING OBJECTIVE #1: Recognize patients can convert to normal sinus rhythm from atrial fibrillation with domestic electrical shocks resulting in symptomatic improvement.

LEARNING OBJECTIVE #2: Understand management for patients who come in after suffering a domestic electrical shock.

CASE: An 82-year old Caucasian female with a past medical history of coronary artery disease, percutaneous transluminal coronary angioplasty stent in her left anterior descending artery, hypertension and persistent atrial fibrillation with preserved left ventricular systolic function (Ejection Fraction=50%) presented to the clinic with reported improvement of her persistent atrial fibrillation symptoms following a witnessed electric shock while attempting to change a lightbulb in her home. She was scheduled for electrical cardioversion a week later. She reported the incident over the phone to her physician and was advised to present to the clinic for immediate evaluation. The patient reported relief from both palpitations and shortness of breath and an improved energy level immediately after the shock. She had been managed for her atrial fibrillation with rate control therapy (atenolol) and warfarin therapy for anticoagulation. Physical examination revealed regular pulse in bilateral upper and lower extremities, and normal first and second heart sounds. An ECG was performed which confirmed the patient was in normal sinus rhythm. The patient was advised to continue warfarin anticoagulation. The patient was reevaluated in four weeks with her cardiologist and repeat ECG confirmed normal sinus rhythm. An ECG at her six month follow up displayed continued normal sinus rhythm.

IMPACT/DISCUSSION: This case illustrates an unusual incident of electrical conversion of atrial fibrillation to sinus rhythm by domestic low-voltage electric shock. Atrial fibrillation is typically managed with either rate control or rhythm control, or less commonly catheter ablation and pacing. Sinus rhythm is typically achieved by either electrical or pharmacologic cardioversion, with electrical cardioversion typically very successful, showing success rates of up to 95% with biphasic shock. Electrical cardioversion through a light bulb socket, to our knowledge, has yet to be reported in the literature. Several, unsuitable for in-hospital use techniques for atrial fibrillation conversion have been reported including: jumping off a ladder or into a cold water tank or grasping an electric cattle fence. One report cites accidentally hitting the stretcher transporting the patient to the intervention room heavily against the door frame, resulting in sinus rhythm.

CONCLUSION: Providers should be aware of the possibility of cardioversion in a patient with atrial fibrillation with non-traditional techniques including domestic electrical shock. This is particularly true for the internist admitting a new patient presenting with a similar history.

THE TALE OF A BLOODY KNEE: A RARE PRESENTATION OF ACQUIRED HEMOPHILIA

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LEARNING OBJECTIVE #1: Recognize hemarthrosis as a rare manifestation of acquired hemophilia

LEARNING OBJECTIVE #2: Assess and diagnose by prompt hematological consultation and workup using mixing studies

CASE: A 69 years old man with Type 2 DM, Stroke, CAD s/p two stents on dual antiplatelet therapy (DAPT), hypertension, chronic kidney disease, and COPD presents to the Emergency Department with right knee pain. It started when he was grilling outside, located diffusely, sharp, non-radiating, worse with movement and progressively worsening to 10/10. There was no history of trauma to the knee. In the ER, knee joint was aspirated, which was sterile, showed calcium pyrophosphate crystals, and significant blood. His WBC count was $12.5 \times 10^3/\mu\text{L}$, Hb 10.5 g/dL, platelets $296 \times 10^3/\mu\text{L}$, Hct 33%. His INR was 1.1, PT 14.3 sec, PTT 80 sec. He was admitted for observation of intractable pain, and DAPT was temporarily withheld. Overnight, he developed effusion in the same knee again, aspirated the next morning, showing a bloody effusion with no crystals or organisms. Upon further inquiry, he reported that he had persistent bleeding from a tooth extraction done one month back and from a laceration on his scalp from shaving. He has undergone right knee surgery, cholecystectomy, rotator cuff repair, and 2 coronary stents without any incidence of bleeding in the past. No history of von Willebrand disease or hemophilia or other bleeding diathesis in his family. His prolonged PTT made us check his records from past admissions for comparison. We noted prolonged PTT for the last 20 years. DAPT does not affect PT/INR/PTT. This prompted work up of this chronically elevated PTT with a mixing study- which did not correct with mixing- pointing towards the presence of an acquired circulating inhibitor. Factor VIII activity was <1 (normal 50-180 % normal).

IMPACT/DISCUSSION: The incidence of acquired hemophilia A is 1.34-1.48/million/year in adults. It is uncommon in children, incidence increases with age, and is underdiagnosed in the older population. Our patient had a typical presentation with spontaneous bleeding and an isolated prolonged PTT. 50% of cases are thought to be idiopathic, whereas the other half have an underlying disorder or infection, like lupus, rheumatoid arthritis, multiple sclerosis, Sjogren's, temporal arteritis, and drugs like penicillin, interferons, and pregnancy (mainly in the postpartum period). Management revolves around treating the bleeding and eradication of the inhibitor. Use of bypassing agents (recombinant activated factor VII and activated prothrombin complex concentrates) is recommended in acute bleeding. Once it is diagnosed, commence immunosuppression with corticosteroids alone or with cyclophosphamide. Rituximab is also used in this patient group.

CONCLUSION: It is imperative to investigate further the etiology of a bloody aspirate obtained via arthrocentesis, especially when there is a prolonged PTT. Acquired hemophilia is a rare but life-threatening disorder that needs to be on the differential in such scenarios.

THYROID SEQUEL OF COVID-19.

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LEARNING OBJECTIVE #1: Evaluation of thyroid dysfunction in patients with COVID-19 infection with persistent tachycardia.

LEARNING OBJECTIVE #2: Recognizing Sub-acute Thyroiditis (SAT) as a possible sequel of SARS-CoV-2 infection.

CASE: A 30-year-old healthy Caucasian lady presented to the emergency room with a syncopal episode. She had been unwell for the past 2 weeks with upper respiratory symptoms. She was vitally stable except for a heart rate of 102 and ECG showed sinus tachycardia. Her routine laboratory investigations and CT head done for syncope work-up were unremarkable. Chest x-ray showed an infiltrate in right lung base and SARS-CoV-2 PCR test was positive. Thyroid profile done to evaluate persistent tachycardia, revealed thyroid-stimulating hormone (TSH) level of <0.01 and elevated free T3 of 7.97. Her T4 and free T4 levels were normal. Her mother had Graves' disease and father had atrial fibrillation.

Patient was monitored with telemetry to exclude arrhythmia and cardiogenic syncope, in view of hyperthyroidism induced tachycardia. Her hospital stay

was uneventful and she was discharged with a referral to primary care physician (PCP) for evaluation of new onset hyperthyroidism. During self-isolation, she had palpitations, insomnia, fatigability and unintentional weight loss. Five weeks later, on PCP evaluation, her TSH remained <0.01 with normal free T3 and free T4. Thyroid ultrasound was normal and thyroid uptake scan revealed low 24-hour uptake at 8% prompting an endocrinology referral.

She presented to the endocrinology office, eight weeks following the syncopal episode, when her TSH was low at 0.067, but free T3 and free T4 were normal. A normal thyroid-stimulating immunoglobulin value ruled out Graves' disease. Antibodies to thyroglobulin and thyroid peroxidase were negative.

She was started on propranolol 20 mg and prednisone 20 mg once daily. Two weeks later she reported improvement in symptoms, with TSH normalizing to 2.9. Prednisone was tapered and stopped.

IMPACT/DISCUSSION: SAT is a self-limiting sequel of numerous viral infections, but relation to COVID-19 infection is not established. Studies have demonstrated that mRNA encoding for ACE2 which is the receptor for SARS-CoV-2 entry is expressed in thyroid follicular cells, making thyroid a potential target. The first case of COVID-19 associated SAT was reported in Italy in February 2020.

Our patient had an extra-pulmonary manifestation of SARS-CoV-2 infection with persistent tachycardia secondary to thyrotoxicosis. WHO COVID-19 clinical management guidelines do not recommend routine assessment of thyroid functions during hospitalization. However, it is reasonable to screen for thyroid function tests in patients with COVID-19 infection with persistent tachycardia.

CONCLUSION: Patients presenting with thyrotoxicosis symptoms should undergo thyroid evaluation. SAT has been reported as a complication of COVID-19 infection with symptomatic improvement after treatment with prednisone.

TO BE OR NOT PE, THAT IS THE QUESTION: AN UNCOMMON PRESENTATION OF A PULMONARY EMBOLISM

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LEARNING OBJECTIVE #1: Discuss an uncommon clinical presentation of pulmonary embolism

LEARNING OBJECTIVE #2: Discuss the need for early diagnosis and treatment of pulmonary embolism

CASE: A 76-year-old male with a past medical history significant for coronary artery disease, diabetes mellitus, unilateral severe carotid artery stenosis, and chronic kidney disease stage IIIb presented to the emergency department after an unwitnessed syncopal event. He was making breakfast when he lost consciousness with no prodromal symptoms. He was unsure of how long he lost consciousness but denied any postictal confusion upon regaining consciousness. He also denied any tongue biting or loss of bowel/bladder contents. His initial labs were notable for a Cr of 2.3 (baseline 2.1), thrombocytopenia, and anemia. He appeared comfortable, being afebrile with a BP of 113/61, HR of 67, RR of 18 with pulse oximetry 99% on room air. Telemetry noted consistent sinus rhythm. Initial ECG revealed sinus rhythm, rate of 78 beats per minute with a large S wave in lead I and a Q wave plus an inverted T wave in lead III. D-dimer was elevated at 606 ng/ml (ULN 225 ng/ml). Given his renal function, a V/Q scan was ordered which detected a mismatch in the right upper lobe consistent with a pulmonary embolism.

Doppler ultrasound of his lower extremities were negative. He was started on oral anticoagulation and discharged with a Holter monitor with plans to follow up with his primary care provider.

IMPACT/DISCUSSION: Acute pulmonary embolism is common; however, they are rapidly fatal and require a high degree of clinical suspicion to ensure prompt diagnosis and treatment. Clinical presentation varies widely from being asymptomatic to developing sudden death. In most cases patients tend to present with some pulmonary symptoms such as dyspnea, or pleuritic chest pain (1). Syncope, an unusual presenting symptom for pulmonary embolism occurs in 10% of patients. While ECG abnormalities are commonly seen in patients with a pulmonary embolism, they are often nonspecific. The most common ECG finding in a patient with PE is sinus tachycardia (2). The

"S1Q3T3" pattern also known as McGinn-White Sign can indicate acute right heart strain and is seen in only 10% of patients with pulmonary embolisms (3). In this case our patient presented with syncope initially concerning for a cardiac cause due to his extensive history of coronary artery disease. However, he was noted to have an abnormal EKG which revealed the S1Q3T3 pattern consistent with pulmonary embolism.

CONCLUSION: This case highlights the importance of considering pulmonary embolism as a potential etiology for a syncopal episode— even in cases where there is no new oxygen requirement.

TO BE OR NOT TO BE: RETROPERITONEAL FIBROSIS AND PERITONEAL CARCINOMATOSIS AS UNUSUAL PRESENTATIONS OF BREAST CANCER METASTASES

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LEARNING OBJECTIVE #1: Recognize uncommon presentations of breast cancer metastasis.

LEARNING OBJECTIVE #2: Identify prognostic factors for peritoneal carcinomatosis (PC) and retroperitoneal fibrosis (RF) in patients with a primary breast cancer.

CASE: Patient is a 64 year-old female. Four years prior to presentation, she was treated for T1bN0 estrogen-positive left invasive lobular carcinoma (ILC) with bilateral mastectomy and adjuvant chemotherapy. Her disease was in remission with unremarkable surveillance. Four months prior to presentation, she presented to an outside hospital with gastrointestinal concerns. Laboratory data noted hyperbilirubinemia (Direct bilirubin 0.7 mg/dL), transaminitis (AST 819 mg/dL ALT 869 mg/dL), and high lipase (189 mg/dL). Imaging revealed findings supportive of acute pancreatitis, biliary tree dilation, surgically absent gallbladder without liver lesions, and bilateral hydronephrosis. She was treated with nephrostomy tubes after ureteral stents did not resolve the hydronephrosis. She underwent endoscopic ultrasound, which found thickening of the second part of the duodenum. Biopsy was non-diagnostic. She was thought to have RF and was referred to Rheumatology. She then developed failure-to-thrive with similar laboratory abnormalities as above. Imaging showed peritoneal fluid. Paracentesis demonstrated transudate fluid, a serum-albumin-ascites gradient less than 1.1, and cytology positive for adenocarcinoma cells likely from breast cancer. She was discharged with Palliative Care services and Surgical Oncology follow-up. She agreed to a diagnostic laparoscopy with possible omentectomy and hyperthermic intraperitoneal chemotherapy (HIPEC) for her ascites. Sadly, she passed prior to surgery.

IMPACT/DISCUSSION: Breast cancer most frequently metastasizes to lymph nodes, lung, and brain. Our case shows an extraordinary presentation of breast cancer metastasis to two rare sites, the retroperitoneum and peritoneum. Previous case reports have described presentations to both sites but not at the same time. In general, RF is idiopathic or secondary to drugs, infections, or surgery. Only 8-11% of cases are due to malignancies, usually hematologic; metastatic breast cancer has been described in select case reports. Peritoneal metastasis is usually due to gastrointestinal or genitourinary malignancies; while breast cancer metastasis has been documented, concurrent metastatic sites have commonly been bone or liver. Risk factors for breast cancer metastasis to these sites include HER-2 positivity, select genetic mutations in p53 and e-cadherin, and ILC. Here, our patient with a history of ILC was not on any notable drugs and had a negative infectious workup. Metastatic disease was supported by peritoneal fluid studies. Treatment options included surgery and HIPEC. Survival rate is typically low in this disease state with unclear rates after palliative measures.

CONCLUSION: PC and RF are rare complications of breast cancer. Identification of risk factors and prompt diagnosis can lead to earlier palliative treatments.

TOPHACEOUS GOUT: WHEN MEDICINE IS NOT ENOUGH

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LEARNING OBJECTIVE #1: Medical management of gout

LEARNING OBJECTIVE #2: Surgical indications for gout

CASE: A 41 yo M with PMHx of erosive tophaceous gout, L hallux amputation 2/2 erosive tophi with superimposed MRSA OM, HTN and alcohol abuse, p/w malodorous drainage from tophi over L hand. His gout regimen included 600mg Allopurinol qD; Due to socioeconomic constraints, elevated pre-infusion uric acid levels and baseline abnormal LFTs, the use of Pegloticase and Lesinurad was limited. Patient reported compliance with Allopurinol, but noticed a "dark spot" that developed over his hand which started draining purulent fluid. He endorsed associated hand swelling, redness and pain to the area. He denied injury, fevers or chills. On exam, VSS. Significant deformities were noted over B/L hands and elbows with a 12.5cmx14cm tophi over the proximal dorsal aspect of L hand towards the 3rd digit with an associated area of erythema and edema which was actively draining purulent and tophaceous material. Labs showed normal kidney function and white count. Uric acid was 9.6. CRP was elevated to 15 with normal ESR. X-ray of L hand demonstrated progressive erosive changes in the 3rd proximal phalangeal joint consistent with infectious vs inflammatory process. Patient was admitted for cellulitis associated with tophaceous gout and was started on IV antibiotics. Plastic surgery was consulted and proceeded with excision of L hand and long finger tophi with Integra and wound vac application. Surgical pathology was consistent with gouty tophi. Wound cultures positive for streptococcal species. Upon discharge, patient reported significant improvement in pain and was sent home with PO antibiotics and continuation of Allopurinol. Unfortunately, patient returned 1-month later after developing abscess over surgical incision and was taken back to the OR for more debridement. A significant foul odor as well as numerous gouty tophi were noted permeating through wound. Extensive debridement was performed; however, due to the extreme amount of gouty disease and previous failed debridement, patient plans to undergo partial left hand amputation under the discretion of his surgeon and rheumatologist.

IMPACT/DISCUSSION: Lifestyle modifications, urate lowering therapy (ULT) and anti-inflammatories are the mainstay of gout therapy, which aim to keep serum urate levels < 6.8, to avoid crystal deposition in joints and soft tissues. Since ULTs are typically effective in managing disease, surgery is rarely needed; however, surgical intervention is indicated in patients with infection, deformity, nerve compression and intractable pain. This case illustrates the need for debulking surgery due to significant joint deformity and infection. This case also highlights the deleterious effects poor socioeconomic status can have on gout management.

CONCLUSION: The surgical indications indicated for gout management are generally limited to the complications of tophaceous disease which include: infection, nerve compression due to tophi mass effect, joint deformity and intractable pain.

TPA INDUCED ANGIOEDEMA: A COMMON REMEDY WITH AN UNEXPECTED REACTION

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LEARNING OBJECTIVE #1: Tissue plasminogen activator induced angioedema is a rare (prevalence 0.2-5.1%) yet, life-threatening reaction. Physicians and all healthcare workers alike should be able to quickly recognize this fatal reaction to properly treat affected patients.

LEARNING OBJECTIVE #2: Given its high risk for mortality, understanding the pathophysiology of angioedema is critical for distinguishing angioedema from other conditions in a timely fashion.

CASE: A 56 year old woman with history of hypertension presents to our hospital with complaint of acute right sided facial droop without associated aphasia, visual, sensory or other motor symptoms. The onset of symptoms was 10 minutes prior to presentation. Imaging illustrates, ischemic stroke of left cerebral hemisphere. The Neurologist was notified of NIHSS: 3; deeming the patient a tPA candidate with ICU admission for close monitoring. Soon thereafter, patient began to have angioedema of mouth, and bilateral hands, without airway compromise. She denied any history of allergies to medications. Home medications are amlodipine and paroxetine, and has never had a

reaction like this in the past. Patient received solumedrol, famotidine and Benadryl with improvement of symptoms. After work-up was completed, her angioedema improved, and she was discharged home with full resolution of neurological deficits.

IMPACT/DISCUSSION: Intravenous (IV) recombinant tissue plasminogen activator(rt-PA) not only improves outcomes in acute ischemic stroke but is a relatively safe drug. Even the most feared complication of IV rt-PA, symptomatic intracranial hemorrhage, occurs in only 2-9% of treated patients. Orolingual angioedema as a complication of IV rt-PA is very rare but extremely fatal. It has been reported in 1.3-5% of stroke patients treated with IV rt-PA. It can manifest as a transient, self-limited swelling of the lips and tongue, but its severity and rapid progression may necessitate emergent intubation or cricothyrotomy. Patients taking ACE-I are at increased risk of developing angioedema after rt-PA, but it has been reported in patients not taking these medications as well as seen in our patient. The pathophysiology involves increased levels of plasma kinins, which is a protease that cleaves bradykinin from high-molecular weight kininogen. An increase in bradykinin leads to increased vascular permeability, and is the primary cause of angioedema associated with rt-PA. There are no first-line treatment options for orolingual angioedema caused by tPA administration, but standard prophylaxis treatment can be used to relieve or contain worsening edema. Many patients have resolution of symptoms with supportive care, corticosteroids, epinephrine, and histamine antagonists.

CONCLUSION: Interestingly, tPA was the only identifiable factor leading to angioedema in this patient presenting with ischemic stroke and should be considered a rare, but potential risk, in patients receiving this life saving therapy

UNCOMMON COMPLICATIONS IN A COVID-19 INFECTION MARKED BY FEVERS

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LEARNING OBJECTIVE #1: 1. Investigate different sources of infections in clinically deteriorating COVID-19 patients.

LEARNING OBJECTIVE #2: 2. Recognize the importance of source control in a critically ill patient.

CASE: We present a previously healthy 52-year-old male admitted to intensive care unit for acute hypoxic respiratory failure secondary to COVID-19 pneumonia. He complained of worsening dyspnea for 10 days followed by increasing fatigue. Upon arrival, he was tachycardic and hypoxic requiring supplemental oxygen, appearing lethargic and dyspneic. Chest x-ray showed bilateral patchy airspace opacities consistent with multifocal pneumonia. Labs were significant for elevated inflammatory markers, lymphopenia, and COVID-19 positive. He was started on Remdesivir, methylprednisolone 1 mg/kg, broad-spectrum antibiotics and convalescent plasma. The clinical course was complicated by persistent fevers despite intervention. Blood cultures grew pansusceptible *Eggerthella lenta*. CT abdomen showed a subcapsular fluid collection measuring about 4.5 cm in thickness that dissected into right pelvis with multiple locules of fluid and gas suggesting abscess. Interventional radiology aspirated fluid and placed a drain in the right lower pelvic collection. Fluid culture grew 3 different morphotypes of *Pseudomonas* and *Enterococcus avium*. Antibiotics were adjusted appropriately. The subcapsular fluid collection was initially presumed a hematoma due to an acute drop in hemoglobin, however, despite source control with the initial fluid collection drainage, the patient continued to have intermittent fevers. Therefore, a decision was made to drain the subcapsular fluid collection, resulting in 700 cc of purulent material. Subsequently, he significantly improved requiring less oxygen. After a 28 day ICU admission, he was stable for transfer to the general medicine floor. This case demonstrates the importance of source control in a critically ill patient. It also highlights the rare occurrence of bacteremia and abscess collection in a hospitalized COVID-19 patient with no comorbidities.

IMPACT/DISCUSSION: Onset of new/persisting symptoms should raise suspicion for other sources of infection/etiologies. Although cultures were

initially negative in our case, fevers persisted prompting further investigation by imaging which revealed a new nidus with no identifiable source. Additionally, *Eggerthella bacteremia*, is generally seen in immunosuppressed states. It has a high mortality risk per literature review. Immunocompromised state secondary to COVID-19 with steroid therapy may be a predisposition to these rare infections.

CONCLUSION: 1. *Pseudomonas* within the GI tract is a very rare occurrence.

2. It is important to note that SARS-CoV-2 infection may cause an immunocompromised state increasing susceptibility to co-infections.

3. Use of steroid therapy, a common treatment modality in COVID-19, may further increase risk of co-infections. Therefore, it is imperative to evaluate secondary sources of infection in patients who are not clinically improving

UNCOVERING THE DIAGNOSIS FOR CHEST PAIN

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LEARNING OBJECTIVE #1: Consider uncommon causes of in low-risk patients with chest pain

LEARNING OBJECTIVE #2: Identify patients with coronary artery aneurysms who are at high risk for MI

CASE: A 43-year-old man with well-controlled HIV on anti-retroviral therapy and hyperlipidemia presented with substernal, crushing chest pain. He works as coach for track and field and exercises daily with no prior pain noted with strenuous activity.

In the emergency department, his initial vital signs and exam were unremarkable. First EKG demonstrated normal sinus rhythm with no ST changes and troponin was <0.02 ng/mL. Repeat EKG 6 hours later demonstrated inferior T-wave inversions with a troponin of 0.65 ng/mL. Bedside transthoracic echo demonstrated an ejection fraction of 45-50% with inferolateral hypokinesia. He was subsequently admitted for a non-ST elevation MI. Overnight the patient's troponin increased to 50.65 ng/mL. He was taken for urgent cardiac catheterization which demonstrated a proximal left anterior descending coronary artery aneurysm (CAA) and a proximal right CAA with a distal embolus. Aspiration thrombectomy of the distal right coronary artery was attempted but failed. Medical therapy was initiated with clopidogrel, aspirin, and metoprolol. Further investigation revealed a CD4 count of 500, a positive *Treponema pallidum* Ab with RPR of 1:8, and an unremarkable autoimmune panel. He was discharged with medical therapy and without further chest pain.

IMPACT/DISCUSSION: Although the pathogenesis of CAA is unknown, there are numerous risk factors for its formation. Kawasaki's disease is the most well-known association, followed by other vasculitides, connective tissue diseases, auto-immune diseases such as lupus, and iatrogenic causes. HIV is a rare cause of CAA but typically presents in patients with poorly controlled HIV. HIV associated aneurysms typically affect men (86%) with a median age of 44, demographics similar to our patient. Tertiary syphilis can also affect the coronary arteries, particularly the coronary ostium. However, this typically causes ostial stenosis and is associated with aortitis, neither of which were observed in this patient.

CAAs are a rare cause of acute coronary syndrome carrying a 5-year survival rate of only 71%. Turbulent flow in the aneurysm leads to hemostasis resulting in thrombus formation. Distal embolization leads to an ischemic event, as seen in this patient. Medical management, surgical excision, CABG, and PCI have been attempted with variable success. However, no randomized trials or societal recommendations exist to guide clinicians. Given that CAAs have a high risk of perforation, surgical intervention and percutaneous coronary intervention should be avoided if possible in favor of medical management.

CONCLUSION: This case illustrates the importance of recognizing rare causes of MI, such as CAA, in younger patients with HIV. It is prudent to consider the whole clinical picture with biomarkers of myocardial injury and expedite left heart catheterization especially when ACS is suspected.

UNDULATING HOSPITAL COURSE: RECURRENT TORSADES DE POINTES

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LEARNING OBJECTIVE #1: Recognize telemetry changes suggesting imminent Torsades de Pointes (TdP).

LEARNING OBJECTIVE #2: Describe the mechanism by which positive chronotropy reduces the risk of TdP.

CASE: A 68-year-old male, with a history of non-ischemic cardiomyopathy, reduced ejection fraction, and daily alcohol use presented with decompensated heart failure and rapid atrial flutter requiring urgent cardioversion. Diuresis was initiated; electrolytes were appropriately monitored and repleted. Post-cardioversion ECG showed prolonged QTc. The next day, he developed TdP. No major electrolyte derangements were identified. Subsequent T-wave inversions and nausea indicated possible cardiac ischemia, and he underwent percutaneous coronary intervention with drug eluting stents to a chronic, unrelated lesion. Despite these efforts, TdP recurred and isoproterenol was initiated for stabilization. Beta-blockade was held. TdP returned with weaning isoproterenol, so definitive treatment with pacemaker and implantable cardiac defibrillator was pursued.

IMPACT/DISCUSSION: TdP is an unstable, polymorphic ventricular tachycardia (pVT) often arising when a premature beat occurs during the QT interval. Appropriate short-term management, monitoring, and definitive treatment are critical in patients with recurrent TdP. First-line treatment is emergent defibrillation and IV magnesium. Then reversible causes of QT prolongation and pVT should be addressed—correct electrolyte abnormalities, stop exacerbating medications, treat cardiac ischemia. Next, consider irreversible contributors like chronic alcohol use and tachyarrhythmia-induced cardiomyopathy. If TdP returns despite these measures, a cognitive transition must be made to temporize and seek more definitive management such as pharmacologic chronotropy or electrical pacing. This is effective because the R-R interval determines the rate of repolarization and subsequent QT interval length. Bradycardia prolongs the QT interval, increasing the probability of a premature beat occurring during repolarization and triggering TdP, but tachycardia is protective. Positive chronotropic agents like isoproterenol or external pacing can accomplish this urgently, but pacemaker placement may be necessary for definitive treatment and allows for beta-blockade to reduce ventricular ectopy. Telemetry must be used to monitor for TdP recurrence. Giant TU waves and short-long-short cardiac cycles are associated with impending TdP. Recognition of this pattern should prompt ICU-level monitoring and application of defibrillation pads to facilitate rapid resuscitation until definitive therapy is achieved.

CONCLUSION: This case provides a dramatic example of acquired QTc prolongation and recurrent TdP despite correction of reversible causes. It highlights the importance of continuous cardiac monitoring to guide rapid resuscitation and illustrates effective therapeutic strategies, including isoproterenol and cardiac device placement.

URINE TROUBLE: NEPHROLITHIASIS IN AN END-STAGE RENAL DISEASE PATIENT

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LEARNING OBJECTIVE #1: Highlight the importance of considering nephrolithiasis in any dialysis patient presenting with abdominal or flank pain
LEARNING OBJECTIVE #2: Highlight the pitfalls of using CT scan for the diagnosis of nephrolithiasis in ESRD patients

CASE: A 63 year old with a past medical history significant for non-oliguric end-stage renal disease on hemodialysis, congestive heart failure, and cirrhosis initially presented to the emergency department after missing multiple dialysis sessions with complaints of dyspnea. Initial ED workup noted normal vitals and unremarkable BMP & CBC. CXR show pulmonary vascular congestion. He underwent dialysis the following morning and soon after developed fevers,

rigors, and dysuria prompting an infectious workup which revealed a positive urine and blood cultures for Klebsiella Pneumoniae. As he still made urine and would self-catheterize it was presumed the most likely route for his bacteremia was his UTI. He received IV ceftazidime with symptomatic improvement. However, several days later he developed fevers, severe left sided flank pain, and rigors. His labs showed a leukocytosis of 14.3K with left shift.

A CT abdomen and pelvis was obtained to rule out suspected perinephric abscess but instead revealed a 7mm proximal left ureteral stone. He underwent left ureteral stent placement and was discharged home with plans for stone removal on follow up.

IMPACT/DISCUSSION: The diagnosis of ESRD is defined as GFR <15 mL/min and requires some form of renal replacement therapy. However, ESRD is not synonymous with anuria, an important distinction. Anuria typically occurs two years after the initiation of HD sessions. While the production of urine may be trivial in amount, it remains sufficient for the development of renal stones. Indeed, the risk of risk of developing nephrolithiasis in ESRD patients on hemodialysis was estimated at 10.5% which is nearly identical to the prevalence in the general population (1-2).

The type of stone forming differs among ESRD and the normal population. ESRD patients tend to develop mineralized matrix stones (high in amino acid content) as compared to the general population who develop calcium oxalate stones (3). Part of the diagnostic dilemma is due to the propensity to develop radiolucent stones in ESRD patients. Stones with lower calcium content generally remain radiolucent on CT scan. Fortunately, in our case, his stone was visualized on CT scan and resulted in prompt stent placement. This case highlights the importance of considering nephrolithiasis as a cause for flank pain in end stage renal disease patients.

CONCLUSION: This case is important for the general internist to remember as a patient with ESRD doesn't preclude them from developing kidney stones.

URTICARIA AS A PRIMARY SYMPTOM OF COVID-19 INFECTION

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LEARNING OBJECTIVE #1: - recognize urticaria as a primary symptom of COVID-19 infection

LEARNING OBJECTIVE #2: - facilitate early COVID-19 diagnosis and prevent disease spread

CASE: A 57-year-old female with no travel history and no sick contacts was diagnosed with idiopathic urticaria. This persisted for three months without fever, shortness of breath, chest pain, fatigue, diarrhea, or myalgias. The patient works at the local hospital and has continued working during the COVID-19 pandemic. As the urticaria persisted for three months with no attributable cause, the patient was evaluated for COVID-19. Chest X ray did not show any sign of acute pulmonary involvement and the patient never developed respiratory symptoms, but tested positive for COVID-19 by PCR.

A 56-year-old female with a chief complaint of dry skin worsening for seven days and myalgias for three days was found to have urticarial rash involving the arms and legs on exam. The patient has continued to work as a medical assistant throughout the pandemic. Patient tested positive for COVID-19 by PCR and was advised to quarantine. Eight days after the initial positive test, she presented to the ED with fever, worsening shortness of breath, and non-productive cough. Chest X ray found bilateral pneumonia. Oxygen saturation was 94% on 2L nasal cannula. She completed a five day course of remdesivir and dexamethasone, oxygen requirement progressively decreased to 1L. She was discharged home with supplemental oxygen. At two week follow up, chest X ray showed resolution of infiltrates.

A 43-year-old female with known exposure to the coronavirus experienced persistent hives and urticarial rash for two weeks. During this time, she tested positive by COVID-19 PCR, and developed nausea, vomiting, diarrhea, and joint pain. Respiratory involvement never developed. All symptoms, including cutaneous involvement, resolved three weeks following positive test.

IMPACT/DISCUSSION: Identification of the cutaneous manifestations of COVID-19 infection may aid in early diagnosis, limitation of spread, prompt treatment, and timely contact tracing. Cases of urticaria associated with

coronavirus infection have been self-limited, resolving with resolution of infection. However, there have been COVID-19 fatalities in cases with associated urticaria. Further studies are required to identify the association of urticaria with disease progression, severity, and prognosis. Analysis of histopathology will allow for further delineation between the various skin manifestations. Skin manifestations are present in a variety of age groups, while viral skin exanthems have previously been more common in childhood. As COVID-19 continues to disproportionately affect people of color, further studies are needed to identify the presentation of cutaneous involvement in this population.

CONCLUSION: - Urticaria should be recognized as a presenting symptom of COVID-19

- Inclusion of COVID-19 in the differential diagnosis for urticaria may facilitate more rapid diagnosis, while limiting disease progression and viral spread

VASCULAR CALCIFICATIONS AND CALCIPHYLAXIS IN A PATIENT ON CONCURRENT HEMODIALYSIS AND COUMADIN THERAPY

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LEARNING OBJECTIVE #1: Calciphylaxis should be considered as a differential diagnosis in patients with end-stage renal disease and non-healing ulcers on the lower extremities.

LEARNING OBJECTIVE #2: Calciphylaxis has a poor prognosis, high mortality rate and is associated with frequent infections.

CASE: The patient is a 48-year-old male with a past medical history of end-stage renal disease on hemodialysis for one year, heart failure with preserved ejection fraction, hypertension, and thrombosis of the right common and superficial femoral vein on Coumadin who presented to the hospital because of dyspnea. The patient has a history of inconsistent hemodialysis and non-compliance with medications. His last hemodialysis was approximately 3 days prior to presentation. The patient also complained of lower extremity edema associated with bilateral painful ulcers for one month. He is a lifetime non-smoker and does not use drug nor alcohol. At admission, the vital signs were blood pressure 192/ 133, heart rate 84, respiratory rate 18 and oxygen saturation 99% on room air. At the physical examination, the patient had a normal heart rate and bilateral lung crackles. The skin examination showed bilateral lower extremity scattered dark brown painful stellated and sharply demarcated ulcers. The laboratory studies showed parathyroid hormone 1252 pg/mL, corrected calcium 9.6 mg/dL, 25-hydroxy vitamin D 33.0 ng/mL, and phosphorus 5.7 mg/dL. CA skin biopsy with von Kossa stain showed stippling in the adipocyte membranes and calcified atherosclerosis of medium sized blood vessel in dermis confirming the diagnosis of calciphylaxis.

IMPACT/DISCUSSION: CUA is a condition with high morbidity and mortality associated with frequent infections. It has an extremely poor prognosis with a mortality rate of approximately 80%, and most patients die from wound super infections or sepsis. Our case is remarkably interesting because the patient has end-stage renal disease, secondary hyperparathyroidism, and used Coumadin for treatment of deep venous thrombosis, but has a normal calcium level. Our patient has had multiple readmissions, one of which was related to infection. He is still alive four months after the diagnosis and his wounds are almost healed. Physicians should always consider CUA as a differential diagnosis of non-healing ulcers in a patient with end-stage renal disease on Coumadin.

CONCLUSION: Calcific uremic arteriolopathy (CUA) or calciphylaxis is a rare life-threatening condition, characterized by calcification of small and medium-sized vessels leading to skin necrosis. It is most commonly seen in patients with end-stage renal disease on hemodialysis or in those who have received a renal transplant. Other causes such as malignancy, end-stage liver disease and medications like chemotherapy, vitamin D, and Coumadin have been described. The patient usually presents with bilateral, painful, non-healing, skin ulcers that can resemble other medical conditions which develop into ischemic necrotic lesions with acral gangrene.

VASOPRESSOR MANAGEMENT IN SETTING OF TAKOTSUBO CARDIOMYOPATHY WITH SYSTOLIC ANTERIOR MOTION OF MITRAL VALVE

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LEARNING OBJECTIVE #1: Treat cardiogenic shock in setting of Takotsubo cardiomyopathy with systolic anterior motion of mitral valve

LEARNING OBJECTIVE #2: Distinguish the effectiveness of different vasopressors in appropriate settings

CASE: Patient is an 86 year old female with history of restless leg syndrome who was brought to the emergency department after being found at home with altered mental status. Initial EKG showed ST elevations in leads II, III, aVF and V3-V5 with elevated troponin. Patient was taken emergently for left heart catheterization, which revealed no significant stenosis in the coronary arteries. Left ventriculogram showed reduced ejection fraction at 30-35%, hypercontractile base, and apical and mid-ventricular segment akinesis. Troponin peaked at 14.572. Follow-up transthoracic echocardiogram showed reduced ejection fraction, apical dyskinesis, and basal septal hypertrophy with systolic anterior motion of mitral valve (SAM). Patient was consequently diagnosed with Takotsubo cardiomyopathy with SAM. After the procedures, patient was hemodynamically stable and was started on minimum dose guideline directed medical therapy with carvedilol and lisinopril. However, patient was unable to tolerate and went into cardiogenic shock requiring vasopressors. Patient was initially started on norepinephrine with the addition of dobutamine and dopamine with minimal improvement in blood pressure. Patient was then started on phenylephrine with fluid support and cessation of dobutamine followed by discontinuation of dopamine and norepinephrine in that order, which saw stabilization of blood pressure. Guideline directed medical therapy was held on discharge due to recent cardiogenic shock, with plans to monitor outpatient and start treatment when appropriate.

IMPACT/DISCUSSION: This case illustrates the importance of appropriate management of both fluid status and choice of vasopressor in the setting of Takotsubo cardiomyopathy with SAM. Patients with Takotsubo cardiomyopathy with SAM are volume dependent given the concern for left ventricular outflow obstruction. As such, fluids can be used judiciously to optimize preload which will improve the cardiac output and also reduce further obstruction. Additionally, the choice of vasopressor therapy should be focused on maintaining the afterload to reduce the pressure gradient across the aortic valve, which will increase the diastolic filling time of the left ventricle and maintain cardiac output. Chronotropic properties will reduce the diastolic filling time, and inotropes can exacerbate the outflow obstruction. Therefore, alpha agonists should be prioritized as the vasopressor of choice to maintain the afterload through their vasoconstrictive properties, as opposed to beta agonists or general agonists.

CONCLUSION: - Understand properties of various vasopressors and use appropriately in different settings.

- Understand the pathophysiology and management of Takotsubo cardiomyopathy and systolic anterior motion of mitral valve.

VERTEBRAL OSTEOMYELITIS (VO): MAINTAINING HIGH SUSPICION IN UNIQUE PRESENTATIONS

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LEARNING OBJECTIVE #1: Recognize the clinical features and risk factors for VO.

LEARNING OBJECTIVE #2: Select an antibiotic regimen for empiric treatment of VO.

CASE: A 70-year-old man with hypertension is admitted for the third time in three months with severe right flank pain. The pain is unresponsive to an

extensive pain regimen. He is unable walk or sleep due to his pain. During a prior admission, he completed a course of Ceftriaxone for Aerococcus urinae bacteremia from a urinary source. He reports a 25-pound weight loss and anorexia. He denies intravenous drug-use, recent surgery, or spinal hardware. Physical exam is pertinent for right sided flank pain tender to light palpation. Labs are notable for ESR 66 and CRP 107. A prior MRI revealed non-specific endplate signal changes at L1-L2. L1 disc biopsy revealed moderate chronic discitis. Bacterial, AFB, and fungal cultures remain negative. Repeat MRI reveals L1-L2 discitis, osteomyelitis with bilateral psoas abscess. Daptomycin and ertapenem is started for culture negative VO.

IMPACT/DISCUSSION: Our case highlights the challenges in diagnosing VO. Unfortunately, VO is often diagnosed late with lack of clinical suspicion a frequent reason for the delay. Back pain is a common medical complaint, and differentiating routine musculoskeletal pain from osteomyelitis is difficult. VO should be suspected when back pain is focal, worse at night, unresponsive to conservative management and associated with systemic symptoms. Our patient reported anorexia and weight loss which should have increased clinical suspicion.

VO is transmitted via hematogenous spread and special consideration should be given to patients with risk factors for bacteremia. Most patients have at least 1 risk factor. Diabetes mellitus is the most common risk factor. Others include history of intravenous drug use, indwelling devices, spinal surgery and any immunosuppression. In our case, our patient had a recent history of bacteremia. Finally, our case is unusual in that a pathogenic organism was not identified. His recent history of Aerococcus urinae does raise the possibility that it was the pathogenic organism. Aerococcus urinae is generally considered a low virulence pathogen found in the urine, but there are case reports of Aerococcus causing invasive disease like endocarditis. Given this uncertainty, our patient was treated with empiric antibiotic therapy. Empiric therapy should have activity against staphylococcus aureus (MSSA and MRSA) which is the most common cause of VO, as well as gram-negative organisms (Escherichia coli and Pseudomonas aeruginosa). Our patient did not have risk factors for pseudomonas, and ertapenem was selected.

CONCLUSION:

Maintaining a high level of clinical suspicion based on a patient's risk factors and presentation is the key to making a timely diagnosis of VO.

Empiric antibiotic regimens for culture-negative VO should have activity against Staphylococcus aureus (methicillin resistant) and gram-negative organisms. Anti-Pseudomonas agents may be indicated if the patient has risk factors.

VERTEBROPLASTY ASSOCIATED PULMONARY CEMENT EMBOLISM PRESENTING WITH HEMODYNAMIC INSTABILITY

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LEARNING OBJECTIVE #1: Recognize percutaneous vertebroplasty (PVP) associated complications

LEARNING OBJECTIVE #2: Conduct appropriate post-operative screening via CT and/or CXR after PVP

CASE: A 74-year-old male presented with 6 hours of excruciating intermittent chest pain. He reported pressure in his left chest, abdomen, and lower back, accompanied by shortness of breath, nausea, and palpitations. He noted increased breathing difficulty and pain with inspiration over the last 3 weeks. His medical history included HFREF, atrial fibrillation, COPD, interstitial pulmonary fibrosis, and rheumatoid arthritis. He had a recent history of percutaneous vertebroplasty (PVP) at 7 and 3 months prior, which used methylmethacrylate cement to treat compression fractures in the thoracic vertebrae.

He presented afebrile, tachycardiac (130 BPM), and hypotensive (92/58 mmHg), with 92% SpO₂. Diffuse inspiratory crackles were appreciated on auscultation. EKG showed atrial fibrillation and no ischemic changes. Troponins were negative. CTPE was negative for a venous thromboembolism but displayed an extruded strand of cement in the paravertebral veins and pulmonary arterial system.

After admission, the patient was asymptomatic and hemodynamically stable. An echo demonstrated an EF of 35-40%. Spect exam showed normal perfusion. The patient was managed conservatively with anticoagulation and

monitoring due to his improvement in symptoms, underlying conditions, and surgical risk.

IMPACT/DISCUSSION: This case represents a rare surgical side effect that presented as a common ED complaint. The incidence of cement leakage after PVP is estimated between 30-90%. Possible complications include kidney injury, nerve compression, rib/vertebral fractures, irregular cardiac rhythm, and pulmonary cement embolism (PCE). The incidence of PCE after PVP is between 4% - 23%. PCE are often asymptomatic, with symptomatic cases estimated between 0.4%-0.9% and presenting similarly to thrombotic pulmonary embolisms.

Our report details a rare symptomatic case presenting months post procedure. The patient had a history of decreased pulmonary reserve, heart failure, and chronic musculoskeletal pain. He presented with acute on chronic chest pain and dyspnea that may have resulted from or been exacerbated by the PCE. Symptoms following PCE most often occur days to months post procedure, with some symptomatic cases reported at 5 months, 9 months, and 10 years post.

Management recommendations include anticoagulation for symptomatic peripheral and central asymptomatic embolisms. Surgical removal should be considered for central symptomatic PCEs.

CONCLUSION: Patients with decreased pulmonary reserve, heart failure, and musculoskeletal pain may be at an increased risk of complications from PVP and delayed diagnosis of symptomatic PCE.

Alternatives to PVP should be pursued in complicated patient populations.

WARM AUTOIMMUNE HEMOLYTIC ANEMIA DUE TO T-CELL LYMPHOMA

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LEARNING OBJECTIVE #1: Autoimmune hemolytic anemia (AIHA) is an uncommon disease identified by the presence of autoantibodies against RBCs. Angioimmunoblastic T cell lymphoma is a rare subtype of lymphoma that is one of the secondary causes of AIHA.

LEARNING OBJECTIVE #2: We present a case report of AIHA due to angioimmunoblastic T cell lymphoma confirmed with biopsy and immunohistochemical studies, which presented clinically as anemia. Our case highlights the importance of a thorough evaluation and diagnostic work up to reveal a rare cause of anemia.

CASE: A 58-year-old male initially presented to his primary care physician with a chief complaint of fatigue for 1 week. His primary care physician ordered a complete blood count, which was significant for a hemoglobin of 7.0, and the patient was sent to the emergency department for further workup. He denied epistaxis, hematemesis, melena, hematuria, and hematochezia. There were no signs of bleeding and physical examination was only remarkable for left axillary lymphadenopathy. In the emergency department, he was found to have a hemoglobin of 6.7, hematocrit of 19.0, a mean corpuscular volume of 88.7, and a corrected reticulocyte count of 4.1. A direct Coombs test was positive for warm IgG autoimmune hemolytic anemia. The patient underwent an excisional lymph node biopsy of the left axilla and he was diagnosed with stage III angioimmunoblastic T-cell lymphoma with involvement of bilateral axilla, mediastinum, bilateral hilum, abdominal periaortic, bilateral pelvic sidewall, and bilateral inguinal region. He was initiated on chemotherapy with cyclophosphamide, doxorubicin, vincristine, and prednisone.

IMPACT/DISCUSSION: In the case reported above, our patient presented with the non-specific symptom of fatigue. Upon further investigation, he was found to have hemolytic anemia with lymphadenopathy and he was ultimately diagnosed with a rare type of lymphoma. Angioimmunoblastic T-cell lymphoma is a rare subtype of peripheral T-cell lymphoma (PTCL) which accounts for 1 to 2% of non-Hodgkin lymphoma and 15-20% of PTCL. The histopathology findings consist of effacement of lymph node architecture with few benign follicles and extension of infiltrate beyond the lymph node capsule with preserved subcapsular sinus. The T cells are positive for markers of CD2, CD3, CD4, CD10, CXCL-13, and PDL 1. Scattered large immunoblastic cells are positive for CD20 and EBER. The disease is frequently associated with

autoimmune phenomena such as the presence of circulating immune complexes, hemolytic anemia, cold agglutinins, rheumatoid factor and smooth muscle antibodies. The clinical course is aggressive with median survival of less than 3 years regardless of the type of treatment. Most patients have advanced stage disease, either stage III or IV at the time of diagnosis [2].

CONCLUSION: This case illustrates the importance of a thorough investigation with an appropriate differential diagnosis when trying to determine the underlying etiology of anemia.

WHAT CONDITION MY NUTRITION WAS IN

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LEARNING OBJECTIVE #1: Identify the classic triad of Wernicke encephalopathy

LEARNING OBJECTIVE #2: Recognize that thiamine deficiency occurs in clinical settings outside of chronic alcoholism

CASE: A 19-year-old man presented with several weeks of nausea, vomiting, and falls. He was confused, disoriented, and unable to recall any recent events. Prior history including idiopathic myocarditis with intermittent episodes of nonsustained ventricular tachycardia. He recently was incarcerated for the last three months, with his release being a few days prior. He and his family also reported no alcohol use but endorsed a poor diet with mostly fast food, chips, and sweets. Vital signs were normal. Physical exam was normal, aside from findings on neurological evaluation. Rotary nystagmus was present; cerebellar function was abnormal with impaired finger-to-nose testing bilaterally. A complete blood count and a comprehensive metabolic panel were normal. Thiamine level was sent but was pending for the majority of the hospitalization. Because of his young age, a brain MRI was recommended by the consulting neurology team. Bilateral mammillary body enhancement seen on MRI brain imaging supported the diagnosis of Wernicke encephalopathy.

His nystagmus and cerebellar abnormalities improved with the administration of intravenous thiamine, but gait and memory remained impaired. He was discharged on oral thiamine supplements with a scheduled outpatient clinic follow up. Thiamine levels eventually resulted and were 33 nmol/L (normal range 70-180 nmol/L). On outpatient follow-up approximately one month later, his mental status returned to normal but required a walker for gait assistance.

IMPACT/DISCUSSION: Wernicke encephalopathy is classically described as a clinical triad of ataxia, ophthalmoplegia, and confusion. Only 30% of patients present with the classic triad, so it is important to consider the diagnosis without the triad. Ocular findings can include horizontal, vertical, and end-gaze nystagmus, as well as lateral rectus and conjugate gaze palsies. Ocular findings correct quite rapidly after administration of intravenous thiamine. Wernicke encephalopathy can progress to permanent neurologic dysfunction (Korsakoff syndrome) or death if left untreated. IV thiamine is generally well tolerated with only rare adverse reactions.

Although Wernicke encephalopathy is most commonly associated with chronic alcoholism, thiamine deficiency can be seen with poor nutritional status, hyperemesis gravidarum, bariatric surgery, HIV/AIDS, dialysis-related thiamine loss, and general gastrointestinal disease. In our patient, continued vomiting paired with a poor diet likely allowed for thiamine depletion. Thiamine stores can be depleted in as quickly as two weeks, with most symptoms arising within three months of thiamine deficiency.

CONCLUSION: It is important to recognize the clinical triad of ataxia, ophthalmoplegia, and confusion in Wernicke encephalopathy, as prompt initiation of IV thiamine decreases the risk of death or neurologic dysfunction.

WHAT YOU DIDN'T KNOW ABOUT YOUR PATIENT'S IV DRUG USE: HOW FILTERS LEAD TO RARE ENTEROBACTER CLOACAE ENDOCARDITIS

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LEARNING OBJECTIVE #1: Recognize intravenous drug use as a risk factor for gram-negative Enterobacter endocarditis

LEARNING OBJECTIVE #2: Assess environmental factors when considering the microbiologic etiology of infectious endocarditis

CASE: The patient is a 57-year-old male with a past medical history of coronary artery disease complicated by ventricular fibrillation cardiac arrest and heart failure with reduced ejection fraction, status post implantable cardioverter defibrillator (ICD) placement, as well as recently relapsed intravenous heroin use disorder. He was admitted for replacement of his ICD battery and found to have subacute progressive dyspnea on exertion, chest pain, and orthopnea. On arrival, he was tachycardic to 105 beats per minute with other vital signs within normal limits. Exam revealed lower extremity pitting edema bilaterally. No murmur or peripheral embolic phenomena were appreciated. Labs showed anemia and an elevated white cell count with bandemia. Serial electrocardiograms and cardiac enzymes did not show evidence of ischemia. Computed tomography revealed new bilateral lung consolidations and left upper lobe cavitation. A transthoracic echocardiogram showed mobile echodensities on the ICD wire. Blood cultures grew Enterobacter cloacae, ultimately treated with cefepime. Further history revealed subjective fevers and re-use of cotton filters to inject heroin. The patient underwent ICD extraction with negative cultures originating from the leads. The patient remains hospitalized with his course complicated by sepsis, respiratory failure necessitating intubation and multiple nosocomial infections.

IMPACT/DISCUSSION: Non-HACEK gram-negative bacillus endocarditis is rare, accounting for 1-2% of endocarditis cases. Although historically considered a disease of injection drug users, it is primarily a healthcare-associated infection more common in the presence of prosthetic valves, permanent pacemakers, or ICDs. However, Enterobacter specifically has been found to be associated with intravenous drug use. First described in 1975, "cotton fever" is a transient elevation in body temperature (1-2°C) occurring minutes after injecting trace amounts of drugs extracted from re-used cotton filters. The Enterobacter genus, and in particular the endotoxins it releases, has been implicated in its pathophysiology. The first study to implicate any bacterial species other than Enterobacter agglomerans in cotton fever was published in late 2019. Similar to our patient, the study described a case of cotton fever complicated by infective endocarditis and associated with Enterobacter asburiae, a member of the Enterobacter cloacae complex.

CONCLUSION: Enterobacter endocarditis is exceedingly rare and has been found to be associated with intravenous drug use. Detailed history can aid in identifying the microbiologic etiology of infectious endocarditis, such as infection with non-HACEK species, especially in patients with implanted endovascular devices.

WHEN ELEVATED LACTATE IS NOT DUE TO SHOCK: CONSIDER THIAMINE DEFICIENCY

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LEARNING OBJECTIVE #1: Recognize thiamine deficiency as a cause of elevated lactate

LEARNING OBJECTIVE #2: Clinically diagnose thiamine deficiency in a patient at risk

CASE: A 57-year-old male with history of small bowel transplant and ileostomy due to history of malignancy was admitted to the general medicine floor with chief complaint of "dizziness," consisting of light-headedness and diplopia. On review of systems he also had paresthesias in his thighs, exertional dyspnea, and three months of progressive forgetfulness. He was otherwise healthy and had no relevant home medications.

On admission, he was well appearing but in mild respiratory distress. Vital signs: BP 106/76, HR 106, RR 24, T 37.0 and SpO₂ 98% on room air. Pertinent labs included sodium 130, troponin 14 and lactate 6.3. EKG showed sinus tachycardia and non-specific ST changes. CT chest showed small bilateral pleural effusions. Echocardiogram showed ejection fraction of 30% and pericardial effusion. Three months prior he had been admitted with a very similar presentation and pattern of lab values (troponin 13, lactate 9). Left heart catheterization showed normal coronary arteries, and at that time he was treated

for presumed pneumonia and NSTEMI. At that time he received high dose thiamine, which is our institution's standard of care for critically ill patients with altered mental status, improved and was discharged home.

Thiamine deficiency was considered as a potential diagnosis. Thiamine level was drawn and empiric treatment started. MRI brain showed contrast enhancement involving the mammillary bodies and medial anterior thalami with focal area of hemorrhage involving the left mammillary body. Thiamine level later returned low (62 nmol/L; normal range 70-180 nmol/L). After five days of IV thiamine, the patient experienced complete resolution of his exertional dyspnea, memory loss, diplopia, and paresthesias. Repeat echocardiogram showed normalized EF to 55%. When seen in follow up several weeks later he was doing well on thiamine supplementation.

IMPACT/DISCUSSION: Thiamine deficiency is classically associated with alcohol use, but malnutrition and/or malabsorption of any form is a risk factor. In our case, lactic acid and troponin levels elevated out of proportion to the clinical picture were diagnostic clues. Thiamine pyrophosphate is a co-factor in the citric acid cycle and prevents lactate buildup. A slowed or stopped citric acid cycle damages high energy cells, including myocardial cells. Thiamine repletion is safe and should be initiated empirically when deficiency is suspected as whole blood testing can take several days. Thiamine administration can be therapeutic and diagnostic; ventricular function and lactic acid levels typically normalize quickly with repletion.

CONCLUSION: Consider thiamine deficiency in patients with risk factors for malnutrition, including but not limited to alcohol use. Many clinical manifestations of thiamine deficiency resolve with repletion. Thiamine repletion is safe and should be initiated empirically when deficiency is suspected.

WHEN URINE LYTES LIE: HYPONATREMIA AND ILEAL CONDUIT UROSTOMY

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LEARNING OBJECTIVE #1: Recognize the challenge ileal and other diverting urinary conduits present when evaluating hyponatremia

LEARNING OBJECTIVE #2: Recognize limitations in the physical exam for accurate volume status assessment

CASE: A 63-year-old woman with CKD, bladder cancer with cystectomy, ileal conduit diversion urostomy and ileostomy was admitted when routine labs noted a sodium level of 112 mEq/L. She was asymptomatic but had decreased ileostomy and urostomy outputs. She drank 2L of water daily. Vital signs were normal. Mucus membranes were moist. She had no edema or jugular venous distension. Laboratory values on presentation were: Na 117 mEq/L, chloride 73 mmol/L, creatinine 2.1 mg/dL, BUN 67 mg/dL and serum osmolality 264 mOsm/kg. The rest of her electrolytes were within normal ranges. Urine electrolyte studies were not obtained, as urine composition is altered by ileal conduit diversion urostomy. We presumptively diagnosed SIADH and began fluid restriction to 1.3L daily without improvement in Na levels. We liberalized fluid intake and Na levels improved to 121mEq/L, suggesting hypovolemic hyponatremia. We started 125cc/hr of NS for a further 24hrs with improvement of Na to 130 mEq/L. The patient was discharged with instructions to maintain her fluid intake.

IMPACT/DISCUSSION: The evaluation of hyponatremia requires history, physical exam, and laboratory findings to elucidate the cause of dysregulation between sodium and free water. Our patient appeared clinically euvoletic. Data on physical exams findings commonly taught as signs of hypovolemia such as decreased skin turgor and dry mucus membranes actually have poor sensitivity and specificity. Dry axilla is the most specific finding of hypovolemia in all age groups. In patients with equivocal physical exams, urine osmolality and sodium levels can help differentiate between hypovolemic hyponatremia and other processes. Low urine sodium suggests decreased effective circulating volume; high urine osmolality indicates concentrating of urine as seen in hypovolemia.

With an ileal conduit diversion, urine electrolytes and osmolality are unreliable assessments. Ileal conduits and colostomies can cause electrolyte and free water losses, stimulating ADH secretion and RAAS system activation. ADH secretion increases thirst, thereby increasing intake of hypotonic fluid. Our patient was likely hypovolemic and low in total body sodium. Giving normal saline increased serum sodium levels as expected with normal renal physiology through the RAAS system.

CONCLUSION: Hypovolemia may be challenging to diagnose by physical exam. History and urine studies can be helpful. Ileal conduit diversion urostomies invalidate urine electrolyte studies. Ileal conduits and colostomies are risk factors for hypovolemic hyponatremia.

YOU'RE PULLING MY LEG: BACTERIAL CELLULITIS TRIGGERING CUTANEOUS POLYARTERITIS NODOSA

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LEARNING OBJECTIVE #1: Identify the clinical symptoms of cutaneous polyarteritis nodosa **LEARNING OBJECTIVE #2:** Recognize the importance of daily thorough physical examination, through the resolution of presenting symptoms

CASE: A 52-year-old man presented to the emergency department with worsening pain, edema, erythema, and warmth of the right lower extremity. His history was notable for alcoholic cirrhosis, bronchiectasis on 4L at home, and recurrent cellulitis. Two days prior, he noticed pruritic lesions on his bilateral lower extremities. He endorsed scratching and picking these lesions which he believed to be bug bites. On presentation, the patient denied fever, chills, tingling, or weakness.

Physical exam was notable for right lower leg cellulitis extending to the mid-calf. Bilateral, tender palpable purpura were present on the lower extremities. CBC and BMP were normal with the exception of sodium 131 and lactate 2.7. Blood culture was negative, venous doppler was negative for acute DVT, and foot/ankle X-ray showed soft tissue swelling without concern for osteomyelitis. The patient's cellulitis markedly improved with IV vancomycin and Zosyn.

On hospital day 3, bilateral lower extremity livedo reticularis developed. A serological workup for syphilis, HIV, HBV, HCV, ANA, ANCA, SSA/SSB, Scl, Sm, cryoglobulins, and dsDNA returned negative. Urinalysis showed no hematuria or proteinuria, and repeat CBC revealed leukopenia and mild microcytic anemia. Punch biopsy of the left thigh revealed superficial and mid-dermal neutrophilic vasculitis of small to medium-sized vessels most consistent with leukocytoclastic vasculitis (LCV) vs. cutaneous polyarteritis nodosa (CPAN).

He was discharged in stable condition on oral cephalexin, doxycycline, and an 8-week prednisone taper. Close outpatient follow-up with dermatology was advised.

IMPACT/DISCUSSION: This case illustrates the importance of a thorough, daily physical exam in the inpatient setting alongside the importance of amending working diagnoses to reflect developing symptoms. Furthermore, this case challenges the clinician to assess the utility of lumping cutaneous symptoms into one problem versus separating them into distinct, yet related problems.

CPAN is a small-to-medium-vessel vasculitis that presents with tender subcutaneous nodules, livedo reticularis, purpura, cutaneous necrosis, and single-organ involvement. Although the etiology remains unknown, medication, autoimmune disease, and infection (most notably group A streptococcal (GAS) infection) are associated triggers. Protracted courses are commonplace and treatment is based upon disease severity. NSAIDs and colchicine are prescribed for mild symptoms, while steroid tapers treat more severe presentations.

CONCLUSION: Herein, daily physical examination revealed that while the patient's initial presentation of cellulitis waned, a vasculitis likely triggered by GAS cellulitis was brewing. The diagnosis of CPAN was confirmed based on a lack of systemic involvement, negative immunofluorescence on biopsy, and negative ANCA serologies.

Clinical Vignette - Medical Ethics, Professionalism, and Humanities

(UN)INFORMED CONSENT: ETHICAL CHALLENGES WITH A 66-YEAR-OLD VIETNAMESE- SPEAKING FEMALE WITH NSCLC AND NEW BRAIN METASTASES

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LEARNING OBJECTIVE #1: How can informed consent be administered to patients who prefer to remain uninformed of their diagnoses? Can risks and benefits be fully explained?

LEARNING OBJECTIVE #2: How can we respect patient autonomy while fulfilling a moral obligation to truth-telling as physicians? Do cross-cultural barriers simplify or complicate these interactions?

CASE: A 66-year-old Vietnamese-speaking female with a history of non-small cell lung cancer (on Crizotinib) who was sent to our emergency room by her outpatient oncologist after MRI noted findings concerning for new brain metastases. She was started on high dose steroids and admitted to the medicine/solid oncology service with plans for non-urgent neurosurgical resection after pre-operative risk stratification. History was obtained via translator phone in the emergency room. However, her (bilingual) daughter expressed to us that her mother "would not want to know the details of her new brain metastases" as this would be distressing to her. Her daughter stated that "protecting" her mother from this news aligned not only with her mother's wishes, but also with their broader family and cultural values. This posed a challenge to our medical team, as our (Western) training emphasizes patient autonomy and truth-telling in the informed consent process. Given the recommendation for a neurosurgical intervention, it was unclear what level of information could/should be disclosed to allow for informed decision making (within the patient's goals).

Language/cultural barriers also added to the complexity of this decision process. This case allowed me to reflect on duties and roles as a physician and how to best provide patient-centered care (and information) while respecting autonomy in the context of cultural and linguistic barriers.

IMPACT/DISCUSSION: Our team initially considered involving palliative care/the ethics consult service for this case. However, after general conversations with the patient (via translator phone), she was able to articulate her desires for all information and decision-making to be directed through her daughter, and clearly had to capacity to request this. Her ability to assent/consent proved to be simpler than we anticipated upon her initial admission. This was a rewarding experience as unity between the medical team and patient/her family was reached after open discussions regarding the patient's values and preferences. It served as a reminder that ethical considerations of care are a cornerstone of general internal medicine. Our patient was able to move forward with her surgical resection, tolerated the procedure well, and was shortly discharged home with continued oncology follow-up.

CONCLUSION: Ethical considerations regarding patient autonomy are fundamental parts of the practice of internal medicine. This case provided many teaching points regarding moral duties to patients, (un)informed consent, and cultural/linguistic barriers to unified planning between patients and providers.

LANGUAGE DISCORDANCE AND CULTURAL BARRIERS TO IMPROVED PATIENT CARE: COMMUNICATION, CONNECTION, AND MUTUAL UNDERSTANDING

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LEARNING OBJECTIVE #1: Recognize that language interpretation is not a perfect proxy for cultural understanding.

LEARNING OBJECTIVE #2: Assess the power and limitations of medical interpreters in facilitating improved physician-patient understanding and communication.

CASE: A 62-year-old Haitian female presents with chronic lower back pain. She has no significant medical history and her only surgical history is a total hysterectomy (no reason given) approximately twenty years ago. The patient describes some bilateral lower leg pain. All musculoskeletal strength and neurological exams are normal. She takes ibuprofen for her back pain. She describes the pain as dull and constant throughout the day and evening, and all labs and images are unremarkable. She only speaks Haitian Creole and lives in a Haitian immigrant community. Ultimately, the patient's daily ibuprofen dosage is increased.

IMPACT/DISCUSSION: Only after the patient encounter did the medical interpreter explain how the patient likely thought her pain was "God's retribution" for her hysterectomy, considered to be an "unnatural" operation for many Haitian immigrants. The interpreter expressed that in general, Haitian immigrants are reluctant to use social services due to structural discrimination and fears of deportation. For example, in the 1980s, a law was passed to expand immigration from all countries in Central America and nearby territories except Haiti, and in 2017, temporary visas to over 60,000 Haitian immigrants who fled the 2010 earthquake were suspended. This clinical experience showed me the important of understanding patients' explanatory models, defined by medical anthropologist Arthur Kleinman as the ways in which people make sense of their illnesses. Comparing the explanatory models of both physician and patient allow for identification of major differences that may lead to challenges in clinical management, as well as appropriate patient education and clarification. Existing research has not proposed more responsibilities for medical interpreters, yet they can serve valuable roles in facilitating better mutual understanding and patient-centered care.

CONCLUSION: "Pure" language interpretation omits salient cultural aspects that may be important for physicians to know in order to provide the best care. The sporadic and short "cultural competency" training sessions in most hospitals and medical schools are not enough for cultural fluency. If physicians do not understand their patient's cultural or racial background – which often times they do not, regardless of whether they are fluent in English – then the scope of the medical interpreter should be augmented and he or she should be able to serve as a cultural and/or racial broker too. Examples of what this may look like include encouraging physicians to join interpreter-specific lectures and classes and including interpreters on medical rounds and asking, when appropriate, for their input. Such increased dialogue outside of single-patient encounters will improve future collaboration and patient care.

Clinical Vignette - Mental Health and Substance Use

ESCITALOPRAM AS A CAUSE OF WORSENING TREMORS IN A PATIENT WITH PARKINSON'S DISEASE

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LEARNING OBJECTIVE #1: Identify the side effects of escitalopram in patients with Parkinson's disease

LEARNING OBJECTIVE #2: Distinguish anti-depressants and anti-anxiolytics that have least risk of motor side effects in patients with Parkinson's disease

CASE: A 72-year-old female with a past medical history of Parkinson's disease (PD), depression, intermittent asthma, insomnia, and osteoporosis, presents to primary care clinic with complaints of worsening depression secondary to the COVID-19 pandemic. Two weeks prior, she presented with similar symptoms to her neurologist and she was started on escitalopram 10 mg once daily. Given worsening symptoms of depression, escitalopram was increased to 15 mg once daily.

At 3 weeks follow up, the patient noted worsening tremors causing impaired quality of life. Physical exam was notable for a resting tremor of her bilateral feet and left hand. Her medication list included: escitalopram 15mg daily, carbidopa-levodopa 36.23 mg-145mg four times daily, and rasagiline 0.5 mg once daily. Lab testing showed normal CBC, CMP, B12, TSH, serum and protein electrophoresis. Given her worsening tremor, it was recommended that the patient taper off escitalopram over 2 weeks and follow up with her neurologist (at which time a daily rotigotine 4 mg patch was added to her

treatment regimen). After stopping escitalopram and adding the rotigotine patch, the patient reported her new tremors resolved but that she was very anxious, depressed, and crying more. Her primary care provider attempted to restart escitalopram 10 mg once daily, thinking that the initial tremors were due to poorly controlled PD. After one dose of escitalopram, patient reporting worsening tremors; therefore, she was told to stop medication and again her symptoms resolved. After input from Neurology, her primary care team decided to start Mirtazepine 7.5 mg at bedtime which resulted in improved mood symptoms without additional tremors.

IMPACT/DISCUSSION: Selective serotonin reuptake inhibitors (SSRIs) can be useful in treating anxiety and depression in patients with PD; however, side effects contributing to worsening motor symptoms must be taken into consideration. There are a few case reports linking escitalopram (in addition to other SSRIs) to worsening PD motor symptoms, the etiology of which may be related to serotonergic inhibition of the dopaminergic pathway¹. There are several meta-analyses documenting the efficacy of SSRIs, serotonin-norepinephrine reuptake inhibitor (SNRIs), tricyclic antidepressants (TCAs), and monoamine oxidase inhibitors (MAOs); however, there is evidence that the SSRIs sertraline and paroxetine and the SNRIs venlafaxine and mirtazapine may be associated with less risk of motor side effects in patients with PD²⁻⁵.

CONCLUSION: If patients with Parkinson's disease are unable to tolerate previous antidepressant therapy due to motor side effects, the SSRIs sertraline and paroxetine and the SNRIs venlafaxine and mirtazapine may be appropriate alternative treatment options.

HYPERREFLEXIA, CLONUS AND TACHYCARDIA: OH, MY!

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LEARNING OBJECTIVE #1: Recognize prolonged clinical course and symptoms of serotonin syndrome

LEARNING OBJECTIVE #2: Treatment for Serotonin Syndrome

CASE: A 33 year old male with a history of schizoaffective disorder, bipolar type, and alcohol abuse who presented after a suicidal attempt. He had taken twenty tablets of Escitalopram 20 mg after he had heard voices telling him to kill himself. He denied taking any other tablets. On presentation, he was afebrile and tachycardic to the 110s. Physical exam revealed a diaphoretic male with dilated pupils (6 mm), rigidity, clonus and hyper-reflexia in all extremities but worse in the lower extremities. He also exhibited ocular clonus. Labs remarkable for CPK 289 IU/L. He was admitted to the ICU and treated for serotonin syndrome with intravenous (IV) fluids and ativan 1-2 mg as needed. He was on cardiac monitoring and had frequent vitals and labs to monitor his CPK and renal function. Patient continued to exhibit clonus and hyper-reflexia over 48 hours. He was then treated with cyproheptadine 4 mg q6h with a taper and ativan 1-2 mg PRN with maintenance IV fluids. Hyper-reflexia, Clonus and tachycardia resolved and CPK and vitals improved over the next 3.5 days.

IMPACT/DISCUSSION: Serotonin, 5-hydroxytryptamine, is a neurotransmitter that is the target for many anti-depressants that seek to increase the level of serotonin in the brain. Serotonin syndrome occurs when the level of serotonin is too high. Elevated serotonin level then causes symptoms of altered mentation, autonomic instability and neuromuscular changes. Other components of the syndrome includes clonus, hyper-rigidity, agitation, diaphoresis, diarrhea and hyperthermia. Based on the literature, serotonin syndrome is most commonly caused by the intentional overdose of anti-depressants, rarely with addition of other serotonergic agents. The differential diagnosis for Serotonin syndrome is Neuroleptic malignant syndrome and malignant hyperthermia. Treatment of serotonin syndrome involves stopping the serotonergic medication and initiating supportive management with intravenous hydration and benzodiazepines. In some cases, cyproheptadine was found to be helpful in symptom resolution. Cyproheptadine is an anti-histamine that antagonizes 5-HT₂ receptors. There are multiple dosing recommendations to support an initial dose followed by maintenance dosing.

Complications of Serotonin syndrome include autonomic changes, rhabdomyolysis, dysrhythmias and rarely, death.

CONCLUSION: Serotonin syndrome is a rare drug complication that can be life threatening if not managed appropriately. It is important to understand the differential diagnosis and options for treatment for correct and timely correction. Cyproheptadine can be a beneficial addition to supportive management with intravenous hydration and ativan, especially when conservative measures alone are not leading to symptom resolution.

Although resolution is seen in 24 hours with therapy, prolonged clinical course can be expected in the setting of drugs with extended metabolism.

LIVER TRANSPLANTATION AND SUBSTANCE USE

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LEARNING OBJECTIVE #1: Describe the current state of liver transplantation for people with substance induced ESLD

LEARNING OBJECTIVE #2: Assess risk factors for return to substance use following liver transplantation

CASE: A 29 year old woman with decompensated HCV and alcohol related cirrhosis (diagnosed 7/2018), alcohol use disorder in sustained remission (last drink 7/2018), opioid use disorder in sustained remission (IV heroin, last use 9/2018) on buprenorphine maintenance, cocaine use without a use disorder (last use 11/2018), and tobacco dependence who died 1/2020 from complications related to end stage liver disease (ESLD).

The patient underwent phase 1 evaluation for liver transplant at UCSF in June 2019. She was declined due to a 12-month sobriety requirement prior to evaluation (last positive Utox 11/2018, notable for cocaine; tobacco use). Ultimately, transplant re-evaluation was deferred due to an unmet requirement to attend Alcoholic Anonymous daily despite abstinence from alcohol for > 1 year and declining functional status limiting attendance. Ultimately, the patient was never re-considered for liver transplant and died in Jan 2020 from complications related to ESLD.

IMPACT/DISCUSSION: Injection drug use causing HCV infection and heavy alcohol use are the top two causes of ESLD in the US, contributing to ~60% of cases; yet, such patients account for only 11.2% and 27% of transplant recipients, respectively. While the percentage of liver transplant recipients for alcohol induced cirrhosis increased from 17% to 27.4% between 2008 and 2018, that for HCV cirrhosis declined from 24% to 11.2%. There are comparable graft and survival outcomes for patients with alcohol-related or HCV cirrhosis as compared to those with other cirrhosis etiologies.

The hesitancy to list individuals with a history of substance use disorder (SUD) for transplant is well founded due to high return to substance use rates, which increases risk of graft failure and mortality. Poor social support, tobacco use, comorbid psychiatric conditions, and pre-transplant non compliance are well-documented risk factors for return to use; however, few studies have evaluated interventions to prevent return to use following transplant, largely due to a paucity of such programs. Positive outcomes are shown with pre-transplant structured addiction programs and follow up with an addiction psychiatrist.

All four of the aforementioned risk factors are prominent in this case; however, the patient was not offered a structured approach to her SUD history or maintenance of her abstinence. Liver transplantation is a field wrought by the responsibility to allocate a limited resource. This case calls into question the unsystematic, non-evidenced based, and often fatal approach to evaluating patients with SUD for liver transplant.

CONCLUSION: A disproportionately small percentage of liver transplant recipients have substance use related ESLD.

Individualized programs are necessary to prevent return to use post transplant and should be core components of transplant evaluation.

MANAGEMENT OF ANTIPSYCHOTIC-INDUCED WEIGHT GAIN IN THE PRIMARY CARE SETTING

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LEARNING OBJECTIVE #1: Recognize metabolic sequelae of long-term antipsychotic use

LEARNING OBJECTIVE #2: Manage antipsychotic-induced weight gain (AIWG) with a patient-centered approach

CASE: HPI: Mr. T has schizoaffective disorder and was doing well on 600 mg quetiapine QHS but recently his psychiatrist was concerned about metabolic side effects decreased his quetiapine to 400 mg. Since then he reports increased auditory hallucinations which are very distressing. He tries to compensate with the voices by turning up his radio and reading his Bible but the voices persist. He has been experiencing passive SI. He receives all his medications in bubble packs and has good medication adherence.

Past Medical History:

Schizoaffective disorder: diagnosed in late 20s. One prior hospitalization for SI, no prior SAs. Type 2 diabetes, insulin-dependent COPD HLD OSA

Social History:

Lives in a public housing unit by himself. Utilizes public transportation and ambulates with a cane. Smokes 1-2 PPD x30 years.

Family History: No family history of diabetes, heart disease, or psychiatric illness.

Physical Exam

Temp 98 F, BP 119/75, pulse 64, RR 18, SpO2 95%, BMI 41
Weight 307 lb (2 years ago 247 lb)

GEN: appears state age, obese, NAD CV: RRR, no murmur

RESP: lungs CTAB

Neuro: Shuffling gait, bradykinesia

Psych: depressed mood with flat affect, +AVH, +passive SI

Diagnostic Studies

A1c: 8.3

Clinical Course

Mr. T expressed understanding that his diabetes and weight gain were related to antipsychotics. He stated that suicide was an immediate threat to his health, whereas metabolic syndrome was a long-term threat. He requested increasing the dosage of quetiapine and agreed to increased medical treatment of metabolic syndrome.

In conjunction with his psychiatrist, we increased his quetiapine to 800 mg QHS. He was already taking maximum dose metformin and insulin for diabetes. We added dulaglutide for glycemic control and weight loss. Given recent evidence demonstrating efficacy of topiramate specifically in AIWG, we started topiramate at 50 mg daily and uptitrated to 150 mg over three months. From peak weight of 309 lb, his weight decreased to 267 lb over 8 months. His hemoglobin A1c decreased to 6.1, and insulin was discontinued.

IMPACT/DISCUSSION: This case demonstrated the importance of shared decision-making in the management of medical sequelae of long-term antipsychotic use. Traditional methods of weight loss like dietary changes and exercise were limited by this patient's psychiatric illness and resources. Given the patient's medication adherence and buy-in, we were able to add a GLP-1 agonist and topiramate to facilitate weight loss while increasing his antipsychotic. This case empowers general internists to utilize medications like topiramate for management of AIWG.

CONCLUSION: AIWG requires a patient-centered approach weighing the long-term risks of metabolic syndrome against the benefits of psychiatric compensation. Metformin and topiramate have been demonstrated in the psychiatric literature to show benefit in AIWG. GLP-1 agonists may also be a useful adjunct.

STRAIGHT OUTTA KRATOM: A CASE OF KRATOM WITHDRAWAL

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LEARNING OBJECTIVE #1: Diagnose possible symptoms of kratom withdrawal

LEARNING OBJECTIVE #2: Recognize the role of kratom in opioid withdrawal management

CASE: A 36-year-old male with a history of opioid abuse and regular benzodiazepine use was brought to the ED by EMS after his girlfriend found him mute with shivering, diarrhea, jaw clenching and drooling on his couch, which was unlike his usual opioid withdrawal symptoms. He had been acting bizarrely the day before and had been expressing nonsensical ideas. It was unclear if he was hallucinating. He had run out of opioids 6 days prior and was using kratom to aid his withdrawal symptoms. He had last used kratom 3 days prior and benzos 4 days prior to admission. He had no previous psychiatric history and was not on SSRIs. He was tachycardic and mildly febrile on arrival with 4 mm pupils bilaterally, jaw spasms and muscle rigidity. CT of the head and neck were unremarkable. Labs showed a mild leukocytosis. UDS was positive for opiates and benzodiazepines.

CK was not elevated. Fevers and mental status improved with scheduled benzodiazepine therapy.

Psychiatry and Poison Control were consulted. Given the patient's initial presentation, he was initially admitted with concern for NMS or serotonin syndrome. However, given clinical improvement with scheduled benzodiazepines, his symptoms were attributed to psychomotor disorganization due to acute withdrawal or intoxication. Given this patient's polysubstance abuse and chronicity of use, his symptoms were likely due to a mixed picture of benzodiazepine and kratom withdrawal, which is less well documented given its new and over-the-counter use for opioid withdrawal symptoms.

IMPACT/DISCUSSION: Kratom is an opioid receptor agonist originally found in southeastern Asia that has gained popularity in the United States for management of opioid withdrawal. It is commonly sold on the Internet as well as in drug stores and health stores. Dosages and potency vary per manufacturer. It creates a stimulant-like effect that can cause psychosis at low doses and opioid-like effects at higher doses. In recent years, epidemiological studies have shown increased reports of adverse effects after abrupt discontinuation resembling opioid withdrawal symptoms, and life-threatening toxicities including seizures and arrhythmias. This patient developed symptoms of opioid withdrawal several days after use as well as hyper autonomic symptoms that have been documented in kratom withdrawal cases.

Given its novelty in the US, no standard protocols exist to treat kratom withdrawal. No federal laws exist to regulate the sale and distribution of kratom. More evidence is needed to bring this to the attention of policymakers.

CONCLUSION: Kratom is a new over-the-counter herb used for opioid withdrawal with poorly understood toxicities and withdrawal effects. Clinicians should be able to recognize the symptoms of kratom withdrawal and incorporate details of kratom use into their history taking.

VAPING "NIC-SICKNESS" AND SIADH

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LEARNING OBJECTIVE #1: Recognize potential causes of SIADH

LEARNING OBJECTIVE #2: Anticipate challenges of managing SIADH in those with mental conditions

CASE: A 22M with MDD with prior suicide attempt, bulimia in remission, and anxiety presented with 2d polydipsia, lightheadedness, nausea without vomiting, and poor appetite. He reported 3 pack-year smoking. Meds included bupropion, Adderall, and PRN hydroxyzine. He was hospitalized 6mo prior for Na 122 and EtOH abuse, and improved with 1.5L fluid restriction and Abilify discontinuation. This admission, he denied any drug/alcohol use, hallucinations, or med changes in the last 6mo.

He arrived afebrile, normotensive, HR 69 bpm, BMI 22, euvolemic without neuro deficits. Labs showed Na 120, urine Na 34, urine osm 231, serum osm 252, normal LFTs without leukocytosis, and HIV NR. CXR was unremarkable. 14mg nicotine patch was started. Na improved to 132 with 1.5L fluid restriction, at which point urine osm was 895. Psychiatry felt psychogenic polydipsia and psychotropics as unlikely etiologies given lack of SSRI and psychosis. SIADH etiology remained unclear.

In clinic 1wk later, Na was 131. Weekly urine osm remained high, 700-900 with urine Na >100. Further social history revealed he smoked ¼ ppd, took 15mL of 6mg/mL nicotine liquid daily, and vaped 2 JUUL pods weekly. He was started on 14mg nicotine patches with 4mg gum PRN and weaned. Na

improved to 142 with NRT and 2L restriction. AM cortisol, ACTH, TSH, renin, and aldosterone were normal. Nephrology ruled out RTA, started salt tabs, and recommended urea/tolvaptan. Another provider recently started Sertraline, corresponding with Na decrease to 129.

IMPACT/DISCUSSION: Nicotine, nausea, and psychotropics stimulate ADH. This case is the first suggesting nicotine delivered by e-cigarettes as liquid or vapor contributes to SIADH. A traditional cigarette contains 1mg nicotine; Juul states each pod is equivalent to 20 cigarettes. Studies show nicotine in e-cigs to be at least equivalent to that in cigarettes. The CDC warns ~60mg nicotine daily for an 150-lb adult is deadly. Side effects of vaping, known as “Nic-sickness,” include nausea, diarrhea, poor appetite, and dry mouth. This 150-lb-patient’s excessive vaping likely contributed to SIADH due to nausea, nicotine levels, and now an SSRI. Notably, though Na improved with fluid restriction/smoking cessation, his urine osm remained elevated on NRT; some studies have associated NRT with SIADH. With his psychological comorbidities, managing his hyponatremia will remain difficult while balancing any new psychotropics. In SIADH, the clinician must inquire about vaping, which can cause nausea through its variable amount of nicotine.

CONCLUSION: In young adults with hyponatremia, nicotine use, especially through vaping, should be elicited.

Beyond classic causes of hyponatremia, such as drugs (SSRI), hypothyroidism, mineralocorticoid deficiency, and RTA, limbic causes—stress, fear, nausea, and pain—should be considered. Fluid restriction may not be sustainable in individuals with mental conditions.

WHY IS MY PAIN MEDICATION NOT WORKING? THE EFFECTS OF TOBACCO SMOKING ON DULOXETINE

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LEARNING OBJECTIVE #1: Recognize the interaction of tobacco smoking and duloxetine

LEARNING OBJECTIVE #2: Identify that chronic pain management can be improved with smoking cessation.

CASE: A 73-year-old Veteran has chronic low back and bilateral shoulder pain from osteoarthritis for which he has undergone multiple surgeries. His past medical history also includes chronic obstructive pulmonary disease, peripheral neuropathy, depression, posttraumatic stress disorder, and tobacco use. He uses multiple pain medications (duloxetine 120 mg, pregabalin 450 mg, tramadol 300 mg, acetaminophen 2000 mg, and topical lidocaine) and acupuncture with little improvement in pain.

He began smoking at age 18 when he commenced military service and has a 50 pack-year smoking history. He reports that smoking distracts him from his pain and soothes him. He rates his pain intensity as consistently 7 out of 10 (with 10 representing worst pain possible) and frequently higher. After he successfully quit smoking, pain intensity improved modestly to 6 out of 10. He also uses techniques such as progressive muscle relaxation and exercise to help cope with his smoking urges and pain intensity.

IMPACT/DISCUSSION: Patients with chronic pain have higher rates of tobacco smoking than the general population and frequently report that they smoke to cope with pain. However, through an induction of cytochrome P450 (CYP) isoenzymes, polycyclic aromatic hydrocarbons in tobacco smoke impact drug metabolism and serum concentrations of drugs and metabolites. Specifically, smoking induces CYP1A2, thus increasing the metabolism of the serotonin-norepinephrine reuptake inhibitor duloxetine. Duloxetine is an antidepressant that is approved to treat chronic musculoskeletal pain and diabetic peripheral neuropathic pain, which can help reduce opioid use. Studies show that patients who smoke have over 50% lower dose-adjusted median serum duloxetine concentrations. This patient was on the maximum recommended dose of duloxetine in conjunction with all his other treatments yet still experienced significant chronic pain. Other antidepressant drugs that should be monitored in patients who smoke include venlafaxine, fluvoxamine, and mirtazapine.

CONCLUSION: Smoking influences the bioavailability of many drugs, specifically pain medications like duloxetine. Patients who quit smoking may

experience an improvement in the effects of their pain medication and an overall improvement in pain intensity. Providers should prioritize smoking cessation efforts when treating chronic pain in patients who smoke to decrease pain and improve efficacy of pain medications.

Clinical Vignette - Quality Improvement and Patient Safety

DELAYED DIAGNOSIS OF A RARE HEADACHE ETIOLOGY: IMPROVING THE DIAGNOSIS OF TRANSIENT HEADACHE AND NEUROLOGIC DEFICITS WITH CEREBROSPINAL FLUID LYMPHOCYTOSIS (HANDL) IN COMMUNITY HOSPITAL SETTINGS

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LEARNING OBJECTIVE #1: Recognize key features of HaNDL for early identification and treatment.

LEARNING OBJECTIVE #2: Recognize the relevance of outpatient neurology follow-up. **CASE:** A 28-year-old male with a history of left inguinal hernia s/p repair, intra-abdominal hemorrhage, recent COVID-19 infection, was admitted with two weeks of numbness, headache, altered mental status, atypical psychotic features. His symptoms initially began with right arm paresthesia, then progressed to the entire body. Other symptoms included intermittent paralysis, headache, and vomiting. He was unable to report his symptoms. Relatives reported intermittent personality changes, falls from paralysis, and seizure-like activities at night, that were mostly associated with headache. He had two prior ED visits for headaches six days before his admission. There were no known concerning exposures, including environmental, travel, substance use, medications, physical/psychosocial trauma. Vital signs and initial laboratory results were unremarkable. Viral serology workup, autoimmune markers, CT/MRI brain were normal. CSF analysis was significant for pleocytosis and elevated proteins. EEG indicated left hemispheric slowing. Empiric therapy for meningitis/encephalitis was initiated and neurology consulted to evaluate for other possible etiologies such as stroke, seizure, and complex migraine. By hospital day 2, he began to clinically improve, regained baseline mental status, neurologic function, and his headache resolved. He was discharged with neurology follow-up. On follow-up, he was symptom-free and HaNDL was confirmed by the neurologist.

IMPACT/DISCUSSION: The presumptive diagnosis upon discharge was aseptic viral encephalitis and HaNDL. HaNDL is a rare and relatively new diagnosis, with limited literature to guide practitioners. Distinguishing features include severe headache, transient neurologic deficits, and CSF lymphocytic pleocytosis. CT/MRI Brain findings are nonspecific, while EEG typically shows unilateral slowing. Predominant findings include focal sensory disturbance (78% of patients), aphasia (66%), and motor symptoms usually hemiparesis (56%). The diagnosis is made after ruling out other prevalent/life-threatening etiology. Patients are empirically treated for etiologies like meningitis. HaNDL is self-resolving, requiring mainly symptomatic treatment of headache. While the etiology of HaNDL remains speculative, there is prevailing theory that it may be secondary to infection/inflammation. A preceding viral illness has been reported in 25-50% of cases. HaNDL can be easily missed in hospital medicine, due to lack of knowledge and similarity to aseptic viral meningitis. An early diagnosis could lead to improved patient care, and reduce unnecessary hospitalizations, costs, and anxiety to patient/relatives.

CONCLUSION: This case illustrates a rare etiology of headache that could be misdiagnosed. In managing HaNDL, it is imperative to consider infectious/noninfectious causes of headache. The case demonstrates the role of early outpatient followup.

WHEN SAFETY SEARCHES HINDER SAFETY: ADDRESSING IN-HOSPITAL SUBSTANCE USE

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LEARNING OBJECTIVE #1: Describe consequences of inadequate pain and withdrawal management in persons with opioid use disorder

LEARNING OBJECTIVE #2: Recognize adverse effects of safety searches among patients suspected of in-hospital drug use

CASE: A young man with opioid use disorder (OUD) presented to the Emergency Department with several days of excruciating left knee pain. He had injected heroin/fentanyl earlier that day and worried about withdrawal. His knee exam demonstrated warmth, limited range, and a large effusion concerning for septic arthritis. Ketorolac was administered for pain with plans to re-dose before joint aspiration. Due to a miscommunication, he underwent aspiration without additional analgesia and had not yet received medication for withdrawal. Soon after, he was somnolent and reported injecting heroin/fentanyl to address uncontrolled pain. The medical team requested permission to conduct a “safety search” that would result in confiscation of drugs and paraphernalia. He declined, and after a few attempts to persuade him, got upset and decided to leave the hospital prior to completing treatment for his septic arthritis.

IMPACT/DISCUSSION: Patients with OUD often have increased pain sensitivity and opioid tolerance, thus acute pain necessitates proactive multimodal analgesia. This may include NSAIDs, acetaminophen, topical agents, nerve blocks, and opioids. When opioids are used, higher doses may be required. Despite the evidence, providers may not provide adequate analgesia due to discomfort with higher opioid doses, fears about worsening OUD, and stigma. Patients, in turn, are often fearful of inadequate pain control, a common trigger for relapse. When pain is uncontrolled, patients may be compelled to self-medicate, and healthcare systems often respond punitively. Safety searches can breach trust in the medical system, evoke past trauma, confiscate sterile supplies that reduce infection risk, and trigger patient-directed discharges. Though searches may be well-intentioned, they hinder treatment of acute pathologies and also limit opportunities to engage patients around their OUD.

Studies show that uncontrolled withdrawal and pain, stigma, and in-hospital restrictions contribute to premature patient-directed discharges. Moreover, there is little evidence that safety searches improve outcomes or protect from liability and there is clear evidence of potential harm, as in this case. In-hospital drug use should be seen as an opportunity for partnership with patients to adjust treatment plans so that self-medication is not needed. General internists are well-positioned to drive this culture change. If patients do leave the hospital prematurely, attempts should be made to safely transition care using harm reduction principles.

CONCLUSION: Early, transparent, and proactive management of acute pain and withdrawal are critical in patients with OUD; insufficient treatment may motivate patient-directed discharges.

In-hospital drug use should serve as an opportunity to engage patients rather than for punitive action.

WHEN SODIUM HAS YOU DOWN

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LEARNING OBJECTIVE #1: Understand the pharmacology of cytochrome P450 induction and inhibition

LEARNING OBJECTIVE #2: Apply knowledge of P450 interactions to medication reconciliation to improve patient outcomes

CASE: A 72-year-old man presented with progressive shortness of breath, fatigue, thirst, and bilateral rash on his forearms. He had a history of Addison’s disease, latent tuberculosis infection (LTBI), and atrial fibrillation. Two months prior, he had been initiated on isoniazid for latent tuberculosis but developed isoniazid-induced hepatitis and was switched to rifampin. He was found to have sodium of 122mEq/L and had a bilateral purple macular and scaly rash on his forearms. His rifampin was held on admission. He was given five liters of normal saline to correct his sodium deficit, and levels increased from 122mEq/L to 129mEq/L. His home dose of prednisone 5mg was tripled to 15mg. His sodium returned to normal and the rash resolved with treatment of the adrenal insufficiency crisis. Infectious Diseases and Endocrinology services were consulted. The Infectious Disease service recommended rifampin

for a total course of 4 months, since he had failed the other first-line therapy with isoniazid, and using other forms of rifamycins are not well-supported in the literature. The Endocrinology service recommended prednisone 10mg twice daily for the remainder of his LTBI treatment course due to its interaction with rifampin. Before discharge, his medications were reviewed for interactions with rifampin. His home medication of apixaban was discontinued as it was contraindicated for concurrent use with rifampin. He was switched to warfarin before discharge for ease of monitoring while on rifampin.

IMPACT/DISCUSSION: While the most common cause of adrenal insufficiency is tuberculous infiltration, medication interactions can precipitate an adrenal crisis. Rifampin in patients with pre-existing adrenal insufficiency has clearly been shown to increase the risk of adrenal crisis. Rifampin increases P450 enzymatic activity and the amount of sarcoplasmic reticulum proliferation in hepatocytes.

Rifampin is a potent cytochrome inducer, which can potentiate the depletion of other drugs, including glucocorticoids, to sub-therapeutic levels. It reduces plasma clearance of prednisolone by 45% and drug availability by 66%.

Potent inducers/inhibitors of the P450 system are important medications to evaluate when treating patients with medication that may become sub-therapeutic, especially in diseases that require steroids such as Addison’s disease, asthma, COPD, and inflammatory bowel disease. As patients’ complex chronic health issues increase the need for polypharmacy, proper medication reconciliation becomes even more critical.

CONCLUSION: We rarely consider the exact pharmacokinetics of P450 induction/inhibition of most medications except for a select few drugs. Rifampin, as in this case, is one of those medications that must be examined carefully for its interaction with other medications.

WICKED BREW: KAOPECTATE® INGESTION AS A CAUSE OF SALICYLATE TOXICITY

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LEARNING OBJECTIVE #1: Recognize the impact of components of well-known OTC medications

LEARNING OBJECTIVE #2: Recognize clinical and laboratory signs of salicylate toxicity

CASE: A 63-year-old woman with a past medical history of chronic systolic heart failure and chronic constipation was brought to the hospital by her son for one day of altered mental status. Vital signs were significant for tachypnea (respiratory rate 22 bpm) and tachycardia (heart rate 120 bpm) but the patient was afebrile (97.6°F) and normotensive (blood pressure 127/77 mmHg). She appeared agitated and was non-responsive to verbal cues. Collateral provided by the patient’s son revealed that the patient ingested a bottle of Kaopectate® the previous night which she mistakenly thought would relieve her constipation. The basic metabolic panel on admission showed metabolic acidosis with bicarbonate of 15 mEq/L and an anion gap of 19 mEq/L. Creatinine was at baseline 0.86 mg/dL. Arterial blood gas revealed a respiratory alkalosis with pH of 7.49 and PaCO₂ of 27 mmHg. Toxicology panel showed a serum salicylate level of 52 mg/dL (normal: 15-30 mg/dL). The patient was started on a sodium bicarbonate infusion, with the resultant improvement of salicylate blood levels, metabolic acidosis, and mental status.

IMPACT/DISCUSSION: While generally viewed as a benign OTC medication, acetylsalicylic acid was responsible for greater than 17,000 cases of salicylate poisoning in the United States in 2018, the majority of these unintentional (1). Salicylates are found in aspirin, analgesic mixtures of choline and magnesium salicylate, methyl salicylate in topical ointments, and OTC preparations of bismuth subsalicylate as in Kaopectate® and Pepto-Bismol® (1). The wide familiarity with the trade name Kaopectate® does not readily convey salicylate-containing compounds. Bismuth subsalicylate was added to the formulation for Kaopectate® after the FDA banned the use of attapulgite in 2004 (2). This formulary change can result in unintentional salicylate poisoning and misdiagnosis by physicians who are unaware of this change. This change may be especially important for patients already taking aspirin for secondary prevention.

Clinical signs of salicylate toxicity are dose-dependent and cover a wide range of symptoms. Mild to moderate symptoms include tachycardia, tinnitus, vertigo, nausea, and vomiting. Severe toxicity (levels greater than 40 mg/dL) can be associated with altered mental status, high-grade fever, renal failure, hypotension and even coma. Acid-base disturbances are typically seen in laboratory studies, most notably with an anion gap metabolic acidosis. A compensatory respiratory alkalosis associated with tachypnea can be present on exam. Severe salicylate toxicity may require hemodialysis.

CONCLUSION: Patients should be counseled on appropriate dosing of OTC medications Kaopectate® and Pepto-Bismol® to avoid salicylate toxicity. Recognition of early signs of salicylate toxicity and review of sources of OTC salicylate can prevent progression to severe toxicity.

Clinical Vignette - Veterans Affairs

HYPERBARIC OXYGEN THERAPY (HBOT) IN THE TREATMENT OF TRAUMATIC PRETIBIAL WOUNDS

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LEARNING OBJECTIVE #1: Review HBOT as a safe, effective adjunct treatment modality in certain approved clinical indications

LEARNING OBJECTIVE #2: Manage non-operative lower extremity traumatic wounds, including HBOT as an adjunct therapy

CASE: A 37-year-old nuclear submarine mechanic sustained a 14 x 5 x 7 cm deep traumatic avulsion to his left anteromedial tibia. He underwent I&D and skin flap placement at a local trauma center. Wound care nursing was consulted post-op, and antimicrobial dressings, debridement and leptospermum honey were used as standard of care treatment. However, necrotic tissue delayed wound healing.

At his 60 day follow up, his wound healing had stagnated. The wound was open, measuring 6.5 x 2 x 0.5 cm with areas of necrosis. In consultation with the Navy Experimental Diving Unit hyperbaric trained physicians, he underwent 20 hyperbaric treatments on a USN Treatment Table 9. Treatment Table 9 is a hyperbaric oxygen treatment table providing 90 minutes of oxygen breathing at 45 feet. The patient was switched to a Solosite® hydrogel, which is compatible with the hyperbaric environment. The patient also successfully quit dipping tobacco on day 1 of hyperbaric therapy. He was given NRT to wean off his longstanding use of dip tobacco.

Photos taken with patient consent along the way show pinkened skin at the edges of the wound within the first 48 hours (Figure 2). He followed with wound care for debridement, and dressing supplies. At the 20th treatment, his wound measured 3 cm x 0.5 cm x 0.2 cm. He continued for a planned additional 10 treatments until a plateau of improvement was noted on treatments 24-30. One week after his final hyperbaric treatment, the wound closed. Serial neurologic examinations showed an unchanged 5 cm area of absent sensation to light touch and pinprick sensation on the inferolateral margin of the wound. This was believed to be due to traumatic shearing of a superficial sensory branch of the tibial nerve, and it did not improve with HBOT treatment.

IMPACT/DISCUSSION: Pretibial lacerations are common with varied approaches to care and overall poor outcomes. Deep pretibial avulsions often shear fragile vasculature in a watershed area, leaving “degloved” skin and soft tissue at risk for poor wound healing. HBOT has a well-established role in the treatment of select non-healing wounds. Biochemically, O₂ is a co-factor for collagen cross-linking and maturation, and it promotes bacterial killing and angiogenesis.

We report a case of a poorly healing pretibial degloving injury that responded well to HBOT. The rate of wound healing after the addition of adjunct HBOT accelerated by three-fold. The Sailor was able to return to work two months earlier than originally anticipated. Nuclear operators cannot have open wounds before returning to radiation work, so he and the Navy saved on overall costs associated with his accelerated healing timeline.

CONCLUSION: This case highlights the utility of hyperbaric oxygen as an adjunct therapy in pre-tibial wounds – a notoriously difficult to heal area.

Clinical Vignette - Women's Health

A CASE OF EXTENSIVE VENOUS THROMBOEMBOLISM AFTER INITIATION OF COMBINED ORAL CONTRACEPTIVES FOR TREATMENT OF MENORRHAGIA IN A PATIENT WITH UNDIAGNOSED MAY THURNER SYNDROME

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LEARNING OBJECTIVE #1: Recognize VTE after initiation of COC may be due to previously silent risk factors such as MTS.

LEARNING OBJECTIVE #2: Explore the contraceptive and menorrhagia treatment options for a patient with prior history of VTE.

CASE: Patient is a previously healthy 24 year old female who presented with left lower leg pain and swelling 3 months after starting COC (norgestimate and ethyl estradiol) for treatment of menorrhagia. Imaging demonstrated an extensive LLE DVT extending into the infrarenal IVC, bilateral pulmonary embolisms, as well as anatomic compression of the left common iliac vein consistent with May Thurner Syndrome (MTS). She remained hemodynamically stable, but required MICU admission for catheter directed thrombolysis due to her anatomic variance in addition to a heparin drip. Her left common iliac vein was stented for prevention of further DVT. Thrombophilia work up was negative. The patient was discharged on indefinite clopidogrel, apixaban, and compression stockings. COC was discontinued. The patient was discharged without contraception or treatment for menorrhagia. She was instructed to follow up with her PCP for possible treatments.

IMPACT/DISCUSSION: The event of VTE that occurred in this patient is attributed to her underlying diagnosis of MTS and recent estrogen/progesterone exposure. MTS is defined as extrinsic venous compression by the arterial system against bony structures in the ilioacaval territory. The exact prevalence of MTS is unknown, but likely underestimated as most individualizes require no treatment. The incidence is of MTS estimated to be around 18-49% of all patients with DVT. Diagnosis is made by CT venogram. The risk of symptomatic MTS increases with female gender (peripartum or COC exposure), hypercoagulability, dehydration, and scoliosis. The risk of VTE increases three to fivefold after recent initiation of COC in all users. This risk is highest in the first few months, then declines. This risk significantly increases in the setting of other factors (PCOS, smoking, thrombophilia). Prior VTE is a contraindication to further COC. This patient is now on anti-coagulation and anti-platelet agents and menorrhagia is expected to worsen. While a copper IUD would be effective and safe birth control for this patient, this may likely worsen her menorrhagia. Progesterone only contraception may be safe in patients with prior VTE. However, depo provera injections and progestin only pills remain controversial in regard to their risk profile. The levonorgestrel intrauterine device (IUD), which has limited systemic absorption, does not increase the risk of VTE.

CONCLUSION: VTE often occurs in the setting of multiple risk factors: MTS and COC exposure as in this patient, and can cause serious illness. There are limited contraceptive options in women with prior VTE, especially those with menorrhagia. Progestin-only IUD is safe to use in those with VTE, but further research is needed to explore other progesterone only alternatives.

A SURPRISING CAUSE OF SUB-ACUTE ABDOMINAL SYMPTOMS DURING THE COVID PANDEMIC

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LEARNING OBJECTIVE #1: Investigate sub-acute abdominal symptoms in a middle aged-patient (Patient Care)

LEARNING OBJECTIVE #2: Recognize the variety of presentations of mucinous cystadenomas (Medical Knowledge)

Adapt high-value care work-up to limited in-person services during the COVID-19 pandemic (Systems- Based Practice)

CASE: Ms. B is a 59 year old woman with a history of obesity who presented to her PCP via telehealth during the COVID pandemic for routine care. On review of systems, she endorsed months of early satiety, bloating, decreased

oral intake, and infrequent, small volume bowel movements. She denied hematochezia, melena, weight loss, or other red flag symptoms. Basic labs were normal including a CBC and CMP. The patient was started on a PPI, scheduled for an in-person visit for a physical exam, and referred for endoscopy. At her in-person visit, the patient described continued symptoms worst in the right upper quadrant, but her abdominal exam was only notable for central obesity with normal bowel sounds, no tenderness to palpation, rebound or guarding. Her PCP noted the low threshold to pursue abdominal imaging should symptoms worsen or endoscopy not identify the cause. Prior to completion, the patient presented to the ED with acute RUQ pain. CT revealed a 28 x 28 x 12 cm mass with internal vascularity that originated from the left ovary concerning for primary ovarian neoplasm. An exploratory laparotomy revealed a mobile, cystic mass originating from the left ovary. Pathology was notable for a mucinous cystadenoma. The patient did well post-operatively and was discharged without incident.

IMPACT/DISCUSSION: A mucinous cystadenoma is a benign ovarian neoplasm that is often found incidentally but can present with symptoms of abdominal mass effect or ovarian torsion. This case represented a common scenario of multiple sub-acute abdominal complaints without alarm symptoms. Age and progressive symptoms motivated expedited workup that initially targeted luminal pathologies. Prompt referral after identification of the mass was key.

Ms. B showed multiple symptoms that did not fit neatly into a diagnostic category but contained elements of altered bowel habits, dyspepsia and bloating. Society guidelines recommend endoscopy for new onset dyspepsia at age 60. Younger patients judged to have a higher baseline risk or concerning features should also be offered endoscopy. With multiple abdominal complaints, imaging may also be needed to identify a cause. As illustrated in this case, non-specific abdominal complaints even with normal labs should not be ignored in this age group.

CONCLUSION: Nonspecific abdominal symptoms in a middle-aged patient require a careful workup guided by a detailed history and physical exam even in the absence of classic alarm symptoms or lab abnormalities with endoscopy offered in all patients over 60 or those judged to have an elevated risk of malignancy. Imaging should be considered in a high-risk population for those with multiple or undifferentiated symptoms.

CATAMENIAL DIABETIC KETOACIDOSIS: A CASE REPORT

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LEARNING OBJECTIVE #1: Diagnose diabetic ketoacidosis(DKA) in a young female with negative workup

LEARNING OBJECTIVE #2: Highlight the importance of insulin adjustments prior to menstruation in a female with catamenial DKA

CASE: An 18-year-old female with a PMH of DM1(diabetes mellitus) diagnosed at age 13 that presented to the ED with a complaint of continuous nausea and vomiting that began earlier in the day. She managed her diabetes with total 50U insulin humalog daily and glargine 34U at night. She endorsed complete compliance with her medication regimen and denied missing any doses before presenting to the emergency room.

On presentation, she was tachycardic, tachypneic, afebrile but had a normal blood pressure. Her pertinent labs were as follows sodium (Na) = 132 mEq/L, potassium (K) = 4.9 mEq/L, Chloride (Cl) = 100 mEq/L, Bicarbonate (HCO₃) = 12 mEq/L, Anion gap (AG) = 20, Glucose = 337 mg/dL, Lactate = 2.1 mmol/L, White blood cell (WBC) = 12.3 k/uL, HbA1C = 8.4%. A diagnosis of DKA was quickly made and she was started on an insulin drip, IV fluids and kept NPO. She denied any infectious symptoms or recent sick contacts. A chest X-ray and urinalysis were done in the ED to evaluate for any source of infection and no sources were found. Further review showed that the patient was on the second day of her menstrual cycle when the symptoms began. She also reported 4 similar episodes of DKA over the past year that all occurred on the first or second day of her menstrual cycle. She denied any reduction in her insulin dosages during her menstrual cycles or changes in food habits. Her

menstrual cycles were regular. After thorough investigation with negative results, her DKA was attributed to the start of her menstrual cycle.

She was eventually transitioned to subcutaneous insulin and a diabetic diet after her AG closed. Upon discharge, her insulin was adjusted and increased to match her requirements. Furthermore, she was advised to increase her insulin dosages by 1-2 units 1 day prior to start of her menses, in anticipation of catamenial hyperglycemia.

IMPACT/DISCUSSION: Catamenial hyperglycemia is a condition characterized by an increase in blood glucose levels related to menstrual cycle changes. It is thought to be caused by an increase in progesterone levels during menstruation leading to an increased inflammatory state and a subsequent rise in blood glucose levels. DKA is a serious and common complication of type 1 DM. For patients that are compliant with their insulin regimen, there is usually a precipitating factor such as an infection. Identifying the triggering factor is paramount for the patient, in order to decrease the recurrence rate. For menstruating women with recurrent episodes of DKA at the beginning of their menstrual cycle, and no other precipitating factors identified, a diagnosis of catamenial DKA is reasonable.

CONCLUSION: The implication is that for patients diagnosed with this condition, they can increase their insulin dose prior to the start of their menses, to blunt the effect of the catamenial hyperglycemia.

COVID-19 ASSOCIATED NON-SEXUALLY ACQUIRED ACUTE GENITAL ULCERATION

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LEARNING OBJECTIVE #1: Recognize common causes of genital ulceration in young women.

LEARNING OBJECTIVE #2: Describe the clinical features of non-sexually acquired acute genital ulceration.

CASE: A 19-year-old female with hypothyroidism presented to the ED with a two-day history of severe vaginal pain and dysuria in the setting of a one-week history of cough and sore throat. She denied vaginal bleeding and changes to her vaginal discharge. She stated she was sexually active with inconsistent condom use. She denied any prior history of vaginal or oral ulcers. On exam she had a 3 by 2 cm shallow ulcer with a violaceous border involving the left and right labia minora just inferior to the urethra. She had no oral ulcers, other mucosal changes, or rash. Her medications included levothyroxine 75 mcg daily.

Labs were significant for normal CBC, normal ESR, and mildly elevated CRP at 2.8 mg/dL. A urinalysis showed 5-10 WBCs and 10-25 RBCs with negative nitrite. A urine culture and pregnancy test were negative. Testing for gonorrhea, chlamydia, HIV, and syphilis were negative. Serum HSV-1 IgG was positive and HSV-2 IgG was negative. A SARS-CoV-2 PCR test was positive. In consultation with gynecology, the patient was diagnosed with non-sexually acquired acute genital ulceration (NAGU). Given her severe symptoms she was started on dexamethasone 6 mg daily for 7 days. Her NAGU resolved by one month after presentation.

IMPACT/DISCUSSION: Evaluation of genital complaints is an important skill for the internist. The differential for genital ulcerations is broad and includes infectious etiologies like HSV, syphilis, and *Haemophilus ducreyi*, as well as non-infectious etiologies like NAGU, Behçet syndrome, Crohn's disease, trauma, and drug reactions. To narrow this list, it is important for clinicians to obtain a detailed history to elucidate the time course and associated symptoms, and to perform a thorough exam to evaluate ulcer morphology. Risk factors for STIs should also be ascertained. In this patient's case, the likely diagnosis is NAGU, also called a Lipschütz ulcer. NAGU is thought to be an immune response to a recent infection, and is typically preceded by a viral syndrome with flu-like symptoms. It is most common in adolescent girls and young women. Lesions are often large, bilateral and involve the labia minora. Patients frequently endorse severe dysuria and genital pain. NAGU is classically associated with EBV, but there have been case reports associated with acute COVID-19. Ulcers usually resolve over 2 to 6 weeks. Treatment is supportive, but topical or systemic steroids may be considered in severe cases.

While this patient did have positive serum HSV-1 IgG, genital herpes was felt to be less likely given the presence of one large ulceration rather than multiple vesicular, small lesions on an erythematous base.

CONCLUSION: NAGU is an important diagnosis to consider in young women with large, bilateral genital ulcerations, particularly after a viral prodrome. COVID-19, like many other viruses, may be associated with development of NAGU.

ESTROGEN INDUCED OVARIAN DEEP VENOUS THROMBOSIS.

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LEARNING OBJECTIVE #1: Association of Estrogen use and Ovarian DVT.

LEARNING OBJECTIVE #2: Treatment of Ovarian DVT.

CASE: A 46-year-old female, G5P3 presented with dull/crampy non radiating suprapubic abdominal pain and vaginal bleeding since the past 3 days. She denied any nausea, vomiting, or diarrhea. No fever, chills, palpitation, or lightheadedness was reported. Initial presentation appeared to be that of dysmenorrhea. 3 years ago she was treated with Depo-Provera injection for metrorrhagia, however, that aggravated the problem. More recently, she was started on an estrogen containing OCP which partially improved symptoms.

Initial lab work revealed microcytic, hypochromic anemia, her hemoglobin dropped from 9 g/dL to 7.5 g/dL. Her Mentzer index was >16. Her D-dimer was 6 UG per mL, warranting work-up for VTE.

CT Angiography of the abdomen revealed a filling defect in the right portal vein extending into the intrahepatic veins as well as a possible filling defect in the gonadal vein. An Ultrasound confirmed a right ovarian vein thrombus.

Heparin was initiated, OB/GYN then performed a hysterectomy. Prior to the surgery, the patient received an IVC filter. Her heparin drip was then resumed, and she was bridged to Coumadin, after which her IVC filter was removed.

IMPACT/DISCUSSION: Ovarian vein thrombosis is rare and may mimic a surgical abdomen. It is often diagnosed postpartum, with an incidence of 1 in 2000-3000 deliveries. The majority of cases involve the right ovarian vein. OVT presents as chronic colicky abdominal, back, or pelvic pain. The pain is aggravated by lying down, ovulation and menstruation. In a retrospective review of 74 cases of OVT, 81.1% were pregnancy related. Thrombophilia positive in 20% of pregnancy related OVT (Rottenstreich et al., 2016).

CT pelvis is the imaging of choice to diagnose ovarian vein thrombosis, with a sensitivity of 78-100% and a specificity of 63-99%. The diagnosis is based on the Zerhouni criteria, which is enlarged vein, low-density vein lumen and well-defined vessel wall with perivascular inflammatory stranding (Klima and Snyder, 2008). MRI is another option, however is time-consuming and less readily available.

Relevant clinical suspicion is imperative as symptoms are vague. Prompt treatment is indicated in order to avoid complications such as sepsis, ovarian infarction, and PE.

Management requires a multidisciplinary approach and includes OB/GYN, Hematology, and Vascular Surgery. Pharmacotherapy of choice remains anticoagulation. DOAC's such as Rivaroxaban and Apixaban have mostly replaced warfarin because of easy of use, but warfarin remains cost affective.

CONCLUSION: Ovarian vein thrombosis secondary to estrogen use is an unusual location for thrombosis, and symptoms are vague. OVT most commonly occurs postpartum. Diagnosis is made with imaging such as CT/MRI, or Doppler, and is managed with anticoagulation and elective Hysterectomy. Heparin, with warfarin bridging was commonly used, however newer generation anticoagulants like rivaroxaban have become more common.

LUNG NODULES NUMEROUS? MAYBE IT'S THE UTERUS

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LEARNING OBJECTIVE #1: Diagnose and treat benign metastasizing leiomyoma

LEARNING OBJECTIVE #2: Expand the differential for lung disease in women

CASE: A 52 y/o woman with type 2 diabetes presented to transfer primary care. She reported progressive, debilitating shortness of breath and fatigue. Financial and transportation restraints limited prior workup. Surgical history was notable for hysterectomy 10 yrs prior for benign leiomyomata. She denied wheezing, cough, fever, melena, hematochezia, headache, snoring, or smoking. SpO2 92% on room air with exertion. Exam was notable for dyspnea on minimal exertion and normal breath sounds. Labs showed Hgb 10.8 and IDA. Prior TTE and nuclear stress test were normal. Prior PFTs showed FVC 41% predicted (restrictive, severe). Chest CT w/o showed scattered, bilateral, solid-appearing nodules. FDG-PET showed minimal uptake. Diagnostic VATS was recommended due to locations of the lesions. Given significant barriers to care, she was directly admitted for expedited workup. Colonoscopy/EGD showed no abnormalities. VATS biopsy and resection showed benign metastasizing leiomyoma, with similar morphology to the patient's prior hysterectomy. She was started on oral medroxyprogesterone 10mg daily and iron with significant improvement in symptoms and quality of life. Video visits have facilitated follow-up.

IMPACT/DISCUSSION: We pursued workup for dyspnea, then restrictive lung disease. This revealed bilateral, solid pulmonary nodules. Lung disease in women of reproductive age introduces often overlooked, rare diseases including lymphangioliomyomatosis (LAM), diffuse idiopathic pulmonary neuroendocrine cell hyperplasia (DIPNECH), connective-tissue-related ILD, and benign metastasizing leiomyoma (BML).

BML is a slow-growing smooth muscle proliferation of extra-uterine benign leiomyoma, most commonly in the lungs. Only around 100 cases have been reported, though >40% of women over age 40 have fibroids. Metastasis is thought to be due to uterine leiomyoma cells embolizing hematogenously at the time of hysterectomy. BML have a low metabolic rate on FDG-PET. Progestins and estrogens increase the growth of BML, thus they grow during pregnancy and regress after menopause. Symptomatic BML can be treated with GnRH analogs, SERMs, selective progesterone receptor modulators, aromatase inhibitors, or surgery.

The patient's workup was limited by her socioeconomic situation. We made progress with her outpatient workup by addressing access to care – FMLA paperwork, transportation – and strategizing with specialists. When progress stalled, direct admission completed the workup. Video visits have increased access to care.

CONCLUSION: -BML is a rare complication of surgery for uterine leiomyoma often presenting as SOB and treated with hormonal therapy

-The differential for lung disease in women includes BML, LAM, DIPNECH, and connective-tissue related ILD

-Barriers to accessing care in patients requiring complex workups can be addressed by maximizing work protections, prioritizing plans, direct admission, and telehealth

PERITONEAL COCCIDIOIDOMYCOSIS IN EARLY PREGNANCY IMITATING CARCINOMATOSIS

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LEARNING OBJECTIVE #1: Distinguish causes of peritoneal nodularity

LEARNING OBJECTIVE #2: Recognize atypical presentation of disseminated coccidioidomycosis in immunocompetent host

CASE: A 39 year old woman who was 4 weeks and 1 day pregnant via intrauterine insemination presented to the emergency department in Southern California with four days of fevers, abdominal pain, and bloating. She initially attributed abdominal cramping to her recent IUI, however upon development of fevers her obstetrician recommended evaluation for other etiologies. She presented twice to an urgent care clinic where she had normal vitals, negative urine culture, negative STI testing, negative influenza test, mild leukocytosis (13.12 × 10⁹/L), and mild transaminitis (AST 96 U/L; ALT 93 U/L). She presented to an emergency department when her pain worsened, and she

developed diarrhea, nausea and bloating. A CT scan showed moderate ascites with peritoneal nodularity and enhancement concerning for malignancy. She was admitted for further evaluation and treatment. During her hospitalization, she had daily fevers, progressive abdominal distention, and increased leukocytosis (up to $30 \times 10^9/L$) despite antibiotic treatment for possible bacterial peritonitis. Tumor markers were checked as part of a malignancy work-up and CA-125 was mildly elevated to 96 U/mL. A percutaneous peritoneal biopsy was performed and showed fat necrosis and evidence of granulomatous. Ascitic fluid analysis did not reveal bacteria, mycotic elements or malignant cells. Diagnostic exploratory laparoscopy was performed which showed extensive studding of the peritoneal cavity and adhesions which appeared consistent with carcinomatosis versus peritoneal tuberculosis. Culture performed on the sample grew *Coccidioides immitis*. The patient was started on a prolonged treatment with fluconazole.

IMPACT/DISCUSSION: *Coccidioides immitis* is found in the soil southwestern United States, Central and South America. This patient was likely exposed at Southern California construction sites. Typically, *c. immitis* infections affect the lungs, but can involve other organ systems. It is not typical to see disseminated coccidioidomycosis in immunocompetent patients, however it is important for providers to remember that pregnancy is a risk factor for disseminated disease. The mild immune suppression and change in sex-hormones of early pregnancy contribute to the increased risk of dissemination. Peritoneal coccidioidomycosis can appear like carcinomatosis on imaging and can cause an elevation in tumor markers.

CONCLUSION: - Disseminated coccidioidomycosis can present with similar symptoms to peritoneal carcinomatosis.

- Pregnancy can trigger disseminated coccidioidomycosis.

Innovation in Healthcare Delivery (IHD) – Clinical Informatics and Health Information Technology

HIGHWAY TO ED: NEW APPROACH TO TRANSITION AMBULATORY PATIENTS TO EMERGENCY DEPARTMENT (ED)

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

Ambulatory clinicians need efficient and reliable way to handoff patients to ED

LEARNING OBJECTIVES 1: Clinicians can utilize direct referrals to transfer patients from clinics to EDs efficiently across different visit types.

LEARNING OBJECTIVES 2: Innovative workflow leveraging electronic health record (EHR) tools are well received and adopted by clinicians across different visit types.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS) :

Safe and efficient handoffs to ED is crucial for patient care. Clinic providers usually place phone calls to ED to transfer their patients. In the era of COVID-19, where efficiency is essential and there is increase utilization of new forms of care delivery like telehealth, such practice may not be efficient. The traditional workflow of placing calls can be time consuming and not achieving the goal of efficient transfer of patients.

Most EDs have rotating providers where the clinician who receives the handoff is unlikely to be the one who ultimately cares for the patient. Clinicians frequently waste time being on hold or have to drop what they are doing to be on the phone.

Furthermore, the COVID-19 pandemic has changed the way we deliver care to our patients. The volume of telehealth visits exploded during the pandemic along with increase phone calls and nurse triage visits.

We created a new order entry item (“ED Referral”) with associated order questions that allowed providers to alert our ED within our EHR (Epic, Verona, WI). We implemented the optional new workflow replacing phone calls to ED providers with our new order in phases, starting on August 10, 2020

and evaluated it over a three-month period. During the study period, 3 different groups went live: General Internal Medicine, Geriatrics, and Family Medicine. Clinicians can continue to use phone calls or use this new option.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Data from all ED encounters occurring on days when a patient sent to ED via the referral order was collected. Outcomes of interest were the distribution of the dispositions from the ED between patients who had referrals and standard ED patients. Count data was given with associated percentages. Central tendencies were represented as median with interquartile ranges. Evaluation of the distribution of dispositions between both referral and standard ED patients was performed using Chi-Square Goodness of Fit Test.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

The 3 departments studied generated 180 referrals to the ED using our new tool over the study period. Over the course of the study, we saw an increase in the use of the new tool. Most ED referrals originated from telephone encounters (38%), office visits (22%) followed by video visits (17%) (Table 1). All telemedicine encounters (video, phone, patient portal, nurse triage) accounted for 77% of all referrals made.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?):

EHR tools and new workflow can be leveraged to efficiently and reliably transfer patients from ambulatory setting to ED. This new tool and workflow are adopted by clinicians and used across different visit types

HOME-SAT: A MULTIMODAL POST-DISCHARGE VIRTUAL FOLLOW UP PROGRAM FOR COVID-19 PATIENTS.

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

There is a need for early identification of patients with COVID-19 who may clinically deteriorate at home upon discharge from the hospital.

LEARNING OBJECTIVES 1: Impact of virtual post-discharge follow-up visits on early identification of clinical deterioration of patients with COVID-19 at home. (Patient care)

LEARNING OBJECTIVES 2: Understanding requirements and barriers to implementation of a multi-modal virtual follow-up program. (Systems-based practice)

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

UMass Memorial Healthcare (UMMHC) is a large academic health care system caring for patients in central Massachusetts. A field hospital in the city of Worcester’s convention center, DCU center (DCUFH) was opened from April to May 2020 during the first COVID-19 surge, serving as an extension hospital to care for low acuity overflow patients with COVID-19. Patients with COVID-19 are susceptible to rapid clinical deterioration requiring hospitalization and ICU care that includes ventilatory support, especially in the early clinical course. The HOME-SAT virtual follow up program was developed shortly after the opening of DCUFH to monitor patients who were discharged home.

Patients identified to be discharged were assessed for smartphone access, technological literacy, and language. Patients were then provided instructions and given pulse oximeters accordingly. Two days after discharge patients were called via their respective virtual method (video or audio) for clinical assessment with the aid of a standard questionnaire built in the electronic health record and pulse oximetry data. Fourth year medical students under direct physician supervision conducted visits and referred patients to the ED if needed. Non-English speaking patients were contacted in advance by interpreter services.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Number and proportion of patients who were successfully contacted for a follow-up visit by visit method, patient language, and patient satisfaction.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

From April to May 2020, 118 patients were discharged home:

54% were English-speaking

33% were Spanish-speaking, constituting the largest non-English speaking population

81 patients were successfully contacted:

62% by video

38% by telephone visits

35 patients had pulse oximetry measurements

2 patients identified to be deteriorating at home. All patients expressed satisfaction.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Virtual post-discharge follow-up to monitor patients with COVID-19 for clinical deterioration is feasible

Usability of the technology tools used needs to be considered to improve patient adoption and engagement including use of web RTC based video technology and use of simple pulse oximeter devices

IMPROVING PHYSICIAN ENGAGEMENT IN THE ELECTRONIC MEDICAL RECORD

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

How can physicians be recruited to complete a program on EMR efficiency and personalization, and increase involvement in informatics at an academic medical center?

LEARNING OBJECTIVES 1: Objective 1: Interpersonal and Communication Skills: describe tools and strategies to engage physicians in EMR optimization.

LEARNING OBJECTIVES 2: Objective 2: Interpersonal and Communication Skills: Describe the physician recruitment process and the tools needed to maintain physician engagement in EMR personalization and efficiency.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

A team of physician informaticists and Provider Optimization Experience Team members developed a plan to recruit physicians to complete a certification program, which consists of 8 classes and 9 projects. The Physician Power User course was developed by Epic and is aimed at increasing efficiency and personalization in the EMR. Our unique program enlisted physicians to recruit other physicians. We focused on ambulatory physicians in a wide range of specialties. The team had weekly virtual meetings and developed strategies to recruit and encourage course completion. The tools employed included checklists, escalation protocols, weekly reports from Epic, and flow charts. Following certification, participants were invited to participate in Physician Informatics Council meetings. They will also be notified in advance of new EPIC upgrade features and have access to different Epic environments to help them share new skills.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Our initial goal was for 9 physicians to complete the Power User certification program between September and December 2020. We estimated that we would need to recruit and enroll 40 physicians in order to have 9 completions by December 2020 (~23% completion rate). Our secondary goal is to have increased physician engagement, which will be

measured by attendance at Physician Informatics Council meetings and participation in EMR upgrade discussions.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

As of December 30, 2020, we exceeded our goal and recruited and enroll 60 physicians in at least one class. Seventeen physicians completed the 8 class/9 program certification (~28% completion rate). Prior to our program, Rush had 3 Power Users. Our intervention added an additional 17 Power Users in a 4 month timespan, and more are expected to complete the program soon. Physicians from multiple specialties and Rush locations participated.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Despite demanding schedules, many physicians were enthusiastic when presented with an opportunity to improve efficiency and personalization of the EMR. Using physicians with informatics experience to connect with other physicians was an effective way to recruit. With regular communication and encouragement, several physicians completed Power User certification. Through the use of independently designed tracking tools, we were able to organize course schedules for 60+ physicians, monitor their progress, and provide feedback and support. Prior to our intervention, physicians at our institution were not seeking out this program, and feedback from participants so far has been positive.

INCREASING HIERARCHICAL CONDITION CODING (HCC) IN PRIMARY CARE

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

HCC is increasingly used for reimbursement as the environment shifts to value based payments, however HCCs have been difficult for primary care physicians to code in a busy clinical environment.

LEARNING OBJECTIVES 1: Replicable process and technical build for addressing HCC capture in primary care.

LEARNING OBJECTIVES 2: Understand how to engage providers at the point of care to increase capture of HCC

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

Our intervention was focused on outpatient clinicians at Rush University, a large tertiary care academic hospital system in Chicago, IL. A 2 day event was conducted with stakeholders to develop a plan for increasing HCC. The event included control and impact analysis, review of best practices from other healthcare systems, and an effort/impact chart. The event led us to create a metric called HCC recapture rate to assess how well each physician and Rush as a system were doing on HCC. The HCC recapture rate was calculated using the: # of HCC coded in current calendar year divided by the # of HCC coded in past calendar year. Our information systems team updated our problem list in the electronic healthcare record to display HCC diagnosis at the very top as well as development of clinical reminders. The clinical reminders, housed in the clinical reminders section where physicians frequently looked, helped remind physicians of which HCCs still needed to be addressed during the calendar year. Additionally each physician could see on their clinic schedule how many outstanding HCCs each of their patients had as well as view the HCCs on the L hand sidebar in the EHR for every patient. The importance of HCC's were disseminated at all individual clinic meetings as well as division wide meetings multiple times. Individual providers received 1:1 training from Information Systems specialists on all of the new features that were developed.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Increase of 30% in HCC recapture across all of primary care.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

Since launching the program in June 2020 to November 2020, our HCC recapture rate increased from 42% to 73% when compared year over year relative to the current date. The Information Specialists were able to train 93% (58/63) providers on the new functionalities. 14 physicians were interviewed regarding their perception on HCC. 100% (14/14) physician stated they had no issues with being able to put in HCCs. 86% (12/14) physicians saw the HCC intervention in the clinical reminder.

In December, we realized that capturing HCCs year over year relative to the current date is less accurate than just comparing recaptured HCCs of the current year against the total number of HCC coded in the previous year. These new numbers will be reported moving forward.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): 1. Feasible to develop an EHR intervention to increase HCC in primary care.

2. Recapturing of previously coded HCC is a great starting metric to measure HCC performance.

3. The EHR intervention has to occur at an area that the physician is already looking at.

4. Any HCC Intervention needs to be combined with communication and dissemination plan

REDUCING DIGITAL INEQUITY IN SOCIAL SUPPORT DURING COVID: PROVIDING PHONE-BASED TECHNICAL SUPPORT FOR LOVED ONES TO VIDEO CONFERENCE WITH PATIENTS ADMITTED TO A SAFETY-NET HOSPITAL

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

Video-conferencing has been utilized to decrease isolation in hospitalized patients during COVID-related visitor restrictions; however, communities served by safety-net hospitals may face structural barriers to participating in video-conferencing as these platforms were not designed for populations with limited English proficiency or limited health literacy.

LEARNING OBJECTIVES 1: To describe the feasibility, workflow, and outcome of a technical support service designed to promote video-conferencing access.

LEARNING OBJECTIVES 2: To describe common technological barriers and access to video-conferencing devices among loved ones of patients admitted to a safety-net hospital.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

This project is part of a larger 3-hospital resident and medical student-led initiative to facilitate video calls for hospitalized adults. For the project to enhance digital access at a safety-net hospital, we developed a standardized script and trained 17 medical students to serve as remote technical support volunteers. The remote volunteers called the patient's chosen contact(s) and provided step-by-step instructions to identify the correct device to use (phone, computer, tablet), download the video platform, and enter meeting ID information to join a video call. This instruction would conclude with a practice video call to ensure adequate sound and video quality.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): To evaluate the process outcomes of this quality improvement project, during a convenience subset of these support calls students recorded call time and collected information from the contacts about their access to smart phones and computers with audio/video capacity.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

Remote volunteers supported the friends and families of 98 hospitalized patients over seven weeks which resulted in 255 video calls between patients and their loved ones. The average duration of each remote support call was 11 minutes per family (range 2-30 mins). Data on technology access was collected for 38 contacts. Of these 38 contacts, 9 (24%) did not have access to a computer with audio-visual capability, 2 (5%) did not have access to a smartphone, and 1 (3%) did not have access to either smartphone or computer with audio-visual capability. The most common support issues included: downloading the video software application on mobile devices, turning on the microphone, and identifying how to join a video meeting.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?):

Video health or social interventions may benefit from remote digital support for loved ones, including step-by-step setup instructions and troubleshooting to address technological barriers. Our sample may underrepresent those with digital access barriers as care teams may have screened for lack of device or internet access prior to referring patients for the service. However, by reducing the perceived technical support burden on front-line providers, these brief support calls could help broaden the reach of video calls for patients to support greater digital inclusion and improved care experience for hospitalized patients at safety-net hospitals.

Innovation in Healthcare Delivery (IHD) - Clinical Practice

ADVANCING WOUND CARE COORDINATION THROUGH THE PRIMARY CARE MEDICAL HOME

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

Patients with chronic wounds suffer from poor care coordination as they often get shuffled between outpatient clinics without a clear sense of who is managing their wound care.

LEARNING OBJECTIVES 1: Patient care: To show how a new primary care wound clinic can improve access to care for patients with chronic wounds in a federally qualified health center (FQHC) system.

LEARNING OBJECTIVES 2: Systems-based Practice: To understand how the health delivery system is improved through more centralized care and improved coordination among providers to address patients with chronic wounds.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

We have created an outpatient wound clinic which operates two days per week within a high utilizer primary care clinic. It provides for patients within a FQHC serving a high percentage Medicaid population. The objective is to streamline care for patients suffering from chronic wounds and prevent further complications due to infections and limb ischemia. While the purpose is not to take over all primary care responsibilities, the patients are evaluated by an internal medicine provider while in the clinic to assist with care management.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION):

1. Measuring access to care and time to follow up
2. Measuring wound healing rates based on size and features of the wounds
3. Measuring patient and provider satisfaction with the new system

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

1. The clinic has served 35 patients with 148 total appointments in 2020
2. Improved access to care leads to better follow up and improved outcomes
3. Providers and patients are pleased with the new system

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?):

Chronic wound care patients often suffer from

fractured care due to poor coordination which leads to bad outcomes. Creating a wound clinic within the primary care medical home improves access to care and leads to better coordination between providers. Downstream this leads to less complications from chronic wounds and reduced stress on the health system.

HOW SMART IS YOUR GOAL? RESIDENT MOTIVATIONAL INTERVIEWING BRIEF INTERVENTIONS TO CALIBRATE PATIENT GOALS IN MANAGING UNCONTROLLED DIABETES.

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): In our safety-net hospital's predominantly Afro-Caribbean, low socioeconomic status population, 40% of patients living with diabetes mellitus (DM) have Hemoglobin A1c > 8%.

LEARNING OBJECTIVES 1: To teach residents to use their population health registry to identify and manage high-risk patients living with DM

LEARNING OBJECTIVES 2: To apply motivational interviewing (MI) behavioral interventions to engage patients in setting DM self-management Specific, Measurable, Achievable, Realistic and Time-bound (S.M.A.R.T) goals

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): Resident physicians were trained in MI, a patient-centered approach focused on elicit behavioral change by strengthening an individual's motivation and commitment to a specific goal. Residents used the NYCH+H/Kings County population health registry to identify empaneled primary care patients living with DM. Residents administered a standard questionnaire designed to assess confidence with and barriers to diabetes self-management in-person or by phone. Using MI techniques, residents worked with patients to identify a SMART goal. 4-6 weeks later, residents contacted patients by telephone and assessed confidence with DM self-management and satisfaction with achieving their SMART goal.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Patients were assessed for barriers to self-management, which were grouped into common themes. A readiness ruler was used to establish pre- and post-intervention confidence in diabetes self-management, as well as motivation, commitment to and confidence in patient ability to pursue and achieve a DM self-management SMART goal. SPSS analysis of pre- and post-intervention confidence rulers was performed using the paired-samples t-test.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Participants were predominantly women (57%), with an average age of 60. 46/48 patients completed both initial and post-intervention surveys. Most commonly perceived challenges to DM self-management were: diet (42%), medication issues (18%), stress (11%). 52% patients were satisfied (score 8-10 on confidence ruler) with achieving their SMART goal.

Pre- and post-intervention self-management scales were positively correlated ($r=0.70$, $p=.000$). On average, DM self-management improved from a mean of 7.13 to a mean of 7.72, $t(45)=-2.446$, $p=0.018$, following resident-patient MI and SMART goal setting.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Application of structured motivational interviewing techniques in a resident primary care practice engages patients to establish and

pursue SMART goals focused on diabetes self-management. Use of population health chronic disease registries enables residents to identify and target high-risk patients for these effective interventions which improve DM self-management.

MEDICALLY TAILORED MEALS AND NUTRITION THERAPY TO IMPROVE OUTCOMES IN CONGESTIVE HEART FAILURE PATIENTS

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

Will providing medically tailored meals and medical nutrition therapy following discharge improve health outcomes for patients hospitalized with congestive heart failure?

LEARNING OBJECTIVES 1: To identify medical nutritional interventions that may improve health status, enhance health knowledge, and prevent rehospitalization among patients recently hospitalized with congestive heart failure

LEARNING OBJECTIVES 2: To identify and tailor non-pharmacologic therapy for long term management of congestive heart failure to the sociocultural context of high-risk patient populations

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

Open Hand Atlanta is a social services organization dedicated to helping members of the community prevent or better manage chronic illness through Comprehensive Nutrition Care, which offers home-delivered meals and nutrition education provided by Registered Dietitian Nutritionists. The non-profit organization partnered with Grady Hospital, Atlanta's largest public healthcare system, to provide medically tailored meals and Medical Nutrition Therapy (MNT) to patients following hospitalization for an acute exacerbation of congestive heart failure. Candidates were referred to the program if they were at high risk for readmission and food insecurity as determined by the two-question hunger vital sign screening tool. Participants who completed the program received 3 meals a day for 3 months, as well as individual sessions with a Registered Dietitian Nutritionist at the beginning, middle, and end of their participation. Patients' healthcare utilization, biometrics, and nutrient intake were monitored over the course of the intervention.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Readmission rate, cardiology appointment adherence, blood pressure, weight, and BMI were evaluated as health outcome markers. Nutrition metrics included change in fruit, vegetable, sodium, and fat consumption pre and post intervention.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Of the 38 patients who were enrolled after recent CHF hospitalization, 15 completed the three months of MNT and daily medically tailored meals. Among those who completed the intervention, 73% avoided hospital readmission and 47% adhered to their scheduled cardiology follow up visit. Average weight and blood pressure remained stable for the majority of participants and one patient lost 15 pounds. Patients saw a 53% increase in vegetable and fruit consumption, a 48% decrease in sodium intake, and a 12% decrease in saturated fat intake.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Ultimately, 9153 medically tailored meals were successfully delivered along with MNT to a high-risk population of CHF patients. The provision of such meals and structured sessions with nutritionists following discharge may improve health status and prevent

rehospitalization among those recently hospitalized with CHF. Metrics for a retrospective cohort of matched controls are currently being analyzed to better assess the efficacy of this intervention. Future research should increase cohort size and program duration to evaluate whether nutrition intervention can significantly impact health outcomes and healthcare utilization.

PHYSICIAN IMPRESSION OF TELEMEDICINE DURING CORONAVIRUS PANDEMIC AT A TERTIARY CARE CENTER

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

How do physicians at an academic center perceive telemedicine in their medical practice?

LEARNING OBJECTIVES 1: Understand how telemedicine was rolled out at a large tertiary care academic center.

LEARNING OBJECTIVES 2: Understand physician's perceptions of telemedicine and areas to improve telemedicine efficacy

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

During the COVID 19 pandemic, Rush University, like many other healthcare institutions expanded telemedicine to help continue to care for our patients. The telemedicine development consisted of in person and virtual training on how to conduct telemedicine visits, large deployment of iPads to clinics to help facilitate telemedicine visits, and alignment with billing to ensure compliance. Quickly we realized technical barriers, such as initiating the video visit and optimizing sound quality were the biggest issues. A medical assistant workflow was implemented to help connect with the patient prior to the clinic appointment to ensure connectivity along with completing standard aspects of the in person rooming workflow. A team of Associate Chief Medical Informatics Officers and Physician Informaticists developed a survey to assess providers perspective regarding telemedicine visits. The survey was disseminated across the Rush University Healthcare system and we received responses from 114 physicians. The survey was analyzed to determine overall perceptions of telemedicine by physicians and to continue to work towards improving technical and logistical challenges.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): We sought to understand physicians perspective around the following questions

1. Ease of using current telemedicine platform for both physician and patients
2. Percentage of clinical practice that was virtual
3. Issues and challenges of telemedicine visits
4. Importance and utilization of telemedicine in the future

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

About 78% (81/104) physicians felt that it was easy to join video visits as a provider, however only 23% (24/103) of physicians stated that their patients can easily connect and maintain connections during the video visits. There were 33% (34/105) of physicians who had over 50% of their clinical time spent providing telemedicine service, but the bulk 51% (54/105) of physicians spent 0-25% of their clinical time performing telemedicine services. Features that caused physicians to use an alternative telemedicine platform included: Ease of use on provider (18) and patient end (29), Better audio (13) and video (16) quality, Patient request (9) and being unsure of how to use the video visits (4). 94% (108/115) of physicians felt that it was important that we keep offering telemedicine as an option.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Physicians felt that telemedicine visits were easy to join but the majority did not feel that they were as effective as in person visits. Despite this sentiment, the majority of physicians believed

telemedicine should continue to be offered. Most physicians experienced patients having issues with connecting to the telemedicine service. In order for telemedicine to grow in the future, patient usability of the platform must be addressed.

TELEHEALTH FOR PREP INITIATION: A PILOT PROGRAM TO EXPAND ACCESS TO HIV PREVENTION SERVICES

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

To determine the feasibility and acceptability of using a virtual-only model for initiating and maintaining patients on PrEP (pre-exposure prophylaxis) for HIV prevention.

LEARNING OBJECTIVES 1: Participants will be able to identify 3 key considerations in developing a clinical workflow for virtual PrEP initiation.

LEARNING OBJECTIVES 2: Participants will be able to discuss 3-5 challenges associated with virtual PrEP initiation, and identify strategies to address these challenges.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

The Family Health Centers at NYU Langone (FHC) is a federally qualified health center network with 8 clinical sites in Brooklyn, NY, primarily serving a low-income, immigrant community. Since 2016, FHC has operated a focused outreach program to promote PrEP to high-risk individuals, using targeted strategies to engage those not currently in PrEP care.

Our intervention sought to expand on our successful outreach model by using telehealth to remove geographic barriers to participation. We developed clinical and patient navigation workflows to enable patients to initiate and continue PrEP through virtual visits. For necessary labs, patients were supported in identifying a lab collection site convenient to their home. Patient navigation staff played a key role in risk reduction education, benefits navigation, and facilitating compliance with labs and virtual care.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION):

The key measure of success is PrEP uptake and continuation among the virtual visits cohort. Additional evaluation measures include the referral source of patients for virtual PrEP initiation, patient demographics, and HIV risk—these measures will enable us to assess whether we are reaching a more diverse or higher risk population through this program.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

The pilot project launched in October 2020. In the three months since project launch, 8 patients were served through this program. Six of the patients (75%) had been initially engaged with the FHC through the HIV prevention program, while two were existing FHC patients—one of whom had previously been in standard PrEP care, but struggled to make the in-person visits. Six patients were cisgender men who have sex with men, while two were transgender women. Virtual PrEP provided an opportunity to link patients to other needed healthcare services, including vaccination and STI treatment.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?):

The telehealth PrEP pilot program enabled us to reach a diverse group of high-risk patients, a majority of whom had not previously been engaged in care within our health system, and we anticipate continued growth this program as we expand our outreach to additional geographic areas. Navigation staff were key in overcoming some of the barriers associated with the virtual model by building relationships with the patients and serving as a reliable source of support for patients encountering logistical barriers. PrEP initiation by telehealth must account for additional logistical considerations—most notably,

ensuring patient compliance with labs—but it is a feasible approach for engaging high-risk patients in HIV prevention services.

WHAT CAN A DIETITIAN DO FOR YOUR CLINIC? MORE THAN YOU MIGHT THINK!

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Do Registered Dietitians (RD) embedded in primary care clinics only see patients for weight management and diabetes?

LEARNING OBJECTIVES 1: Describe the characteristics of patients seen by the embedded RD in primary care clinics.

LEARNING OBJECTIVES 2: Describe the variety of disease states seen by RDs in primary care clinics.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): Registered Dietitians provide medical nutrition therapy and nutrition counseling for patients with a variety of health conditions. While well aligned with the health promotion and disease prevention goals of primary care, RDs are often missing from primary care clinics. We have RDs embedded in four academic General Internal Medicine practices in the Denver area. The RDs had been physically integrated in the clinics until March 2020, when they transitioned to exclusively telehealth to comply with safety requirements for COVID-19. We evaluated patient-level data for all patients seen by the RDs from March 1, 2020 – December 16, 2020 to see if providers were primarily referring for weight management and diabetes or if clinics had found additional ways to leverage the RD skill set.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Patient demographics including gender, insurance type, and age.

Distribution of disease states seen by the RDs.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

Clinic A Clinic B Clinic C Clinic D

Demographics Female 59.35% 65.85% 100% 73.50% Male 40.65% 34.15% 0% 26.50%

Avg. Age 56 53 45 58

Insurance Medicare 33.18% 25.61% 16.94% 34.19% Medicare Advantage 7.94% 7.32% 4.03% 5.98% Medicaid 10.75% 18.29% 14.52% 0.85%

Commercial 42.52% 43.29% 60.48% 55.56% Other 5.60% 5.50% 4.03% 3.42%

Disease States #1 Diabetes Wt Mgmt Wt Mgmt Wt Mgmt

#2 Wt Mgmt* Diabetes GI Pre DM

#3 Prediabetes Other Diabetes UWL^

Other than weight 20.16% 35.37% 32.26% 52.14%

management, diabetes, and prediabetes

*Weight management

^Unintentional weight loss

While all four clinics had a large proportion of patients seen for diabetes or weight management, work on other disease states made up 20.16% - 52.14% of the RDs' workload. Other prominent disease states included GI conditions, unintentional weight loss, and hyperlipidemia. The RDs saw patients for a variety of other reasons, too, including vegan lifestyle education, gout, kidney disease, disordered eating, dysphagia, healthy aging, congestive heart failure, celiac disease, and NASH.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): RDs embedded in primary care clinics can support initiatives focused on chronic disease self-management for diabetes, prediabetes, and overweight/obesity.

RDs embedded in primary care clinics can provide medical nutrition therapy or nutrition counseling for a variety of other conditions commonly seen in the primary care setting. RDs saw patients from a variety of payer groups.

RDs saw more women than men, but men still made up at least 25% of the RDs' patient population. We also observed positive trends related to patient participation with the switch to virtual visits. We are analyzing that data and will include it in the final presentation. The RDs reported fewer no-shows and cancellations after switching to a virtual format.

Innovation in Healthcare Delivery (IHD) - Geriatrics, Palliative Care, and End-of-Life

BILLING PRACTICES FOR ADVANCE CARE PLANNING AT AN ACADEMIC INSTITUTION

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²Department of Medicine, University of North Carolina at Chapel Hill School of Medicine, Chapel Hill, NC; ³Durham VA Medical Center, Durham, NC. (Control ID #3540837)

STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): In the 5 years since Medicare introduced billing codes for advance care planning (ACP) reimbursement, how have providers adopted ACP billing at an academic institution?

LEARNING OBJECTIVES 1: Objective 1, Practice-Based Learning and Improvement: To describe how advance care planning quality improvement (QI) projects affect provider practice patterns for ACP billing.

LEARNING OBJECTIVES 2: Objective 2, System-Based Practice: To describe long-term billing trends throughout a health system using an electronic health record (EHR) data warehouse tool.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): Using the electronic health record (EHR) and a data warehouse querying tool, we examined ACP billing trends since Medicare introduced ACP billing codes in 2016. At our institution, several clinical services have piloted quality improvement (QI) initiatives to promote ACP conversations since 2017. We evaluated ACP billing trends in the institution as a whole and in departments and clinics who promoted ACP as part of a QI initiative. While approaches have differed, all QI initiative have included a component of provider education regarding ACP, including instruction on ACP billing codes and requirements. These initiatives have taken place in select primary care and resident-run internal medicine clinics, gynecologic oncologic clinic and inpatient service, and general internal medicine inpatient service.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): We examined the number of providers who billed at least one ACP intervention and the frequency of ACP billing per provider at all clinical sites over 5 years. We used run charts to understand the number of ACP billing encounters by quarter in the context of QI intervention timing.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

At our institution between January 2016 and August 2020, 1199 patients had a billed ACP visit and 123 providers utilized the billing code. Despite efforts across multiple departments to promote ACP conversations, the proportion of patients above 65 years of age with ACP encounter billing remains small (0.002%). A small number of providers (16) have made ACP billing a routine part of their clinical practice with 10 or more billing encounters; many of the providers who have used an ACP billing code have only used it one time (62 providers, 50.4%).

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Longitudinal EHR data across multiple clinical entities within an academic institution can be used to gain insight into the adoption of ACP billing codes and assess the impact of QI initiatives. While we did see changes in ACP billing within departments and clinics who piloted QI interventions for ACP, the results were driven by practice changes in a relatively small number of providers. To broaden the

uptake, future education and implementation efforts should focus on disseminating best practices from successful users of ACP encounters to receptive nonusers.

Innovation in Healthcare Delivery (IHD) – Healthcare Delivery and Redesign

ADDRESSING THE SOCIAL DETERMINANTS OF HEALTH FOR PREGNANT, HOUSING-INSECURE WOMEN THROUGH AN INTEGRATED, INNOVATIVE CARE DELIVERY MODEL

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

Housing-insecure pregnant women disproportionately bear the brunt of structural health inequities, causing them to fall through gaps between inpatient and outpatient care and risk worse maternal and newborn health outcomes, thus demanding interventions beyond the standard of care.

LEARNING OBJECTIVES 1: Evaluate a collaborative care model between a tertiary care hospital and a community organization that bridges gaps in care for these women.

LEARNING OBJECTIVES 2: Reimagine the care delivery system to meet the needs of this transient high-risk population during the COVID-19 pandemic.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

Bridges to Moms (BTM) is a collaboration between Brigham and Women's Hospital (BWH) and Health Care Without Walls, a non-profit that employs a community-based field team to target social determinants of health for housing-insecure pregnant women. Each patient is assigned a nurse and community health worker dyad throughout pregnancy and postpartum. Together, they address barriers to healthcare access by supporting transportation, housing, food security, personal safety and continuity care.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): BTM is evaluated using maternal and newborn chart data and tracking non-profit spending.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): We compared women who enrolled in BTM from 2017-2019 (N=134) with a matched group of housing-insecure women who received prenatal care and delivered at BWH from 2017-2019 but did not enroll (N=133). Overall, the BTM group had significantly greater postpartum clinic attendance rates and connections to primary care. Women enrolled in BTM for over 30 days pre-delivery (N= 92) also had significantly higher prenatal clinic attendance rates and their infants who required NICU care had significantly shorter NICU stays than the comparison group. This dose effect underscores the importance of the timing of intervention in maximizing health returns. The COVID-19 pandemic challenged us to adapt the BTM model to real-time stressors. Compared to 2019, BTM spent 309% more on addressing food and transportation insecurity. With a nimble adoption of telehealth, we also documented 13% more clinical encounters in 2020, allowing BTM patients to continue to benefit from equitable consistent care during a time of great disparity. We have demonstrated that in tandem with traditional obstetrical services, a program that provides community-based case management, nursing, and social support improves maternal and newborn outcomes and is resilient under pandemic pressures.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Delivering culturally-competent care to vulnerable populations requires hospital engagement of community stakeholders who understand the real-world context of patients' lives and can navigate intersecting medical and social complexities. This integrated care delivery model closes healthcare gaps and is replicable nationwide.

Healthcare democratization demands going beneath the surface of health conditions to treat underlying social drivers of health inequity. Intervention during pregnancy offers the unique opportunity to improve the medical and life trajectory for expectant mothers and their newborns.

ADVANCE CARE PLANNING INTERVENTION AND COLLABORATIVE HOSPICE INITIATIVE IN AN AMBULATORY INTERNAL MEDICINE SETTING AT AN URBAN, QUATERNARY ACADEMIC MEDICAL CENTER DURING COVID-19 SURGE

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

How to expand Advance Care Planning interventions and provide goal-concordant care in the ambulatory setting during COVID-19 surge.

LEARNING OBJECTIVES 1: To identify, respect, and care about patients' end of life wishes during COVID-19 surge

LEARNING OBJECTIVES 2: To develop and implement with a multidisciplinary team a streamline process in the ambulatory setting for Advance Care Planning discussions and hospice referrals during COVID-19 surge

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

Given the importance of advance care planning in the setting of COVID-19, an Advance Care Planning Intervention and Collaborative Hospice Initiative process was developed at an Ambulatory Care Network Internal Medicine Clinic, which was a patient center medical home providing care for underserved patients in an urban, quaternary academic medical center in New York, New York. The initiative's goal was to conduct Advance Care Planning discussions before the onset of COVID-19 or clinical decompensation to promote goal-concordant care and prevent unnecessary patient and family suffering. Its secondary aims were to increase and streamline access to hospice services in the ambulatory setting when appropriate.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION):

Qualitative measures included expansion and collaboration with multidisciplinary team, hospice services, and pharmacies for streamline hospice referral during surge AND effective delivery of comfort care medications and oxygen devices to home for patients' who desired hospice services.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Developed and implemented new Advance Care Planning workflow in ambulatory setting, which allowed patients in the ambulatory setting to be referred to hospice by their primary clinicians. Expansion and collaboration with social work, hospice services, and pharmacies allowed for effective goal-concordant care during surge.

New workflow and collaborations allowed for oxygen concentrators and comfort care measures to be delivered at home during surge.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): A multi-faceted Advance Care Planning intervention is needed in the ambulatory medical setting to promote goal-concordant care during a COVID-19 surge.

Expanded and streamlined access to hospice services in the ambulatory setting, close collaboration with palliative care, and integration across outpatient, inpatient, and emergency department settings are critical.

This outpatient Advance Care Planning intervention and collaborative hospice initiative can serve as a model for other hospital centers during a COVID-19 surge or other future public health crisis, threatening to overwhelm our medical infrastructure.

A MEDICAL STUDENT-RUN TELEHEALTH PRIMARY CARE CLINIC DURING THE COVID-19 PANDEMIC: PERSPECTIVES FROM NEW YORK CITY IN MAINTAINING CARE FOR THE UNDERSERVED.

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): In the context of the COVID-19 pandemic, there is limited guidance on providing high-quality care to vulnerable low-income patients.

LEARNING OBJECTIVES 1: Providing information on how the medical student-run Weill Cornell Community Clinic (WCCC) transitioned to telehealth (Systems-Based Practice).

LEARNING OBJECTIVES 2: To determine if transitioning to telehealth increased access to care by decreasing the no-show rate (Patient Care).

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

The WCCC serves a diverse urban patient population in New York City and provides high-quality, longitudinal primary care to uninsured patients earning less than 400% of the federal poverty line. After a brief suspension of in-person operations due to COVID-19 in the spring of 2020, WCCC developed and transitioned to a weekly telehealth clinic model. Using Zoom and Doximity Dialer as HIPAA compliant video and phone conferencing applications, we were able to continue serving patients and avoid disruptions to care. Phone interpreting services or certified student translators were used for all non-English patient encounters. To emulate the structure of our in-person clinic, we utilized several Zoom features such as the "Waiting Room" and "Breakout Room" to enable HIPAA compliant discussions among the interdisciplinary healthcare team.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION):

We examined the no-show rate of our patients during telehealth visits starting in May 2020 and compared this to the previous in-person attendance rate in 2019. We also surveyed patients' access to computer, smartphone, or regular phone to assess their access to technology, a vital component of telehealth.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

Our telehealth no-show rate was 11% (14/128) from May to December 2020, a decrease from the in-person 2019 annual rate of 23% (84/367), ($p < 0.01$). 88% of patients had access to the video component of the telehealth visit (47% smartphone; 43% computer). 10% of patients used a regular phone.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?):

The transition to telehealth allowed us to safely continue to provide patients care during the COVID-19 pandemic, and improved access to care by decreasing no-show rates. The success of this model demonstrates the feasibility, as well as benefits, of telehealth for healthcare delivery to underserved populations. The pandemic was a clear factor of the rapid uptake of telehealth. At the WCCC, there will be a continued role for this health service line post-pandemic. In addition to increased familiarity with telehealth, patients may benefit from the reduced time needed to seek care. For instance, travel-time is a known barrier to care for low-income workers who rely on hourly-wages. Overall, transitioning to telehealth has helped us prevent lapses in care, helped combat the social determinants of health experienced by our patients, and allowed us to connect with our patients in an ever-changing landscape of healthcare delivery. As we look to the future, we aim to further assess patient experience using telehealth and examine the clinical outcomes, such as blood pressure control via the distribution of blood pressure cuffs to our patients.

A MULTIDISCIPLINARY PREVENTIVE GENOMICS CLINIC BASED IN A DIVISION OF GENERAL INTERNAL MEDICINE

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Increasing demand for preventive genetic care requires multidisciplinary team-based approaches, including active participation from primary care providers (PCPs), to ensure access to high quality care.

LEARNING OBJECTIVES 1: To create a novel clinic and electronic consultation (eConsult) service to provide information about and facilitate elective genetic testing for asymptomatic adults.

LEARNING OBJECTIVES 2: To identify barriers accessing preventive genomic care to inform solutions.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

The Massachusetts General Hospital Preventive Genomics Clinic launched in 2019 and offers genetic counseling, testing, and test interpretation to asymptomatic patients concerned about personal disease risks who may be interested in using genetic information to understand those risks. Our team sees patients one day weekly and consists of genetic counselors, physicians (PCP and cardiologist), clinical laboratory geneticists, and a genetic counseling assistant. We also launched an eConsult service to answer clinician questions about genetic testing for asymptomatic adults. eConsults are fielded by our genetic counselors and reviewed by our physicians. Our laboratory geneticists provide expert interpretation of variants. With the COVID-19 pandemic, our clinic model moved from an in-person to primarily virtual consultation service. Specimens are collected via mailed saliva kits.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Patient referral-to-visit ratio; Time-to-consultation; Out-of-pocket patient costs.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

PCPs were the primary referral source. We received 104 referrals during fiscal year 2020 (10/1/19-9/30/20); 49 patients were seen. Of the 55 referrals not seen, 25 (45%) were inappropriate, 27% were lost to follow-up, and 18% declined an appointment. The three primary reasons for consultation were for the utility of genetic testing for a family history of disease (N=29), such as hereditary cancers or hemochromatosis; genetic testing for healthy patients (N=12), such as preconception carrier screening; and for interpretation of prior genetic testing (N=5), like 23andMe. The median time from referral to appointment was 34.5 days. For 35 patients (71%) genetic testing was ordered. Data about out-of-pocket test costs was available for 17 patients. Most paid \$0 (N=11). The maximum was \$250. Patients found to have actionable results were referred for longitudinal subspecialty follow-up. Although we offer full genome sequencing, no patients elected this testing. Our eConsult service received 22 questions. The most common were about interpretation of prior genetic testing (36%), utility of genetic testing for a family history of disease (32%), and utility of genetic testing for symptoms (32%).

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?):

A multidisciplinary preventive genomics clinic facilitated genetic care for healthy patients with low out-of-pocket costs. Next steps include expanding clinic offerings (e.g. we are now offering polygenic risk assessment for cardiovascular disease), streamlining genetic testing processes, and creating resources to address common questions submitted by PCPs to our eConsult service.

A UNIQUE TELEPHONIC MANAGEMENT APPROACH TO COVID DURING THE 2020 PANDEMIC

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

During the COVID pandemic, health systems across the country had to suddenly pivot to providing the largely untested system of telemedicine while simultaneously caring for patients with a novel disease.

LEARNING OBJECTIVES 1: - Operationalize and build a functional telephonic management system for the management of outpatient COVID

LEARNING OBJECTIVES 2: - Telephonically manage patients with COVID or COVID-like symptoms, including evaluation of symptoms, counseling about disease course and isolation/quarantine, and referral to other care modalities

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

Cambridge Health Alliance is an integrated community health system serving a patient population of 130,000 in the north suburbs of Boston, including a large immigrant and safety-net population. As COVID became prevalent in Massachusetts in March 2020, we quickly pivoted to telemedicine in Primary Care, while simultaneously shifting significant resources to care for patients with COVID-like symptoms. We established a dedicated triage center and in-person clinic for patients with COVID-like symptoms. Simultaneously, we developed a robust and fully integrated telephonic Community Management program for COVID, referring patients based on comorbidities and disease presentation at that time. Patients enrolled in Community Management were followed by phone at periodic intervals based on knowledge of disease processes and potential turning points in the disease. Patients were referred to our in-person clinic when needed. Our Community Management program was additionally integrated with our extensive network of social supports, and we were further able to develop new systems to address social determinants of health, such as delivery of food from local food pantries for patients experiencing food insecurity. Over the course of the pandemic, we have continually refined our approach, adjusting our understanding of risk factors predisposing to severe disease and progression of disease and symptoms of concern.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): - Patient satisfaction scores and qualitative patient reports of satisfaction with the Community Management program

- Decreased utilization of the Emergency Department and PPE

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): We have demonstrated very high patient satisfaction scores in Press-Ganey, and qualitative data suggest that our efforts are highly valued by our community. We additionally have demonstrated decreased utilization of our Emergency Department as patients could be seamlessly referred to our in-person clinic rather than seen directly in the ED, and have decreased PPE usage by managing patients telephonically rather than seeing them in clinic if not necessary.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): It is possible to create a robust program to telephonically manage COVID, and doing so is of benefit both to patients but also to the health system, by decreasing unnecessary utilization of resources and providing patients with the support they need during isolation. Operationalization of this type of system requires robust triage and management protocols as well as excellent continuing education for nurses, providers, and other staff.

A USER-CENTERED DESIGN APPROACH TO BUILDING TELE-MEDICINE TRAINING TOOLS FOR RESIDENTS

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Can user-centered design (UCD) facilitate the development of novel and effective training tools for the virtual ambulatory learning environment?

LEARNING OBJECTIVES 1: To identify the needs, preferences, and concerns of resident trainees and attending preceptors regarding the current virtual ambulatory care learning environment.

LEARNING OBJECTIVES 2: To apply user-centered design (UCD) strategies to the development of effective tools to enhance the virtual learning experience of trainees and preceptors.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUT-

PATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): The COVID-19 pandemic spurred a rapid transition to virtual learning environments, the design of which may impact learning experiences and competency development for trainees. User-centered design (UCD) offers a framework to iteratively and collaboratively incorporate needs, preferences, and concerns of users (e.g. trainees and preceptors) in the development of acceptable and effective educational tools. This study applied UCD strategies of “empathize, define, ideate, prototype, and test” among Internal Medicine residents and outpatient attending preceptors to develop innovations for the virtual ambulatory care learning environment.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Using the UCD framework, we identified:

- 1) needs, preferences, and concerns of residents and preceptors in current virtual precepting practices (empathize)
- 2) key problem areas and pain points (define)
- 3) potential solutions (ideate)
- 4) specific products to develop (prototype), deploy, and evaluate (test) in practice

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Qualitative needs-assessment interviews were conducted among 8 residents and 10 preceptors, which identified key areas of learner need: technical and workflow competency; the virtual precepting experience; patient rapport-building and communication; and documentation requirements.

Subsequently, a Design Thinking Workshop focusing on virtual precepting was developed, and 3 workshops were conducted with 12 participants (residents and attendings). Using a three-phase interactive sequence of “explore, ideate, and create”, participants were divided into 2- or 3-person virtual “breakout” groups and asked to 1) identify a key “problem” in current virtual precepting, 2) brainstorm possible solutions, and 3) design and present a low-fidelity prototype of one solution. Key problems identified included: management of technical issues, goal setting for precepting sessions, clinic-specific information dissemination practices, and the loss of shared learning space with colleagues. Potential solutions included: a digital shared-learning plan for residents, a real-time virtual clinical bulletin board, an integrated virtual team huddle, and just-in-time digital chalk talks. Two prototypes are being developed for testing in the live precepting environment.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): User-centered design can be deployed as an effective strategy to engage learners and preceptors in the design and development of educational innovations for the virtual training environment. We recommend collaborating with residents, preceptors, and other stakeholders in the iterative design of virtual learning tools.

CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) SKILLS CLINIC: AN INTERDISCIPLINARY, HANDS-ON APPROACH TO INHALER EDUCATION WITH SKILLS ASSESSMENTS

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Incorrect inhaler technique by COPD patients reduces medication effectiveness and may lead to increased hospitalizations; in a study of 400 veterans with COPD, 25% reported difficulty using their inhalers and 25% did not seek help when experiencing worrisome COPD symptoms.

LEARNING OBJECTIVES 1: To evaluate COPD patients' step by step inhaler technique pre- and post-skills clinic

LEARNING OBJECTIVES 2: To evaluate patients' confidence in COPD self-management pre- and post-skills clinic

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUT-

PATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): A one hour group session is held in clinic every 60 days. Educators include an internist, two nurses and a pharmacist. Patients are randomly chosen from a primary care COPD registry. They complete Likert scale surveys to rate their confidence levels in COPD self-management pre- and post-clinic and satisfaction levels post-clinic. The goals of the clinic are to demonstrate proper inhaler technique, review why proper inhaler technique is important, and understand when to use one's specific inhalers. In the first activity, each patient is paired with an educator and asked to demonstrate inhaler technique using simulation inhalers. Educators document performance of each step as "yes" if correct or "no" if incorrect. Educators provide feedback about errors in technique. Next, the group discusses why proper inhaler technique is important and reviews when to use each inhaler. Lastly, patients again demonstrate their inhaler techniques. Nurses call patients one month post-clinic to measure their retention of inhaler skills.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Quantitative metrics include patients' inhaler performance, retention of skills post-clinic, and hospitalization rates. Qualitative metrics include patients' confidence in COPD self-management and overall clinic satisfaction.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): COPD patients with an average age of 71 years old participated over 18 months, including 29 males, 2 females, 74% African Americans, and 26% Caucasians. Patients with erroneous inhaler preparation reduced from 55% pre- to 22% post-clinic. Inadequate pre-inhaler care reduced from 62% to 16%. Improper inhalation technique reduced from 35% to 9%. Inadequate post inhaler care reduced from 51% to 19%. All patients denied receiving hands-on inhaler use education pre-clinic and rated confidence in knowing how, why and when to use their inhalers an average of "slightly confident" pre- and "confident" or "very confident" post-clinic. All patients rated the clinic as highly satisfactory; 80% cited patient camaraderie as a highlight. Ten percent of patients did not retain inhaler skills after one month. Hospitalization rates for COPD were similarly low both one year pre- and post-clinic.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Due to time constraints or limited resources, COPD patients may not receive adequate inhaler use education. A skills assessment clinic enabled educators to successfully correct errors in patients' inhaler techniques and improve their confidence in COPD self-management. The group setting enhanced patient engagement. Patients with a new COPD diagnosis and intact cognition may benefit most from this intervention.

CLINIC TO THE PEOPLE: DEVELOPMENT OF A CONVENIENT WALK-IN PRIMARY CARE CENTER FOR PEOPLE EXPERIENCING HOMELESSNESS

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): A growing number of people experiencing homelessness (PEH) in Sacramento lack access to primary care that meets their needs.

LEARNING OBJECTIVES 1: Primary care services that are conveniently located and flexibly scheduled can improve access to care for PEH.

LEARNING OBJECTIVES 2: Partnership with community organizations can promote initiatives targeting social determinants of health and improve access to care for marginalized groups.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): In the Spring of 2020, clinicians from a Federally Qualified Health Center (FQHC) in Sacramento created a new primary care satellite clinic for PEH in partnership with a community organization that is the city's largest provider of free meals, showers, and laundry. The clinic is

adjacent to a lot where 100s of unhoused people gather daily for free breakfast. Visitors can drop-in for primary and urgent care services 5 days a week. The satellite clinic also connects patients with social and medical services (case management, housing, insurance navigation, and mental health care). The clinicians utilize the FQHC's EMR and provide transportation to the main clinic for radiology, laboratory, and pharmacy services. This is the only clinic in the city providing accessible, full-scope primary care for PEH near where they live.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): We track the # of clinic encounters (both daily and monthly), patients' insurance status, # of patients successfully connected with community services, and the % of patients who attend follow-up visits. **FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):** Over 12 weeks, there were 277 patient visits in 45 half-day clinical sessions. Patients ranged in age from 28 to 73 years (median 54 years), and 26% were female.

Clinical volume varied from 0 to 8 patients per half day. Contributing factors include the time of the month, natural disasters (Northern California wildfires), climate extremes, police sweeps that displaced encampments, and changes in availability of services due to COVID-19.

A successful early intervention was changing our clinic's start time from 8am to 7:30am two days a week to better coincide with the 7am breakfast service, which significantly increased the number of patients seen. Additionally, several patients who struggled to attend visits at the main FQHC began to drop in at the new clinic at their convenience.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): 1) Partnering with a respected and experienced community-based organization serving PEH not only provided a clinical space located near patients' encampments, but also helped clinicians gain patient trust.

2) Flexible schedules with drop-in appointments at times convenient for patients is essential for improving access to care for PEH.

3) Utilizing existing community organizations to publicize our services through word of mouth and distributing clinic fliers to encampments and local hospitals helped improve the clinic's visibility among the community.

4) Frequent informal and formal needs assessments help us better serve our patients. Since starting our clinic, we have added on-site vaccinations & medications, rapid flu tests, and helped with housing and insurance applications.

CONTINUOUS CARE: IMPLEMENTATION OF A VIRTUAL AND IN-PERSON TRANSITIONAL CARE MANAGEMENT (TCM) CLINIC BY INTERNAL MEDICINE RESIDENTS

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): The transition between hospital and home is a vulnerable time for patients, who are at risk for readmission, medication reconciliation errors, and lack of follow up.

LEARNING OBJECTIVES 1: Introduce a new type of visit to improve continuity of care for patients recently discharged from acute care

LEARNING OBJECTIVES 2: Apply data from TCM visits to identify areas for improvement in the hospital discharge process

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

The time between hospital discharge and primary care follow-up has historically been a vulnerable period for patients. The COVID-19 pandemic has exacerbated this transitional period, as patients have been forgoing their routine healthcare visits, losing touch with their primary care providers (PCPs), and not having a point of contact for their health needs after they leave the hospital.

We launched a new resident-led virtual and in-person post-discharge clinic at an urban academic hospital connected in order to address the increasing need for follow-up care after hospital discharge. Patients admitted to the hospital who did not have a PCP or could not schedule a PCP visit within 10 days after being discharged were given the option of either an in-person or video TCM visit with an internal medicine resident. Each visit consisted of a templated set of questions, including whether medications were reconciled, and if follow-up appointments were scheduled.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): The primary endpoint for this pilot program was the total number of completed TCM visits. Secondary endpoints included the number of visits where there was a discrepancy in medications or follow-up appointments after hospital discharge.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

Between October and December 2020, there were a total of 79 scheduled TCM visits (28 virtual visits and 51 in-person visits) and 51 (67%) completed visits. For the virtual visits, there was a 86% (24/28) completion rate. For in-person visits, there was a 53% (27/51) completion rate. In 31% (16/51) of the visits, subspecialty appointments were not scheduled at the time of discharge. In 12% (6/51) of the visits, there was a discrepancy with the medications patients were discharged with, with 50% (3/6) due to misprescribed antihyperglycemic agents.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): The increased completion rate of virtual visits as compared to in-person visits (86% vs. 57%, respectively) suggests virtual visits may be a more convenient and preferable mode of follow-up for patients after hospital discharge. This pilot also shows how TCM visit data can offer insights about the hospital discharge process that would otherwise go unnoticed. The data on discrepancies in medications reveals antihyperglycemic medication reconciliation may be a potential area of focus to improve the hospital discharge process. More data is needed to determine the effectiveness of this resident-led TCM initiative, including its effects on hospital readmission rates. The preliminary data suggests that TCM visits, especially virtual visits, may effectively bridge gaps in care from the time patients leave the hospital until they establish more permanent care.

DEVELOPMENT AND IMPLEMENTATION OF AN AMBULATORY MONITORING PROGRAM FOR HIGH-RISK POST-DISCHARGE PATIENTS WITH COVID-19

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): High risk patients hospitalized with COVID-19 often have ongoing medical and social needs post-discharge, and an urgent need exists to improve transitions of care including coordination with inpatient and outpatient medical teams, case management, and social work to decrease preventable 30-day readmissions.

LEARNING OBJECTIVES 1: 1. Describe the development of a transitions of care pathway to manage symptoms of recently discharged COVID-19 patients.

LEARNING OBJECTIVES 2: 2. Describe the development of a multi-disciplinary team to create outpatient pathways of care for recently hospitalized COVID-19 positive patients.

3. Evaluate the effectiveness of a high intensity transitions of care pathway to prevent unnecessary 30-day hospital readmissions and on patient satisfaction.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): At UCLA, we created a COVID-19 Ambulatory Monitoring program in April 2020 with a focus on close outpatient monitoring of recently discharged COVID-19 positive patients in the acute phase of their infection. These patients were deemed high risk due to their need for

hospitalization. Patients were followed by primary care physicians with COVID-specific training with monitoring through day 7 post-hospitalization, as well as clinical check-ins at day 30, 60, and 90 days post discharge. Patients also received a care coordination check-in by a care coordinator within 72 hours of discharge. Symptoms were monitored through daily questionnaires via patient portal to monitor symptom progression, and telephone RN monitoring was conducted for patients that were non-English speaking or could not utilize the portal. Patients with new symptoms were quickly escalated for further MD intervention by the COVID Monitoring Team.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): 1. Patient satisfaction with the program was assessed through a telephone survey post-discharge.

2. 30-day hospital readmission rate was assessed.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

324 patients were followed from post-discharge to 90 days from their enrollment in the program. Patients were mixed in their socioeconomic backgrounds, ethnic make-up, primary payor, and preferred language. Patients were queried at 90 days about their experience with the program (n=62). Their experience was evaluated based on a 10-point Likert scale, with 1 being very unsatisfied to 10 being very satisfied. Of patients who responded, patients felt the program was beneficial (average response 9.04), frequency of phone calls was appreciated (average response 9.27) and were satisfied overall with the program's interventions (average response 9.38).

Of the 324 patients enrolled in the COVID monitoring post-discharge program, 11 patients (3.4%) were readmitted to the hospital within 30 days. 2 were for new thromboembolism, 7 were for worsening respiratory status, 1 for bacteremia, and 1 for exacerbation of chronic non-COVID related problem.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Close monitoring of high-risk post-discharge patients can be an effective intervention to assist in preventing readmissions, improving quality of patient care, and improve patient satisfaction with their providers and healthcare system.

DEVELOPMENT OF A NOVEL INTERPROFESSIONAL TELEHEALTH INFRASTRUCTURE FOR PEOPLE EXPERIENCING HOMELESSNESS.

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): A shelter-based student-run free clinic closed in March 2020 due to COVID-19 restrictions on direct patient contact for students; increased reliance on telehealth during the COVID-19 pandemic likely also widened healthcare disparities for people experiencing homelessness (PEH), who historically have had poor access to technology.

LEARNING OBJECTIVES 1: Develop a student-led telehealth workflow that addresses reduced access to urgent care and referral services for homeless shelter residents during the COVID-19 pandemic.

LEARNING OBJECTIVES 2: Provide service-learning opportunities for health profession students, physicians, nurses, and pharmacists to care for PEH.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): We gathered best practices from a consortium of student-run clinics that have adopted telehealth during the COVID-19 pandemic. In June 2020, a team of medical, nursing, and pharmacy students developed a telehealth workflow to

serve residents at Multi-Service Center-South (MSC-South), the largest homeless shelter in Northern California. Physician faculty and San Francisco Department of Public Health (SFDPH) leadership advised on and approved the workflow. Using Zoom (San Jose, CA), an on-site DPH nurse joined the Zoom call on an iPad with a patient, facilitated the encounter with our telehealth clinic, and dispensed medications. A remote team of medical and pharmacy students conducted the history, performed medication reconciliation, and formulated the assessment and plan under the supervision of remote medical and pharmacy preceptors.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Piloting a telehealth clinic with two patient encounters demonstrated proof of concept for remote urgent care and referral services for PEH at MSC-South. Our partnership with on-site SFDPH staff enabled us to establish a virtual clinic to provide healthcare services to PEH and remote service-learning opportunities for health professions students.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

An interdisciplinary student team was able to conduct comprehensive mental health referrals and medication reconciliation. Post-clinic modifications included improvement of patient handoff between the medical and pharmacy teams, and streamlined communication among team members. Refinement of the protocol will facilitate the adoption of telehealth as an adjunct service at MSC-South.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Due to ongoing restrictions on direct patient contact for pre-clinical students, the success of a telehealth model required and benefitted from collaboration with on-site SFDPH shelter nursing staff. Poor access to technology among PEH, limitations on physical space in the shelter as well as the number of nursing staff and iPads, and concerns about liability coverage for student volunteers were unique challenges to implementing shelter-based telehealth. Despite these challenges, we created a telehealth model that increases access to care for PEH, enriches interprofessional community-engaged service learning, and strengthens institutional collaboration with key stakeholders.

EARLY EXPERIENCES WITH A PRIMARY CARE CENTERED LONG COVID-19 CLINIC

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): The burden of Long COVID, defined as ongoing symptoms after resolution of acute infection, is growing as the pandemic continues unabated.

LEARNING OBJECTIVES 1: Describe a primary-care-centered Long COVID clinic model to provide comprehensive care for an emerging multi-system disease, and opportunities to improve care for communities disproportionately affected

LEARNING OBJECTIVES 2: Describe the role of a Long COVID clinic in advancing biomedical and systems-based knowledge of an emerging disease entity

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

Given the growing numbers of Long COVID and disproportionate effects on vulnerable populations, we developed a cohesive patient-centered medical home approach led by IM/ID physicians. The clinic utilizes a rehabilitation and function-informed approach, with immediate linkage to neurocognitive testing, therapy services, and specialist referrals (e.g. Pulmonology, Cardiology, Neurology, Physical Medicine & Rehabilitation, and Geriatrics). Our clinic integrates with the GWU COVID-19 Biorepository to help researchers understand Long COVID pathogenesis and immune responses.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Standardized templates and data collection

tools include a comprehensive clinical assessment, scales (e.g. PHQ-9, GAD-7, PCL-C, QOL and fatigue), and lab evaluation. Clinical data and research participation are tracked by means of a REDCap database.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

An initial needs assessment of COVID-19 patients was conducted. At 66.7 ± 24.0 days post-test, 22/92 (23.9%) participants reported ≥1 persistent symptom of COVID-19 and 5/22 (5.4%) reported ≥3 persistent symptoms. Fatigue (8/22), cough (5/22), dyspnea (4/22), and headache (4/22) were most common. Participants were 48.9% male and aged 44.4 ± 13.7 years (range: 23-73 years). Thus far, 80 patients have been seen with 15 enrolled in the biorepository. Patients commonly report dyspnea, chest pain, tachycardia, orthostatic symptoms, post-exertional fatigue, headaches, and neurocognitive impairment. Common laboratory abnormalities include slight elevations in D-dimer and ferritin, and low vitamin D levels.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): A primary-care-centered clinic with strong linkages to subspecialties is an effective and easily adaptable model for the care of patients with Long COVID. Initial evaluation should include an assessment focusing on identifying high-risk complications (e.g. thromboembolic disease) and modifiable conditions (e.g. Vitamin D deficiency), and a unified workflow for referral to specialists. Therapy services play a key role in recovery after COVID-19. There is a robust Long COVID community, in which many are keen to contribute to scientific understanding of the pathophysiology and treatment of their condition. Our COVID Recovery Clinic provides a model for how specialized care can be coupled with research via the development of a database and a linked biorepository. Disparities in access deserve pro-active engagement, and strategies are needed to better reach communities of color who face higher barriers in navigating healthcare systems and are at highest risk for contracting COVID-19.

ED2HOME, AN INTERDISCIPLINARY OUTPATIENT APPROACH TO ADMISSION DIVERSION OF COMPLEX CARE PATIENTS

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Medically and socially complex patients have high rates of emergency department and inpatient utilization and often receive low-value, redundant acute care that is not in alignment with their unique goals.

LEARNING OBJECTIVES 1: Explain why high rates of acute care utilization by the complex care population are low-value

LEARNING OBJECTIVES 2: Identify strategies to implement and evaluate an admissions diversion program for complex care individuals

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

Commonwealth Care Alliance (CCA), a community-based payor-provider for dual-eligibles in Massachusetts, has devised a novel program, "ED2Home," to meaningfully address medical and social drivers of acute care utilization and avoid costly, ineffective, and sometimes harmful admissions to the hospital. An interdisciplinary team of outpatient providers with complex care expertise assesses each CCA member who presents to a local ED. The team, which is comprised of at least a physician, community health worker, and transitions of care nurse, then initiates outpatient measures to address both acute and chronic medical and psychosocial needs. The team arranges home health and paramedicine services necessary to care for acute conditions and allow the patient to avoid admission. A key component of this program is engagement with the patient's primary outpatient team to ensure appropriate follow-up.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Rates of ER transfer to inpatient and to observation are measured at the ED2Home site and at control sites (all other hospitals to which CCA members present that do not have

ED2Home). Actuarial estimates of cost savings based on pre- and post-intervention inpatient and observation transfers are also calculated.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Preliminary findings of the first 6 months of the program are promising. Over this period, there was a 7% and 11% reduction in the rates of inpatient admission and observation, respectively, at the ED2Home site as compared to the control group. In addition, the total annualized estimated savings for patients seen at the ED2Home site were estimated to be \$594,389.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Individuals with complex care needs are not well-served by the current system of hospital-based acute care. One solution is an ED-based interdisciplinary admission diversion team with the ability to address unmet medical and social needs. Preliminary findings suggest this program reduces inpatient admissions and is cost-saving.

Organizations interested in this program first need to develop a partnership with their local ED. An “on service” team devotes the majority of their work day to assessing patients in the partner ED.

Clinicians who comprise this team need familiarity with the primary outpatient providers of these patients, the social services and home health services available in the local area, and clinicians that can deliver acute medical care at home.

Organizations best suited for this intervention are those that rely on capitated reimbursement, as this allows the financial flexibility required to employ a dedicated team for this program and the incentive to invest in this cost-saving program.

ENGAGING PEOPLE EXPERIENCING HOMELESSNESS IN COMMUNITY HEALTH WORKER-FACILITATED TELEHEALTH SERVICES IN RESPONSE TO COVID-19

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Rapid transition to telehealth delivery of outpatient services in response to COVID-19 presented a novel barrier to individuals experiencing homelessness, who may lack access to necessary digital technologies.

LEARNING OBJECTIVES 1: To identify the barriers to telehealth engagement for people experiencing homelessness (Patient Care).

LEARNING OBJECTIVES 2: To describe the feasibility of telehealth facilitation via a community health worker (CHW) as part of a pre-existing outreach team (Systems-Based Practice).

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): REACH (Respectful, Equitable Access to Compassionate Healthcare) is a community-based medical practice offering low-threshold medication for opioid use disorder (MOUD), primary care, integrated behavioral health and testing and treatment for HIV and Hepatitis C in Ithaca, NY. In March 2020, we transitioned rapidly to providing care via telehealth in response to COVID-19. By April 2020, we identified the need to provide support for our existing patients who were unable to access care via telehealth, particularly those experiencing homelessness. Partnering with outreach workers from other community-based organizations, the REACH CHW engaged with existing and new patients living in several “encampments” in Ithaca, equipped with a smartphone to allow patients to complete telehealth visits with REACH providers. Starting in September, a nurse accompanied the CHW to offer testing for COVID-19. Finally, in response to a Hepatitis A outbreak in the encampment in October 2020, the CHW worked to promote testing and vaccination uptake at the REACH office, though we were unable to provide vaccination at the encampment for logistical reasons.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Basic administrative information on reason for visit, location and services provided was collected. Patient engagement and retention will be monitored. Semi-structured patient interviews are planned to further characterize the impact of this intervention.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Between April and December 2020, 23 unique patients completed 67 total CHW-facilitated visits. The number of visits per patient was 1 to 9 (mean 2.9). Sixteen patients completed visits for MOUD, with four new patients initiated onto MOUD; other services provided included primary care, acute care and behavioral health. The CHW-facilitated telehealth visits in three “encampments” and one temporary housing site. Roughly half of the visits were scheduled and the remaining half were “walk-in” visits scheduled at the time of outreach by the CHW for individuals expressing the need for acute medical care.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Equipping CHWs with smartphones may provide a feasible and sustainable approach to expanding access to and increasing engagement in telehealth among people experiencing homelessness, who may have limited access to the necessary digital technology. Accessing MOUD was the most common reason for visits; scheduled and “walk-in” visits were available and were utilized roughly equally by patients. Additional services including testing for infectious disease and vaccination may also be provided or facilitated through outreach.

FIFTEEN MINUTES TO CHANGE A HEALTH TRAJECTORY: IMPACT OF A NAVIGATOR INTERVENTION ON PRIMARY CARE FOLLOW UP AND ED UTILIZATION IN A MEDICAID PATIENT POPULATION

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Among Medicaid patients, known to utilize the emergency department (ED) more frequently than privately insured counterparts, can a brief, episode-limited ED navigator intervention increase connections to primary care and decrease low-acuity ED visits?

LEARNING OBJECTIVES 1: To recognize the potential clinical value for programmatic intervention targeted toward “rising risk” patients

LEARNING OBJECTIVES 2: To identify features of a described ED navigator program that could be adaptable for implementation at the attendee's local health system

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): The ED Navigator Program was created in 2018 by a large health care system in Massachusetts to promote effective health system navigation among Medicaid patients, by strengthening primary care relationships and reducing low-acuity ED utilization. Implemented at two large academic medical centers and one community hospital, the program involves brief, episode-limited interventions by community health workers stationed in the ED, who identify Medicaid patients presenting with low-acuity ED visits, promote primary care engagement (e.g. by coordinating appointments), and address social determinants-related reasons for ED presentation.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): We compared short-term (30 day) utilization primary outcomes (completed primary care appointment and ED visits) between the intervention population (N=1117) and a comparison Medicaid patient population presenting to the ED in the same time frame (N=3351) matched based on demographics and baseline health care utilization.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Compared to a matched population, Medicaid patients with an ED navigator encounter had a 52% greater odds of a follow up primary care appointment (p<0.0001). Patients with no baseline ED visits in

the preceding 6 months had a 32% lower odds of subsequent ED visit in the following 30 days ($p=0.0247$), whereas no statistically significant impact was seen among those with higher baseline ED utilization.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): A brief, short-term ED navigator intervention at the point of care effectively increases connections to primary care. ED navigator interventions significantly decreased the odds of subsequent short-term ED visits among “ED-naïve” patients, but had no significant effect on those with higher baseline ED utilization (suggesting that more engrained patterns of behavior or triggers underlying presentation likely require longer-term interventions). Whereas many population health programs have focused on frequent utilizers, these results suggest value for preemptively focusing on “rising risk” patients and that fifteen minutes of a strategic intervention could cost-effectively redirect the health trajectory of targeted patient subgroups.

FILLING CARE GAPS AND BOLSTERING PATIENT RETENTION: PRIMARY CARE OUTREACH BY MEDICAL STUDENTS DURING COVID-19

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

During the COVID-19 pandemic, community health center closures in New York State profoundly affected primary care and required rapid implementation of new procedures to reach patients using telehealth. At Montefiore’s Comprehensive Family Care Center, a federally qualified health center in the Bronx, residents were deployed to the inpatient setting for 3 months further compromising primary care.

LEARNING OBJECTIVES 1: Understand how outreach and telehealth can be rapidly implemented.

LEARNING OBJECTIVES 2: Understand how medical students can be deployed as health care providers during a pandemic.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

We implemented a medical student-led volunteer initiative to conduct outreach to vulnerable patients and deliver needed services through telemedicine. Another goal of outreach was to facilitate transitions to new providers, as the pandemic occurred during a time when senior residents were graduating and there was an increased risk for patient loss to follow-up. We identified 107 patients who were either: (1) at high risk for being lost to follow-up based on the assessment by their graduating providers; or (2) at high risk for adverse outcomes due to their participation in a clinic-based diabetes program. Attendings excluded 21 patients based on clinical judgement. The remaining 86 patients were targeted for outreach. Ten senior medical students called these patients by phone within one month using a guiding script and standardized documentation. Outreach assessed: current health status, medication adherence, need for refills, food insecurity, home care needs, substance use treatment needs, and active anxiety or depression symptoms. Students precepted with designated attendings who authorized prescriptions, follow-up appointments, referrals, or other needed services.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): 1. Success in contacting vulnerable patients 2. Number of medical/psychosocial needs identified and fulfilled

3. Patient retention among those transitioning to a new primary care provider during the pandemic

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Medical students successfully contacted 61 patients, a 71% success rate. In this cohort, 48 patients (79%) had unmet medical or psychosocial needs with 85 individual needs identified. This represents a significant care gap that students were able to fill. Twenty-six patients required medication intervention and/or laboratory tests, and 49% required follow-up

within a month of contact. Forty mental health screens were documented, of which 33% were positive for anxiety or depression. Food insecurity, unmet home care needs, smoking cessation interest, and need for social work involvement were also identified. For patients whose resident provider graduated during the pandemic, loss to follow-up was lower in patients with successful outreach. An impressive 65% of those with successful outreach were seen by their new primary care provider within 3 months of the transition.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Medical students can provide effective patient outreach, fill primary care gaps and may prevent loss to follow-up, especially during transitions to a new primary care provider.

FINDINGS FROM A NOVEL CANCER SURVIVORSHIP CLINIC EMBEDDED IN PRIMARY CARE: HIGH SATISFACTION AND IMPROVED PATIENT SELF-EFFICACY

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

The growing population of cancer survivors often feel lost in the transition of care from oncology-led to primary care physician (PCP)-led care.

LEARNING OBJECTIVES 1: Evaluate patient satisfaction and perceived changes in self-management after attending a primary care-based cancer survivorship clinic.

LEARNING OBJECTIVES 2: Demonstrate that a PCP-led shared care model effectively addresses the need for cancer survivorship care.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

In 2018 we established a cancer survivorship clinic in an academic primary care practice. Patients are referred from cancer specialists to a survivorship-trained PCP to discuss core survivorship issues including a tailored treatment summary, effects of cancer treatment, surveillance, and psychosocial impact. This novel shared care model aims to ease the transition of care and health anxiety that many cancer survivors experience after completing active treatment.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION):

We interviewed 20 patients who attended the Stanford survivorship clinic using a semi-structured videoconference format. The interviews included 12 questions that addressed satisfaction, confidence in PCP-led survivorship care, and perceived changes in disease self-management. Patient data was collected through chart review. Patients were administered 2 scales at the start of each interview- the generalized anxiety disorder-7 (GAD-7) and the self-efficacy for managing chronic disease 6-item scale (SMRC)- to help define the mental health and self-management burden of cancer survivors.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): In our study, 100% of participants were satisfied with their primary care survivorship experience and felt it was helpful. 14 of 20 (70%) felt the clinic improved their confidence in self-management, while 6 (30%) felt there was no change or were not sure. 18 (90%) felt all cancer survivors should have a visit in a primary care-based cancer survivorship clinic. 14 (70%) participants thought primary care was the right space for this clinic, 2 (10%) felt it was not the right space, and 4 (20%) were neutral.

17 of 20 (85%) participants are women. The most common malignancy in this cohort is breast cancer. 6 (30%) had 2 primary malignancies. The average time from cancer diagnosis to first clinic visit is 7.7 years with a median of 4 years (range 0.5-32). Average GAD-7 score was 5.5 (scale range 0-21; cutoff for anxiety ≥ 5) while average SMRC score was 45 (range 6-60; higher score=greater self-efficacy).

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Our study shows that this novel primary care-based cancer survivorship clinic is an effective model to address a difficult transition of care. It demonstrates that a modest training and education structure can lead

to PCPs playing an effective and central role in a shared care survivorship model.

IDENTIFYING AND OUTREACHING TO HIGH RISK AMBULATORY PATIENTS DURING THE COVID-19 PANDEMIC

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

Understanding the unmet medical and social needs and fears of complex primary care patients during the COVID-19 pandemic is critical for the provision of comprehensive care as recent studies have shown that adults with chronic conditions and non-COVID-related medical complaints who have avoided medical care and the hospital, are risking deterioration of their health.

LEARNING OBJECTIVES 1: To determine the prevalence of and address medical needs and structural vulnerabilities among our high risk primary care patients during COVID-19

LEARNING OBJECTIVES 2: To understand patient attitudes towards accessing in-person and virtual care during COVID-19

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

We conducted a cross-sectional survey of established patients at an urban primary care practice. The novel 45 question telephone-based survey informed by the Andersen and Aday Model used was conducted by faculty, medical students, and care managers. We identified adult patients (>21 years) with high medical and social needs who would be at risk for adverse outcomes during COVID-19, with assistance from their primary care providers and by an EPIC panel management tool.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): We calculated the prevalence of medical and social needs identified. We also summarize the attitudes of patients regarding in-person vs. virtual care with descriptive statistics. Our outcome measures include # of appointments made, # of patients who complete a clinical encounter after outreach, # of referrals made and medications refilled.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): At present, 205 patients have been outreached to, and 182 interviews were completed from May to Dec 2020. Data collection is ongoing. 61.3% were female. 74.1% are over the age of 60. 69.1% identify as non-White. 79% has Medicaid or Medicare. 149 appointments were made and 130 appointments were successfully completed.

As for identified health-related social needs, 29.6% of patients had medication issues. All were corrected within 1 week. 15.4% had mood complaints and 11.5% experienced loneliness to the degree where they wanted to seek medical assistance. 8.2% were food insecure and given food resources. 4.4% were housing insecure and given housing resources.

As for identified virtual visit related concerns, of the 127 patients who didn't have video visits previously, barriers included lacking technology (14.2%), not knowing how to use the platform (20.5%), not knowing it was an option (15.7%). The other 49.6% preferred in-person appointments and described not needing an appointment.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): This work has not only enabled practice level changes to better understand the medical and social needs of our patients, but also enabled providers to address needs in real-time by providing patients with necessary services through new workflows (i.e., appointment making, telephone answering, and troubleshooting technology questions). Our findings have generated empiric evidence to inform future interventions and policies for primary care and underserved populations.

LONG COVID CLINIC CONSORTIUM

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

Long COVID is an emerging clinical condition with complex, multi-system manifestations, and development of comprehensive and collaborative systems of care is urgently needed.

LEARNING OBJECTIVES 1: Describe structure of emerging clinic models from four institutions who have seen a total of 290 patients to date.

LEARNING OBJECTIVES 2: Describe implementation lessons learned and challenges in setting up long COVID clinics including (1) clinical operations (2) standardizing care pathways (3) multidisciplinary collaboration, and (4) sustainability.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

We are a consortium of four geographically diverse tertiary care academic institutions, each with a primary care-based outpatient long COVID clinic and network of long COVID-focused specialty care.

Developed through multidisciplinary collaboration, the model is hub-and-spoke: patients are seen first by a generalist for a comprehensive standardized assessment and screening labs. Medical management follows symptom-based decisional algorithms with pre-specified referral thresholds.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Our consortium developed standard Core Measures gathered at each institution. Measures include 1) sociodemographic data, 2) acute COVID illness history 3) symptoms at discrete timepoints and 4) symptom-based validated questionnaires.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Clinical Operations: Primary Care is well-suited to provide comprehensive and coordinated long COVID care. Faculty champions obtained institutional buy-in, developed clinical pathways and collaborations, and mobilized administrative support critical to coordinate care. Early involvement of billing and compliance ensured appropriate diagnosis codes needed for reimbursement.

Collaboration: Internal collaboration is important to standardize practices and create clinical pathways, and focused clinical providers facilitate rapid learning. Multidisciplinary conferences are held weekly to bi-monthly for experience sharing and rapid learning. Weekly external collaboration meetings facilitated development of best practices, standardization of core measures, and learning from geographic regions undergoing surges at various timepoints.

Standardization: Given the many unknowns of long COVID, standardization of our core measures was key in working towards a clinical standard while decreasing bias and facilitating data collection.

Challenges: Obtaining rapid funding for research to coordinate a shared database has been challenging. Reimbursement for this clinical care is a major obstacle, and national advocacy for outpatient insurance coverage is critical for health equity and minimizing the morbidity and mortality associated with COVID, especially in vulnerable populations.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Plan early, include billing and compliance, dedicated administrative support

Process is iterative; continued collaboration and effective communication are critical Standardize assessments and management pathways

Focused clinical providers and standing multidisciplinary meetings important for rapid learning Need rapid, coordinated national response to ensure equitable access and facilitate research

NOVEL PARADIGM FOR MANAGEMENT OF SUBSTANCE USE DISORDER IN AN ACADEMIC HEALTH SYSTEM: NEEDS ASSESSMENT AND PARADIGM FORMULATION

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

Increased treatment of opioid use disorder (OUD) is associated with overdose reduction, hospital readmission, and all-cause mortality; however, barriers to care and limited resources prevent wider provision of medication for OUD (MOUD).

LEARNING OBJECTIVES 1: Describe the opportunity to increase the availability of MOUD by utilizing a system-wide resource.

LEARNING OBJECTIVES 2: Describe the cost savings achievable by a system-wide treatment program.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

A multi-disciplinary needs assessment of our primary care (PC), inpatient and ED settings led to development of the Substance Use Disorder – Primary Care (SUD-PC) program. The SUD-PC is a comprehensive resource for SUD treatment, comprised of a Consultation Program (CP) and a mobile Treatment Program (MTP). The CP supports primary care providers (PCPs) as they diagnose SUDs and facilitate treatment, care management, and provider-to-provider consultation. The MTP consists of mobile SUD teams that travel to PC offices to deliver care in person or via telemedicine. Future phases will expand the CP to inpatient and ED settings.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): 1. Complete needs assessment, 2. Program development based on needs assessment, and 3. Determine financial feasibility and system impact.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): The needs assessment showed five primary needs: 1. There is a growing gap between the number of MOUD providers and patients requiring MOUD. 2. Increased identification of OUD exceeds SUD program treatment capacity. 3. A shortage of PCPs providing MOUD has created a delay in transition of stable patients from SUD programs to PC. 4. ED and inpatient consultation services are at maximal capacity. 5. Need for workforce education on SUD treatment.

Data from our main academic center show 61% of OUD patients originate from the surrounding county and heroin overdose hospitalizations have increased from 12.4 (2017) to 13.2 (2018) per 100,000. Behavioral health patients with OUD were 2.4 times more likely to be hospitalized and patients with OUD had a length of stay (LOS) 4.5 days longer than those without OUD. These data show cost saving opportunities the SUD-PC can help realize. The MTP component is self-sustaining via revenue-generating patient encounters, but the CP has limited reimbursable activities, making system-level cost saving a priority. CP is estimated to cost nearly \$500,000 over two years. By comparison, a 10% reduction in endocarditis associated with OUD (31-day LOS with OUD v 18 without OUD) and a 5% reduction in all admissions for patients with OUD would lead to savings of \$505,751/year. There remain uncalculated savings due to undercoding of OUD, including ED savings with published reports suggesting increased retention of patients on MOUD after one year reduce ED utilization by 17%.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): The SUD-PC model allows for a financially sustainable, system-wide response to the substance use epidemic that utilizes limited resources and targets specific needs common to many health systems while supporting PCPs. The support to PC provides an opportunity to increase PCPs provision of MOUD.

RESPIRATORY ILLNESS CLINICS: A MODEL FOR HIGH-VOLUME COVID-19 CARE

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): As coronavirus disease 2019 (COVID-19) cases increase nationally, we balance safe evaluation of respiratory complaints with dynamic case numbers and hospital/clinic capacity.

LEARNING OBJECTIVES 1: Describe key elements contributing to the replicability, safety, and efficiency of a Respiratory Illness Clinic

LEARNING OBJECTIVES 2: Report volume seen in Respiratory Illness Clinics during a one-month period, and illustrate how the model of care supported these volumes.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS) :

Massachusetts General Hospital (MGH) established a clinic system, known as the Respiratory Illness Clinic (RIC) system, to evaluate acute respiratory symptoms. The main goals of the RIC system were to 1) offload the ED from surging volume, 2) prevent exposure of other patients and staff throughout its ambulatory divisions, and 3) create a specialized network of COVID-19 care for testing and in-person medical evaluations by educated clinicians using proper infection control precautions. RICs minimized the burden of infectious patients presenting to ambulatory practices; mitigated fear among patients and staff; and conserved personal protective equipment (PPE) during a time of significant shortage. Key elements contributing to the success of our RICs included identifying optimal locations (central to the hospital for hospital-based clinics to refer to; and in communities of high prevalence and need), planning workflows to support infection control considerations, and generating models for capacity supported by modular staffing models. Staff were redeployed from ambulatory areas which were closed for elective visits and trained using slide decks, job description and guideline documents, and videos hosted on the hospital intranet. Training materials were tailored to site and role group. **MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION):** Clinic leadership developed a capacity model to meet volume demands, and designed appropriate staffing models to support the desired capacity, support safe workflows in the context of infection control considerations, and allow for flexibility for staff to break off to supervise hospital transfers. From 3/23/2020 to 4/22/2020, patients were seen in 3 separate RIC clinics, and during this time we measured number of patients seen at each site, and the subset of those who were transferred to the emergency department.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Patients were seen in 3 locations: 1. Clinic adjacent to the MGH Emergency Department (C1); clinic on ambulatory campus (C2); and 3. Community Health Center (C3). The total patients seen in the month were 9,114 (C1 3811, C2 1987, C3 3316). Patients were tested for SARS CoV-2 virus by PCR: C1 3002, C2 1605, C3 2098. Patients testing positive for COVID-19: C1 600 (20%); C2 514 (32%); C3 1091 (52%). Number of all patients transferred to ED: C1 344 (9%); C2: 241 (12%); C3: 309 (9%).

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Infection control requires carefully planned workflows and staffing to support safe evaluation and can support high volumes. Modular staffing and capacity allow for quick up- and down-shifting of volume, but require core training resources.

STEP PROGRAM: STAGING TRANSITION FOR EVERY PATIENT; A MULTIDISCIPLINARY MEDICAL HOME FOR YOUNG ADULTS WITH MEDICAL COMPLEXITY

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

Transition to adult healthcare has been identified as a critical component of high-quality medical care for children with complex medical conditions. However, there are myriad logistical challenges to implementing a healthcare transition program.

LEARNING OBJECTIVES 1: Describe the creation of an innovative medical home for interdisciplinary treatment of young adults with medical complexity, including primary and subspecialty care, and care coordination (SBP, IPCS).

LEARNING OBJECTIVES 2: Decrease barriers to care for underserved patient population who have extensive multidisciplinary needs. (SBP, PC).

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

The STEP Program or “Staging Transition for Every Patient” serves as a primary care medical home for patients over 18y with any chronic disease of childhood. In the clinic, each patient meets with a PCP, social worker, PT and program director. Various specialists also attend clinic. In addition to medical needs, there is focus on goal setting to promote patient independence, discuss guardianship and focus on personal growth. STEP facilitates care for complex conditions by improving communication with specialists, decreasing barriers to care and care fragmentation. STEP utilizes telemedicine to better care for our underserved patient population who travel further geographically for care or face barriers to coordinating multiple needed visits.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION):

Qualitative metrics include improving access to medical care, mental health resources and patient and provider experience. Quantitative metrics include measures of transition readiness (TRAQ), mental health (PHQ9, GAD7), and caregiver burden, as well as tracking of the number of new patient visits, coordinated subspecialty visits, ER visits, and hospital stays. **FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):** To date, STEP has seen 52 patients with a multitude of chronic diseases, partnering with 10 departments across the medical center. During all initial visits we have established an individualized transition plan (ITP) and obtained baseline transition readiness scores.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?):

While both the pediatric and adult health systems have a vested interest in transition, there is variability in the goals of each institution and in how success is measured. The pediatric facility must develop a transfer of care strategy and a plan to increase patient autonomy and ensure transition readiness. The adult facility must create an environment where patients with “childhood illnesses” can find collaborative care and warm handoff from the pediatric facility. Key to success are collaborators and partners in the pediatric and adult medicine who are passionate about improving healthcare transitions. In developing STEP, we have observed great interest in partnership, sharing of care coordination, community engagement and educational initiatives from adult and pediatric specialists.

The STEP model would be reproducible in any medical center with access to multiple subspecialties and a culture of collaboration. Multiple funding opportunities exist, including departmental support, billing of high RVU visits, and community partnerships.

SUPPORTING POPULATION HEALTH PROGRAMS USING CHATBOT TECHNOLOGY: LESSONS LEARNED DEVELOPING AND INTEGRATING A CHATBOT INTO A HYPERTENSION PROGRAM

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): A hybrid model of clinicians and chatbots could improve clinical efficiency, but little is known about how to develop and integrate chatbots into clinical practice.

LEARNING OBJECTIVES 1: Patient Care: Identify ways a chatbot can facilitate care for patients with hypertension.

LEARNING OBJECTIVES 2: Systems-based practice: Identify opportunities for chatbot to augment clinician care.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

The Employee Hypertension Program (EHP) is a remote hypertension management program for University of Pennsylvania Health System employees. At baseline, the EHP leverages mobile text messaging to facilitate blood pressure (BP) reporting and remote clinician-patient dialogue.

We studied five months of text messages exchanged in the EHP. Inbound message volume ranged from 250 to 350 messages per month—the majority were messages conveying BP, while about 50 per month were non-BP text messages. We coded non-BP message “intents,” i.e. their general content. A third of non-BP messages were categorized as “non-priority”—messages such as pleasantries that did not require clinician attention.

We designed a chatbot to: 1) prompt patients to report BP; 2) accurately process patient-entered BP and relay abnormal readings to the clinician; 3) process non-BP text messages via Natural Language Understanding (NLU) to triage those requiring clinician attention (i.e. priority messages), while providing scripted responses to non-priority messages.

We created a population hypertension management dashboard to display all text message and BP information in a clinically usable and navigable format and facilitate identification of priority tasks.

Phased chatbot deployment began in January 2021. Phase 1, we deploy the chatbot in “silent mode” (no bot-patient interaction) to assess and revise the NLU model. Phase 2, we will activate chatbot responses to patients, with close oversight by the clinical and research teams. Phase 3, independent deployment.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION):

Our goal is to double the EHP panel size from under 200 patients at baseline to 400 by summer 2021, while maintaining the program’s current rate of 90% of patients at target BP. Secondary measures of success include: proportion of patients who remain engaged with BP reporting; patient satisfaction as measured by the Net Promoter Score; and qualitative feedback from both patients and the clinical team.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

When applied to a new month of text data, the model accurately predicted 21 of 57 non-blood pressure related text messages (36.8%) as non-priority messages. One priority message was incorrectly classified as “non priority.” The model will be revised to be 100% sensitive to priority messages.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?):

The development and implementation of automated solutions for health care delivery requires multi-disciplinary collaboration. We embedded iterative intervention development and evaluation into real-time clinical operations, i.e. the EHP, to ensure fluid integration of the technology with clinical practice. Patient and provider experience and outcomes will continue to drive intervention iteration and refinement.

SYSTEMS IMPROVEMENT KNOWLEDGE SHARING AND COLLABORATION VIA CAREZOOMING VIRTUAL ROUNDTABLES

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

Implementation of quality improvement and innovation projects by healthcare providers is often stifled by wide dispersion of relevant information and lack of

access to others who have undertaken similar efforts, and these barriers contribute to healthcare provider burnout.

LEARNING OBJECTIVES 1: Interpersonal and communication Skills: We sought to facilitate information exchange between healthcare professionals engaging in implementation of quality improvement projects, creating a forum for communication where practical information can be shared and discussed.

LEARNING OBJECTIVES 2: Practice-Based Learning and Improvement: We sought to gather healthcare professionals to discuss their experiences in implementation of practice-based improvement projects so that others might be able to learn from their successes and challenges.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): In addition to our online platform (carezooming.com), we created a series of virtual roundtables, during which 2-3 experts with varied backgrounds provide the larger audience (15-20 people) with a 10-minute talk on a designated topic related to ambulatory care innovation, followed by an open dialog. Participants include physicians, nurses, pharmacists, physician assistants, practice managers, department heads, heads of national societies, and trainees from around the country. A list of key takeaway points and important lessons are made available on the CareZooming online platform/newsletter after each roundtable.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Quantitative metrics include the numbers of roundtables conducted and experts/participants involved. Additionally, each person who attends a roundtable is asked to fill out a post-roundtable survey. Further evaluation assesses practice changes and cross-institutional connections that are created from roundtables.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): We have held 3 roundtables featuring 7 expert discussants from Emory, SGIM, ACP, New York Health and Hospitals, Bellin Health, Cambridge Health Alliance, Indiana University, and the Maven Project. Roundtables have included over 45 participants. Topics have included "Virtual and Remote Care," "COVID-19 Wellness", and "Delivering Effective Primary Care in the Context of COVID."

The post-roundtable feedback survey found that 100% (11/11) of participants would recommend a CareZooming Roundtable to a colleague. Participants felt the roundtable provided a "good atmosphere", "diverse audience", and "safe place" for discussion. One roundtable participant said he or she "...appreciated hearing the perspectives and approaches at different institutions."

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): CareZooming Roundtables have provided an opportunity for healthcare providers to ask questions and share their thoughts in real time with a larger group of similarly interested people, with key information made available more broadly to others via online platform and newsletter after the roundtables. Additionally, use of virtual meeting technology has allowed for knowledge sharing while maintaining social distancing, allowing for a geographically dispersed, diverse audience of providers and healthcare innovators.

TEACHING AND LEARNING FROM OUR NEIGHBORS

Ekaterina Vypritskaya

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): The COVID-19 pandemic unmasked health disparities for patients of racial and ethnic minorities with 'Limited English Proficiency' and 'Low Health Literacy'.

LEARNING OBJECTIVES 1: Multidisciplinary approach and strategies to assess modifiable risk factors with intervention at the high risk population at community level.

LEARNING OBJECTIVES 2: Teaching residents through community outreach programs to narrow the gap of healthcare disparities.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

Team of faculty, residents, nursing and nutritionist collaborated with a low income workers group, to provide education in the participants' community backyard. Six sessions conducted on weekends for best participation. Session's included a brief introduction of the topic, followed by small group workshops. Spanish-speaking physicians led the Latino groups.

Sessions were designed to include the following:

- Developing an understanding of the medical problems, nutritional and physical activity habits
 - Strategized to minimize language and health literacy barriers
 - Free flu vaccination was offering
 - Follow up care, information of our Family Health Center- Resident Run Clinic was provided
- Debriefing sessions to share experiences, lessons learned, and strategies for future ideas.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): - Six interactive educational sessions were provided for our community members adjusting to their Health Literacy level and English Proficiency.

- Immunized close to one hundred members of our neighboring community despite skepticism and myths related to vaccines.
- Connected participants with comorbidities to Family Health Center to establish ongoing primary care.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): We learned cultural habits and nutritional traditions of our community. Guidance provided to participants to make simple adjustments to their diet, addition of vegetables and reduction in consumption of sugary beverages were well received and acted on noted on follow ups. Participants desire to healthy food choice was supported by sharing inexpensive 20-minute recipes. Additionally, our team provided a list of healthier choices for the food banks.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): The importance of 'Listening to your patient' was highlighted. Learning their daily routine, eating habits, and challenges assisted us to customize the educational sessions and interventions based on their unique situations.

THE HIDDEN WORK OF PATIENT PORTAL MESSAGING: NEW APPROACHES TO UNDERSTANDING AND ADDRESSING A GROWING WORKLOAD AND SOURCE OF BURNOUT FOR PROVIDERS AND PRACTICES

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): An EMR patient portal provides a high value service to patients who communicate a wide range of concerns, but providers and practices struggle with increasing volume of complex and unreimbursed work.

LEARNING OBJECTIVES 1: To understand the impact of high volume patient messaging on practice operation and morale.

LEARNING OBJECTIVES 2: To identify the barriers and facilitators of effective electronic communication between patients, providers and clinical staff.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): A large academic health system undertook a study to identify how patient medical advice request messages (PMARs) in the electronic medical record (EMR) contribute to faculty burnout. Concerns regarding PMARs were shared in focus groups and surveys by providers and clinical staff from a range of outpatient specialties. Based on results, an academic general internal medicine

(GIM) practice (12,932 patients, 15 providers) participated in a pilot to address concerns about complex yet unreimbursed care by creating dedicated slots to convert PMARs to telehealth visits. Usage was tracked over 4 months (Jul-Oct. 2020).

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Qualitative analysis of clinician feedback on patient messaging was performed. The Maslach Burnout Inventory (MBI) was taken pre and post intervention. The total volume of PMARs, message chain length (all PMAR and In Basket messages generated within 2 weeks of initial message from the patient), and number of PMAR appointments were tracked. Provider profiles were reviewed to monitor overall time in In Basket, adjusted by appointment volume. A post intervention survey obtained provider opinion on the value of use of PMAR slots for reducing message burden.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

In focus groups, surveys and direct observations with clinicians and staff across primary care/specialty practices, actionable “pain” points were identified. MBI confirmed an increased level of burnout at baseline in GIM faculty. Over the 4 months of the study, patients initiated 11,495 messages. Use of protected slots for PMAR visits increased over the study period with a total of 261 video or phone visits scheduled. Compared to the 4 months prior to the intervention, all GIM providers noted an increase in volume of PMAR messages, while the “chain length” trended down (p-value: 0.02). The cause is likely multi-factorial but may represent more efficient handling of patient messages due to enhanced triage and leverage of telehealth.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Telehealth visits are a partial solution for complex portal messages but require administrative support and creative scheduling. Most messages can be handled more quickly asynchronously. Providers favor RVU credit for messages that cannot be converted to phone or video visit.

Triage can be improved by clinical rules for message handling. Standardizing responses for frequent queries requires commitment and communication between providers and clinical staff to reach consensus.

Developing and validating reliable metrics to evaluate the impact of interventions on message handling is necessary to inform best practices

THE ROLE OF ECONSULT IN AMBULATORY CARE REFERRALS DURING THE COVID-19 PANDEMIC

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): How have the utilization and the effectiveness of eConsult referral program changed during COVID-19 surge in a large urban safety-net health system?

LEARNING OBJECTIVES 1: Understand the value of eConsult in managing referrals at NYC Health + Hospitals

LEARNING OBJECTIVES 2: Understand the impacts that COVID-19 had on eConsult referrals and learn how eConsult was leveraged and adapted

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): In NYC, during the surge of the COVID-19 pandemic, access to specialty care was impacted due to a slow-down in ambulatory care services. NYC Health + Hospitals (H+H), the largest public health care delivery system in the US and leading provider to vulnerable populations across NYC, had to quickly adjust by standing-up telehealth services in order to virtually connect patients to care. In addition to its telephonic and video visits, H+H continued its expansion of eConsult to support referring providers in getting patients connected to specialty care. eConsult allows for electronic review of specialty referrals and enables specialists to provide clinical guidance to referring providers obviating the need for a ‘face-to-face’ visit, when appropriate.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): The time period defined for NYC COVID-

19 first wave (FW) is March 2020 through May 2020 and the baseline period is November 2019 through January 2020. We examined and compared 163 eConsult specialty clinics during baseline period and 200 eConsult specialty clinic during COVID-19 surge. The following metrics are examined:

- Referral volume
- Patient demographics
- Percentage of referrals resolved without scheduling an appointment
- Percentage of referrals reviewed within 3 calendar days
- For referrals resolved without a face-to-face visit, percentage of referrals that did not have another visit to the same specialty within 180 days

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Referral volume at baseline was 53,926 and during the COVID-19 FW was 20,702. Both non-eConsult referrals and referrals managed via eConsult had a 62% volume decrease after the COVID-19 outbreak. Overall, 55.8% of referred patients were Medicaid or uninsured; 37.4% were Black and 37.2% were Hispanic; and 44.1% were non-English speaking. Demographics do not differ significantly across both periods.

Of all the eConsult-managed referrals, referrals resolved by electronic consultation increased from 11.2% to 14.8% (RR=1.32, 95%CI=1.27-1.37). Change varied among specialties (RR ranged 0.75-4.24). Referrals reviewed within 3 days of ordering improved from 71% to 76% (RR=1.05, 95%CI=1.04-1.06). Overall, 84.2% of the referrals resolved without a face-to-face visit did not have another visit to the same specialty within 180 days. This percentage remains stable across both periods (RR=1.01, p>0.05).

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Our analyses suggest that eConsult utilization at H+H increased during the COVID-19 FW with higher levels of productivity and stable effectiveness among our safety-net population. eConsult was implemented at H+H to improve access to specialty care in other intended ways, but has been flexible enough to meet the needs during demanding times such as the COVID-19 FW.

TRANSFORMATION OF A LARGE AMBULATORY RESIDENT PRACTICE INTO A NOVEL REMOTE TELE-CLINIC

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Can an internal medicine ambulatory resident practice at a large academic health center successfully function as a remote telehealth practice?

LEARNING OBJECTIVES 1: Reframe resident clinic responsibilities and opportunities in response to externally-driven change in the context of care

LEARNING OBJECTIVES 2: Develop an action plan to transform resident clinic into a fully-functioning remote experience while promoting compassion, appropriate, and effective care

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

When COVID-19 surged in New York in March 2020, the Internal Medicine residency clinics at North Shore University Hospital and Long Island Jewish Medical Center quickly converted into fully functional remote telehealth practices. The two resident practices, on the Queens-Long Island border, are respectively staffed by 70 and 50 residents on a rotating 4+1 schedule. As COVID cases skyrocketed forcing significant physician deployment to hospitals, the risk of a COVID outbreak among a dwindling ambulatory workforce led site leadership to convert the resident ambulatory practices into this new care model.

All residents worked remotely, conducting telehealth visits with patients at home and receiving remote preceptor supervision. Interprofessional support staff largely worked from home. Select faculty in each practice remained on-site to see unexpected walk-in patients. Physician schedules were frozen to prevent inadvertent scheduling of in-person appointments; add-ons required physician approval. Existing in-person appointments were reviewed by physicians to determine whether they should be converted to telehealth visits or rescheduled on-site in the future.

To begin each week, faculty oriented residents virtually to the new care setting, reviewing workflows, roles, resources, and telemedicine. Residents conducted telehealth visits for acute and chronic medical conditions, telephone check-ins for COVID-19 patients, and performed triage, inter-visit care and warfarin management. Residents communicated with each other and faculty via Microsoft Teams throughout the workday. A faculty development session was delivered to burnish skills in teaching, evaluating, and precepting learners in a telehealth practice environment.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Surveys assessing provider satisfaction, benefits, and challenges of practicing in a remote telehealth environment will be administered to residents and faculty.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): The remote telehealth practices were fully operational for 2 complete months, with 8-9 residents staffing the larger site and 4-5 residents staffing the smaller site each week. There were 542 arrived telehealth visits at the larger practice site, most of which were telephonic visits. Preliminary qualitative feedback from residents identified lack of patient access to audiovisual technology, low health literacy, and limited English proficiency as patient-specific barriers to optimal care delivery in this new model.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): With clear workflows and communication, a traditional ambulatory resident practice can be successfully converted to a remote telehealth practice.

USING AGILE PROJECT MANAGEMENT TO IMPROVE CARE FOR HOSPITALIZED PATIENTS WITH OPIOID USE DISORDER

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

Despite awareness of the opioid overdose epidemic, patients hospitalized with opioid use disorder (OUD) at a large urban academic medical center commonly experience stigma, uncommonly receive medications for opioid use disorder (MOUD), and are rarely linked to community based treatment, leading to high rates of AMA (against medical advice) discharges and readmissions.

LEARNING OBJECTIVES 1: Patient Care: Provide compassionate evidence-based care to hospitalized patients with OUD

LEARNING OBJECTIVES 2: Systems-Based Practice: Leverage agile project management techniques to rapidly implement evidence based care for hospitalized patients with OUD.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

An interdisciplinary team, from the Departments of Medicine, Pharmacy, Quality, Social Work, Nursing, Informatics, and Data & Analytics, was formed in October of 2019 to improve care for patients with OUD. UChicago Medicine is a large urban academic medical center caring for an underserved patient population on the South Side of Chicago. Using Agile Project Management (APM) methodology, this team rapidly iterated a series of process improvement interventions. APM, which originated in software development, focuses on cross-functional teams that meet frequently for collaborative decision making ("scrums") to deploy and iteratively enhance a product through rapid cycle development phases ("sprints") that make refinements based on experience and feedback. The work of this team has included launching and scaling an inpatient OUD consult service, expanded inpatient uses of MOUD, developing informatics tools, creating a community based treatment referral process, providing education for clinical and nursing staff, and significantly increasing the number of buprenorphine prescribers.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): The OUD program tracks outcomes for hospitalized patients with OUD, including AMA discharges, naloxone prescribing, receipt of MOUD during hospitalization, receipt of bridging buprenorphine-naloxone scripts at discharge, length of stay and readmission rates.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): To date, 231 OUD Consults have occurred, increasing from 3 in October 2019 to 28 in December 2020. Consult patients were primarily African American (68%), insured by Medicaid (68%), and male (67%). In total 38% were managed and discharged with buprenorphine. An additional 35% were managed with methadone. Over 60% received naloxone at discharge. Length of stay averaged 7.7 days. Readmission rates were 11.2% at 30-days. AMA discharges occurred in 7.4% of cases. These data compare favorably to general hospital metrics and show a substantial increase in the use of MOUD. Over 20 physicians completed DATA-2000 training and all inpatient nurses received training on stigma, OUD management and harm reduction.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Use of APM facilitated rapid cycle implementation of evidence based best practices for the care of patients with OUD at a large urban academic medical center. APM may offer advantages relative to other methodologies (PDSA, Lean) when attempting to rapidly implement a locally contextualized evidence based standard of care.

USING AUTOMATED BIDIRECTIONAL TEXT MESSAGES BETWEEN VISITS TO IDENTIFY BARRIERS TO HIV PREP ADHERENCE: A PILOT FEASIBILITY AND ACCEPTABILITY STUDY

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

Systematic, sustainable solutions are urgently needed to proactively engage patients and identify addressable barriers to HIV pre-exposure prophylaxis (PrEP) therapy in between appointments.

LEARNING OBJECTIVES 1: Patient Care: Identify patient values and preferences for a text message-based population health management tool that proactively screens for known barriers to PrEP and facilitates connection to appropriate resources.

LEARNING OBJECTIVES 2: Systems-Based Practice: Develop an automated text message tool that efficiently identifies patients needing additional intervention and resources.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

This is a partnership between University of Pennsylvania and Philadelphia FIGHT, a federally qualified health center. PrEP Retention Coordinators (PRCs) are non-clinician FIGHT staff who currently text patients on PrEP ad hoc to improve retention and adherence.

The aim of this study is to co-design an automated texting intervention with PRCs and patients to systematically identify patients experiencing barriers to PrEP. With PRCs, we developed a series of automated text screening questions to be administered over 3 months, the standard interval between PrEP follow-up appointments. We also co-designed the criteria and protocols for escalating cases to PRCs for further intervention.

To co-design with patients, we will test the prototype intervention with 10 patients and conduct regular semi-structured telephone interviews. Patient feedback will be used to iteratively modify the intervention. During this test period, we will refine our previously designed clinical escalation protocols to PRCs. We will employ an innovation strategy known as a "fake back end," i.e. a research assistant escalates messages according to protocol, but also exercises

judgment and notifies clinical and research staff when deviations are necessary. This enables quick protocol adjustments for patient safety. Future versions of the intervention would replace the fake back end with automation technology.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Feasibility will be defined by the development of a clinical text and triage protocol that can triage all inbound texts. Acceptability will be defined by qualitative feedback and the System Usability Scale.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): The result of three co-design sessions with the PRCs was an automated text schedule to: 1) confirm medication pickup; 2) assess for acute side effects upon initiating PrEP; 3) assess adherence to PrEP; 4) assess need for assistance discussing PrEP with partners or loved ones; and 5) screen for anxiety and depression, using the PHQ2 and GAD-7 instruments. We designed criteria and protocols for escalation based on patient responses to these questions. Enrollment for the patient co-design phase began in mid-December 2020.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Bidirectional texting may be an accessible tool for maintaining communication with patients outside conventional clinical encounters. Automating some of those text-based interactions can be an effective tool for managing population health while minimizing burden to clinicians.

USING HUMAN-CENTERED DESIGN TO OPTIMIZE SHARED MULTI-USE CLINICAL WORK SPACES FOR CLINICIANS.

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): In the transition away from traditional “doctors’ offices”, how can we optimize shared multi-use clinical spaces to serve clinicians’ needs?

LEARNING OBJECTIVES 1: Identify ways in which a practice that relies upon shared clinical spaces can remain familiar and effective for clinical work.

LEARNING OBJECTIVES 2: Determine how might technology help clinicians develop a sense of belonging, professional pride, and patient rapport in multi-use spaces by allowing them to display personal information and patient education materials related to their practice.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

The traditional “doctor’s office” is being rapidly replaced by multi-use clinical environments that combine exam rooms with shared touchdown spaces, promoting efficient use of space & team-based care approach while utilizing network technologies. While potentially efficient & lower-cost, there’s a need to assess the impact of these configurations on clinician workflows, professional identity & explore opportunities to improve their build and aesthetics. We conducted need assessment interviews with 9 clinicians, health technologists, 2 operational leaders, shadowed 3 clinicians & conducted 4 site visits across various clinical practices. We then issued a 10-question survey and conducted 2 HCD workshops with 12 clinicians to understand the new conditions of clinical work, their impact on clinicians’ professional & personal identity, practice habits, to identify areas for potential optimization to improve clinical workflow & experience. Workshops were divided in three phases: explore, ideate and create.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): We report qualitative success metrics used to evaluate the results of the HCD workshops:

1. Understanding of what shared multi-use work spaces mean to participating clinicians.
2. Identified needs, potential concerns and pain points of clinicians and stakeholders.
3. Group generation of potential solutions without bias towards feasibility.
4. Described solutions using quick prototyping tools.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Clinicians identified the lack of customization and capability for sharing information about their areas of expertise and tailored patient education materials as the most significant problem, and had privacy concerns about sharing personal information on a digital display. Potential solutions include customizable content display controlled by patients that fosters engagement, exploring education materials, patient testimonials, information about the care team and wait time as well as patient-specific information, such as labs and imaging.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): The use of the HCD principles helped us better understand the challenges of multi-use spaces for clinicians, and identify potential technology solutions for data sharing, patient education, personalization, and efficiencies. It is crucial to design these spaces and choose appropriate technology solutions that will help reduce patients’ anxiety by ensuring privacy, comfort, thorough understanding of care plans and boost collaborative care decision making between clinicians and patients.

VIRTUAL SHARED MEDICAL APPOINTMENTS FOR VETERANS WITH TYPE II DIABETES – AN INTERPROFESSIONAL TRAINEE-DRIVEN QUALITY IMPROVEMENT PILOT

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Is video telehealth delivery a feasible method for promoting known beneficial outcomes of Shared Medical Appointments in veterans with type 2 diabetes?

LEARNING OBJECTIVES 1:

1) Understand patient perceptions of care delivery and their ability to direct new paradigms in clinical patient care and quality improvement.

LEARNING OBJECTIVES 2: 2) Identify feasibility and appropriateness of novel virtual telehealth groups for chronic medical conditions.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

Shared-medical-appointments (SMAs) are an evidence-based clinical innovation delivering improved satisfaction and outcomes in chronic diseases. In this pilot, we show it is feasible to deliver an interprofessional curriculum via the VA Veteran Video Connect (VVC) telehealth platform which promotes beneficial outcomes of SMAs. 46 patients with Type 2 diabetes enrolled in our VA outpatient clinics screened-in to undergo 4 monthly group visits utilizing an interactive telehealth curriculum based on diabetes care guidelines and created by an interprofessional team of medicine, pharmacy, and psychology trainees. Seven consenting patients agreed to connect to the VVC platform to participate in the group.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION):

We gathered pre- and post-intervention diabetes-related quality of life modified (dQOLm) scores and narrative responses for feasibility analysis. Two trainee participants evaluated responses and coded them to a numerical score for the diabetes-related quality-of-life (dQOLm) modified scale. Disagreements were settled by consensus. The pre- and post-intervention dQOLm scores were compared using a paired T-test. Responses to qualitative structured surveys were paraphrased in a narrative. Disease control parameters (A1C, kidney function, liver function), and body weight were desired but physical visits were limited due the COVID-19 pandemic. Fortunately, delivery of the interactive curriculum continued in a virtual format.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Five patients completed the intervention and follow-up. One patient was excluded with incomplete data and one patient was lost to follow-up. Significant improvement in dQOLm was observed during the study (mean 36.2 vs 25.8 [p value = 0.0211]). Mostly positive sentiments resulted regarding intervention format and perceptions of care. VVC telehealth technology had improved convenience compared to in-person care. Providers expressed positive perceptions of the interprofessional delivery. Drawbacks included a notable investment in clinic setup by providers and known challenges of telehealth delivery formats.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Patients with diabetes attained improved confidence in self-management in addition to guideline-based interprofessional care through this focused 4-month virtual intervention. Inherent collaboration, whole-person care, and emphasis on patient co-production of health outcomes are central drivers of improved patient satisfaction and chronic care measures with SMAs. These benefits appear to be preserved in a group telehealth format. The creation of a new clinic and delivery structure was additionally feasible within the VHA regulatory framework.

WHEN CARE IS CLOSED: POPULATION HEALTH APPROACHES TO PREVENTIVE HEALTH DURING COVID-19

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Prior to COVID-19 we had a robust population health infrastructure with pre-appointment labs, and outreach for chronic disease management (CDM) or preventative services and appointments. During COVID-19 our normal efforts in CDM and preventative care were stymied as visits were limited, staff were redeployed, and patients had fears of accessing care.

LEARNING OBJECTIVES 1: Describe how we used a “pop-up shop” approach to increasing CDM monitoring, colorectal and breast cancer screening, and appointment scheduling.

LEARNING OBJECTIVES 2: Recognize disparities in screening between populations of white people and people of color and critique how communication strategy may have contributed to these disparities.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): We set up a “pop-up shop” at our flu shot clinics (FCS) where patients’ overdue CDM and preventative screenings were addressed. Messages through our patient portal invited primary care patients to sign up for FSC. Patients overdue for hypertension (HTN) or diabetes (DM) management, colon or breast cancer screening, or patients with HTN, DM, or cardiovascular disease who were overdue for an appointment who were registered for the FCS were included. Prior to the FSC we used population registries to pull lists of patients. Lab work was ordered and patients were given a written reminder for other overdue screenings.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): The data collected included demographics of our patient population, demographics of our FSC patients, and % of patients OOG for a1C, lipids, blood pressure, mammogram, colonoscopy, overdue appointments the week of the flu shot clinic and 6-10 weeks after the FSC.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

In nine flu shot clinics over two months, we vaccinated 1,312 patients. In terms of demographics 69% were white, 11% were Black, 7% Asian, 1% Hispanic, 6% declined or were unavailable. Our primary care patient population is 66% White, 11% Black, 14% Latinx patients. Nearly all (96%) of patients at the FSC were English speakers.

We found that after the intervention patients out of goal (OOG) for A1C screening decreased from 32% to 24%, those OOG for BP monitoring increased from 26% to 27%, those OOG for colon cancer screening decreased from 23% to 18%, those OOG for mammogram decreased from 12% to 8%, and those overdue for a follow-up appointment decreased from 54% to 32%.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): It is clear that our recruitment strategy for the FSC through the portal was ineffective for our Latinx population. In the future we will attempt a multi-modal communication strategy.

While we cannot say that the decrease in patients OOG is solely due to the intervention, the patients OOG for health maintenance decreased after the intervention. Anecdotally, the intervention was very well-received by patients. In the future we plan to increase the effectiveness of the intervention by checking BP at the pop-up shop, having lab services available during the clinics, as well as schedulers to make preventive screening appointments. Given wide-spread COVID-19 vaccination clinics are in the near-term, we think this approach has potential to make up for lost time.

Innovation in Healthcare Delivery (IHD) - Health Equity and Social Determinants of Health

ADDRESSING FOOD INSECURITY THROUGH INNOVATIVE COMMUNITY PARTNERSHIP WITH A LOCAL FOOD BANK BEFORE AND SINCE THE COVID-19 PANDEMIC

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Since the COVID-19 pandemic, the prevalence of food insecurity in the US has doubled from 11% (54 million people) to 22%. Food insecurity has been linked to profound negative health outcomes, including diabetes, anemia, mental health, oral health, and poor adherence to medications. It is also associated with higher health care costs. Yet, food insecurity has not been addressed adequately as one of the major social determinants of health.

LEARNING OBJECTIVES 1: Promoting prevention and population health through addressing food insecurity as one of the major social determinants of health.

LEARNING OBJECTIVES 2: Effectively calling on system resources to address food insecurity through innovative collaboration.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): Since March 2018, Cambridge Health Alliance (CHA) Revere Care Center, a safety net health center in Eastern Massachusetts, has hosted free monthly produce markets for primary care patients and community members in collaboration with Greater Boston Food Bank, Tufts Health Plan, and Good Measures. The market provides more than 25 pounds of free fresh fruits and vegetables per household each month. Since the COVID-19 pandemic, the program has continued to meet the high need after implementing safety protocols, including physical distancing and wearing masks.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): The partnership is conducting quantitative and qualitative studies. Quantitative research is composed of longitudinal survey, market attendance, Good Measures nutrition coaching, EHR and insurance claims data. Additionally, we are conducting focus groups to better understand accessibility, availability, acceptability, and use of distributed foods.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): As of March 2020, more than 130,000 pounds of free fresh produce have been distributed. The market doubled in size from 323 households or 1,224 individuals in March 2020 to 650 households in June 2020 due to the high need during the COVID-19 pandemic. For the quantitative research, we have enrolled 857 participants (50% non-English speakers). Nearly half (43%) of the participants report poor or fair general health. Majority (59%)

reported being employed and 18% of participants reported unstable housing. 57% household reported monthly income less than \$2,500. Despite the high level of need, only 22% receive SNAP benefits and 8% used a food pantry in the past month.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Such innovative collaborations show food distribution at health centers could be optimal ways to reach disadvantaged patients and address food insecurity as one of the major social determinants of health, particularly at this time of great need since the COVID-19 pandemic.

A SCREENING FRAMEWORK FOR SOCIAL NEEDS IN AN AMBULATORY PRACTICE SETTING

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

Though social determinants of health (SDOH) are largely responsible for causing and sustaining the health inequities that are becoming increasingly demonstrable in the age of the COVID-19 pandemic, there is no standardized and scalable framework through which patients can be screened for SDOH.

LEARNING OBJECTIVES 1: Our first objective was to assess and address manifestations of SDOH on an individual level through screening for the social needs of our patient population and connecting patients to resources.

LEARNING OBJECTIVES 2: Our second objective was to enhance our ability to predict and understand patient needs and service utilization, thus setting the stage for future intervention.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

We created a framework and executed a pilot run of a workflow for remote social needs screening within two ambulatory practices at a large academic health system. We initially identified active patients who were at high risk for worse health outcomes based on factors including admission frequency, emergency department utilization, chronic disease, and Medicaid status. Then, a medical assistant called patients, assessed their willingness to participate, and asked questions regarding financial strain, food insecurity, and transportation access. If patients screened positive for needs in any of these categories and were interested in assistance, they were referred to a social worker at their practice. A smaller cohort of patients was referred to resources directly by the medical assistant through an online resource database searchable by patient zip code.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION):

Quantitative metrics of success included proportion of patients reached, proportion of patients willing to be screened, and average length of screening calls. Qualitative metrics of success included general reception towards the screening process, assessed through interviews with the medical assistant who conducted the screen and social workers who received referrals through the screen.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

In total, 129 patients were identified for screening. 64.3% (83/129) were reached, and 61.4% (51/83) of those reached answered the questions. 13 of these patients were referred to social work, and 5 were referred to resources through the online resource database. 41% (n=21) patients reported some degree of financial strain, 27% (n=14) patients reported some degree of food insecurity, and 23.5% (n=12) patients reported difficulty with access to transportation. On average, screening calls took less than 5 minutes, and the medical assistant conducting the calls overall found it to be a positive experience connecting with patients. Social workers felt most referrals were appropriate.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Through a straightforward telescreen, we

demonstrated that patients in our practices have social needs that can be connected to resources or a social worker in a time-efficient manner. Interventions do not need to be sophisticated to be effective, and here was no exception. This represents a low-barrier framework that could be generalized to other health systems or implemented on a larger scale at our own.

ASSESSING THE IMPACT OF TELEMEDICINE ON DIABETIC PATIENTS AT AN UNDERSERVED URBAN CLINIC

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

We sought to define the use and impact of telemedicine for a low-income, urban population during the COVID-19 pandemic.

LEARNING OBJECTIVES 1: To examine the use of tele visits among an urban, racially diverse, low-income population during the COVID-19 pandemic

LEARNING OBJECTIVES 2: To assess the impact of tele visits on chronic disease outcomes for this population.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

This project is conducted at Ryan Adair Health Center, a Federally Qualified Health Center (FQHC) located in the Central Harlem neighborhood of Manhattan that serves as a primary care training site for our Internal Medicine residents. To understand the impact of telehealth access, we focused on a single cohort that included all diabetic patients seen by resident providers within 3 months prior to the pandemic surge. We examined data for these patients over three discrete time periods: "pre-pandemic" (12/15/2019 - 3/15/2020), "pandemic surge" (3/16/2020 - 5/31/2020) and "post-surge" (6/1/2020 - 8/15/2020). This data will be tracked every three months to understand use and impact over the course of the pandemic.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION):

The variables measured included HbA1c and the number and type of visits. We compared pre-pandemic HbA1c values with post-surge values. We stratified tele visits into telephone versus televideo visits

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

Among our pre-pandemic cohort of diabetic patients (n=225), 35.1% (n=79) engaged in tele visits during the pandemic surge, 6.66% engaged in onsite visits, and 56% had no engagement. For patients who engaged in tele visits during the surge, the average HbA1c improved by 0.172%. For patients without tele visits during the surge, the average HbA1c worsened by 0.42%. Among the subgroup of high-risk diabetics during the pre-pandemic period (HbA1c >9), those with improved HbA1c had more tele visits during both the surge and the post-surge periods compared to those whose HbA1c worsened (improvement of 1.73 vs. worsening of 1.9%). Among those who accessed tele visits during the surge period, 79.74% were phone-only (n=63), 7.59% (n=6) were televideo-only while 12.6% (n=10) were both.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Our data suggest that telemedicine access improved average HbA1c outcomes among a low-income urban diabetic population.

During the surge, HbA1c decreased or remained unchanged with telemedicine encounters, while patients without engagement in tele visits showed worsening HbA1c levels. A surprising result was that 79% of tele visits were conducted via phone-only, suggesting a benefit for use of this modality toward improving diabetes control for our population. Most patients in our cohort had no engagement in care during the surge period, highlighting the need to explore barriers to telehealth access. The true impact of HbA1c reduction through tele visits may represent an underestimation, since resident providers were redeployed to the inpatient setting during the surge, thus patients were seen by

providers unknown to them. Exploration of data over the coming months will help elucidate the impact of provider continuity during tele visits on HbA1c outcome.

COMMUNITY HEALTH WORKER (CHW) INTERVENTION FOR PATIENTS WITH POORLY CONTROLLED TYPE 2 DIABETES (T2DM)

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): How effective is a CHW intervention in improving clinical outcomes of patients with poorly controlled T2DM?

LEARNING OBJECTIVES 1: Recognize the impact of CHW intervention on diabetes care.

LEARNING OBJECTIVES 2: Learn about potential barriers to implementing a CHW program for patients with T2DM.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

Patients with T2DM receiving primary care in a community health center in Chelsea, MA were eligible for our intervention if they met the following criteria: 1) Age 18-75 2) Hemoglobin A1c (A1c) 8.5-12% 3) English or Spanish speaking 4) Have not worked with a CHW in the past 6 months 5) Not enrolled in a care management program. 52 patients were paired with a CHW. 16 patients who met the eligibility criteria but were not paired with a CHW completed an intake questionnaire. Patients worked with their CHW for up to 8 months (mean 7.3 months). Diabetes specific CHW interventions included:

1) Addressing barriers to medication adherence 2) Teaching sessions on self-management skills and lifestyle modification 3) Supervised grocery shopping program to teach patients about healthy food choices and how to read food labels. In addition, CHWs helped coordinate care and utilized motivational interviewing techniques and knowledge of community resources to address psychosocial barriers.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Primary outcome of interest was change in A1c. We also assessed other quantitative clinical (e.g. blood pressure) and healthcare utilization measures as well as qualitative metrics (e.g. self-rated health).

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Of the 52 patients paired with a CHW, 29 patients remained engaged in the program. We compared outcomes between engaged patients and patients who were non-engaged (N = 39) either because they were lost to follow up or not paired with a CHW. There was significantly higher percentage of females in the engaged group (75% vs 51%, p = 0.04) but there were no significant differences in age, race, language or insurance. Mean A1c level decreased in the engaged group (9.8% to 9.3%) while it increased in the non-engaged group (9.5% to 9.6%). There was also decrease in mean number of ED visits (0.9 to 0.6) and no-shows to primary care appointments (0.4 to 0.2) in the engaged group. In addition, there was a decrease in the number of patients who reported having fair/poor overall (62.5% to 37.5%), physical (62.5% to 43.8%) and mental health (31.3% to 18.8%) and high level of distress related to diabetes (75% to 50%) in the engaged group based on questionnaire responses pre- and post-intervention.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Our intervention led to reduction in A1c level, ED utilization and no-shows and improvement in self-rated health and distress level related to diabetes. These results demonstrate that CHWs can improve the care of patients with T2DM by addressing social determinants of health,

providing education/counseling and coordinating care. The primary challenge was patients getting lost to follow up despite multiple outreach attempts. Involving primary care providers more closely in the initial engagement process will be important for successful implementation.

DEVELOPING A PEER NAVIGATION PROGRAM FOR AFRICAN AMERICAN PATIENTS WITH HYPERTENSION

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): How can stakeholder input inform the design of a peer navigator program for African Americans with hypertension?

LEARNING OBJECTIVES 1: Discuss African American community members' reported barriers, facilitators, and resources for health and hypertension management

LEARNING OBJECTIVES 2: Identify system-based strategies to improve hypertension care for African American patients

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

An academic, urban primary care practice prioritized addressing inequity in hypertension control for African American patients. We developed a multimodal program to improve hypertension control across the practice and created a peer navigator program specifically for African American patients. To help inform and design the program, three focus groups were conducted in the community to discuss these questions: 1. What resources in the community help you maintain a healthy lifestyle? 2. How is your healthcare provider currently helping you to control your blood pressure and what can they do better? 3. What are the barriers to controlling blood pressure? This project was done in collaboration with community partner African Americans Reach and Teach Health Ministry (AARTH) and the university's Health Equity office.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): 1. Creation and launch of a peer navigator program based on stakeholder input

2. Hiring and training two African American peer navigators

3. Future measures: patient enrollment, blood pressure control, participant and provider satisfaction

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Focus group participants were recruited from the primary care practice, AARTH, churches, and community centers.

Three focus groups were held with 27 participants (93% with high blood pressure). The majority (22) were female and the mean age was 54. Participants identified the following community resources: access to healthy foods (local, affordable, tasty); physical activity (partnered with a friend for routine and accountability); information (from local experts); stress reduction practices. Trust was identified as a key factor in healthcare providers' role, as exemplified by partnering, openness to non-pharmacologic strategies, listening, and encouragement. Identified barriers included the known challenges related to individual factors (medication adherence, diet, lack of information/time), social determinants of health (racism, stress), environmental and community factors (access to affordable healthy foods and local exercise spots).

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Community members are a rich source of information about local community resources for hypertension management. Healthcare providers can focus on promoting trust by partnering, encouraging, listening, and offering non-pharmacologic options for managing hypertension.

Peer navigators of similar ethnic backgrounds can be a trusted advocate to connect patients with appropriate health education, services, and resources.

DOCS FOR HEALTH: A PLATFORM TO SUPPORT PROVIDERS IN ADDRESSING PATIENTS' STRUCTURAL NEEDS

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

Social and historical determinants (SHDOH) account for over 80% of health outcomes, yet time constraints and lack of training limit physicians' abilities to address these important issues.

LEARNING OBJECTIVES 1: Patient Care: To outline the importance of addressing SHDOH for overall patient health outcomes.

LEARNING OBJECTIVES 2: Systems-Based Practice: To demonstrate examples of ways in which providers can engage with broader systems and bureaucracies to address patients' structural needs.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

Healthcare providers are increasingly aware of the impact of factors such as access to healthy food, safe housing, incarceration, and reliable transportation in determining a patient's overall health. Many have begun screening for SHDOH, but providers often struggle to address these needs. Docs for Health (DFH) emerged through a multidisciplinary collaboration among healthcare providers, social workers and lawyers in Providence, RI. The website contains letter generators and fillable forms as advocacy tools to begin to address patient SHDOH.

Example Resources:

Criminalization: Waiving Existing Court Fines/Fees Housing: Preventing Utilities Shut-Off Immigration: Preventing Deportation Transportation: Disability Bus Pass

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION):

DFH has been introduced to the Brown University Internal Medicine residents through multiple didactic sessions. Direct and indirect metrics were used for pre- and post-test analyses about attitudes and behaviors around addressing social determinants. We assessed perceived utility of this service, barriers to use, and knowledge gained around patient advocacy.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Residents expressed an interest in helping patients address SHDOH, but identified lack of time and understanding around resources as barriers in clinic and the hospital. Further, they felt poorly integrated medical and social services led to divisions of labor.

Our survey also consisted of items rated on a five-point Likert scale ranging from "strongly disagree" (score of 1) to "strongly agree" (score of 5). We calculated mean scores and the difference in the pre- and post-test mean scores for questions such as the following:

I am familiar with various forms and letters I can fill out or write to connect patients with specific resources related to:

a) Housing

Mean Scores: 2.2 → 3.8

Difference: 1.6

b) Transportation

Mean Scores: 2.6 → 3.8

Difference: 1.2

c) Immigration Status

Mean Scores: 2.0 → 3.4

Difference: 1.4

d) Criminalization

Mean Scores: 1.8 → 3.8

Difference: 2.0

e) Income Support

Mean Scores: 2.2 → 3.8

Difference: 1.6

These findings demonstrate an increase in knowledge and comfort around using DFH for advocacy.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?):

DFH identifies high-impact advocacy opportunities for providers. We aim to create space to raise awareness, share resources, and encourage collective advocacy among providers and patients navigating health and social inequities. While currently specific to RI, it can be tailored to resources in all communities.

FOOD INSECURITY RESPONSE DURING COVID-19: CREATION OF GROCERY DELIVERY SERVICE FOR VULNERABLE PATIENTS

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

Stay-at-home orders, risk of severe infection, and loss of employment during the COVID-19 pandemic exacerbated long-standing food insecurity in the Bronx community.

LEARNING OBJECTIVES 1: Identify patients in primary care clinics experiencing food insecurity during the COVID-19 pandemic.

LEARNING OBJECTIVES 2: Create a student-run grocery delivery service to provide vulnerable patients with healthy food.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

The grocery delivery project was created as a partnership between medical students and three primary care outpatient clinics in Bronx, New York. With previous unparalleled socioeconomic challenges and COVID-19 infection rates of other boroughs, Bronx residents faced an exacerbation of vulnerabilities, especially food insecurity. Physicians and medical students created a two-tiered screening system to identify food insecurity among patients advised to stay home. Patients who reported food insecurity during telephone visits or student outreach calls were referred to student volunteers for further screening to assess for patients' food access while complying with stay-at-home orders, financial status, and eligibility for governmental assistance. Patients who were unable to leave their homes, purchase food, or receive public assistance were enrolled. Their information was entered into a HIPAA-compliant database. They received pre-packaged, shelf-stable boxes of groceries donated by local food pantries on a bi-monthly basis via student-conducted contactless deliveries. Patients were re-screened bi-monthly for eligibility and interest in the program. Initiation and implementation required various stakeholders including physicians, faculty, social workers, transportation staff, student volunteers, and food pantry directors.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION):

The program's impact was measured by patient enrollment, retention, and amount of food provided. The households served from March to December, number of people in the household, and amount of food each household received were counted. The number of patients lost to follow up was also tracked. Clinical partnership and integration were measured by the number of successful clinic partnerships, stakeholders involved, and patients referred by providers.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

In total, 555 deliveries of 512 boxes of food were made to 170 patient households (22.5% of screened patients). Enrollees were screened from 195 physician- and 560 student-referrals. 54 households (32%) received recurring deliveries, and 116 households (68%) received deliveries once. An average household contained 3.36 people, and each household received 3.24 deliveries, providing 7.53 meals. 16 households were lost to follow up after enrollment, and 2 voluntarily discontinued the service.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): This intervention will allow others to replicate food insecurity screening and grocery delivery service within outpatient clinic operations during emergency situations or in daily practice. Physicians, community organizations, and students can play crucial roles in addressing barriers to food access in their communities.

FROM FARM TO PATIENT: A NOVEL COMMUNITY-BASED HEALTH PROMOTION PROGRAM TO SUPPORT PATIENTS WITH DIABETES EXPERIENCING FOOD INSECURITY DURING THE COVID-19 PANDEMIC

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

The multidisciplinary care model has emerged as the gold standard for comprehensive diabetes care, however for patients experiencing food insecurity, significant barriers to achieving optimal diet control of their disease remain unaddressed by the traditional healthcare team.

LEARNING OBJECTIVES 1: Share the design of a novel community-based health promotion program for patients with diabetes experiencing food insecurity during the COVID-19 pandemic.

LEARNING OBJECTIVES 2: Evaluate the impact of a partnership between a university-based diabetes clinic and a local vegetable farm on patients' perception of food security, disease control, and social support during the COVID-19 pandemic.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

A pilot program was launched in June 2020 to provide patients at an academic center's specialized diabetes clinic with bimonthly vegetable boxes from a local small farm, at no cost to them. 14 clinic patients identified as having significant barriers to food security were selected to pick up 'farm shares' comprised of 8-10 seasonally-varying vegetable items at a socially-distanced university hospital site for 20 weeks. Additionally, patients were offered individualized culinary education from dietetic students in training and all received the farm's weekly newsletter, which included farm share contents and recipes to guide healthy meal preparation.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION):

Pre-program and midseason follow-up semi-structured interviews were hosted in a subset of eight program participants. Initial interviews elucidated barriers participants felt were preventing their achievement of optimal diet and diabetes control, and whether further impacts had been experienced as a result of the pandemic. Midseason interviews focused on the extent participants felt their diet and perception of food security, social support, and disease control had been affected by participation in the program. Thematic analysis of interviews was performed using an inductive approach.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

All participants identified the cost of healthy food as a major barrier to achieving their ideal diets.

Many indicated that their particular vulnerability to the pandemic as patients with diabetes further exacerbated issues of access to healthy foods and their diabetes care team. Participants reported that the program noticeably impacted

their vegetable consumption and the perceived healthiness of their diets. Participants experienced significant relief of food insecurity as well as an added sense of social support from their diabetes care team through the program.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?):

This pilot program offers a model for an effective, cost-efficient, community-based health promotion program that can be adopted in any practice setting where patients with diet-sensitive disease experience food insecurity and isolation. By extending the notion of the multidisciplinary care team to include a local farm, this program directly addresses social barriers to diabetes care not previously possible in the traditional team-based care model.

IDENTIFYING RESIDENT BARRIERS IN RECOGNIZING AND ADDRESSING SOCIAL DETERMINANTS OF HEALTH (SDH)

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

While SDH and health disparities curricula have been adopted by many training programs, significant resident level barriers remain.

LEARNING OBJECTIVES 1: Identify resident knowledge gaps and barriers in recognizing and addressing SDH

LEARNING OBJECTIVES 2: To demonstrate change in resident knowledge and practice regarding appropriate management of patients with identified social barriers to care

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

Social determinants of health (SDH) are important predictors of health outcomes. The World Health Organization defined SDH as "conditions in which people are born, grow, live, work and age." Since 2016, our internal medicine ambulatory curriculum has introduced residents to principles of equitable patient care including how SDH impact the health outcomes of our patients. This study examines the impact of the curriculum on resident knowledge and practice habits as they relate to SDH and health disparities.

During phase one of this project, we invited all internal medicine residents at a large urban program to complete an online survey in the Fall of 2020. Through this survey, we isolated potential knowledge gaps and barriers. Phase 2 of the project will focus on peer to peer resident education on screening for SDH, documenting findings as assessments (Z-codes) and writing social prescriptions. We also hope to create resource sheets for both resident providers and patients.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION):

To assess the effect of these interventions, we will measure changes in the use of EMR-based SDH screening tools, Z-codes assessments, and utilization of patient education regarding specific interventions and referrals. We will also re-survey the residents to track changes in perception and practices for addressing SDH and health disparities.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

Of 126 potential subjects, 65 (52%) completed the survey. While 98.5% of them noted the importance of SDH on health outcomes, only 7.7% knew how to use the screening tool in the clinic EMR, 3.1% knew to document SDH as an assessment and 31.1% noted knowledge gaps in recognizing SDH as a barrier. Other barriers included lack of appropriate time in clinic and uncertainty in available resources once SDH was identified. Most (84%) did consider it to be a physician's responsibility to address SDH.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?):

Addressing SDH during a clinical encounter is a key component to improving health outcomes. Our survey identified numerous barriers to recognizing and addressing SDH in our residency clinic. We

showed that despite a formal, established curriculum on SDH and health disparities, residents remain unprepared to apply that knowledge in a practical manner. Our educational interventions aim to decrease these knowledge-to-practice gaps. Through this repeated application, we hope that addressing SDH becomes as second nature as checking vital signs.

INPATIENT INITIATIVE TO INCREASE ELECTION PARTICIPATION AMONG HOSPITALIZED PATIENTS

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

Unexpected hospital admissions are a barrier to participation in elections and few hospitals have mechanisms to facilitate absentee voting for inpatients.

LEARNING OBJECTIVES 1: Demonstrate that emergency absentee voting can be incorporated into inpatient care.

LEARNING OBJECTIVES 2: Identify how voter assistance programs at hospitals can increase voter turnout from vulnerable patients who otherwise would not participate owing to structural barriers.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

In the 2016 United States presidential election, only 55.7% of eligible voters participated in the general election. Illness and disability were the most commonly cited barrier to election participation among Americans making less than \$30,000 and Americans ≥ 65 years. In 38 states, emergency absentee voting is permitted for voters with a medical emergency or hospital admission. In these states, hospitals have a unique opportunity to facilitate voter participation during elections.

The goal of this initiative was to facilitate emergency absentee voter participation in the 2020 general election for inpatients, family members, and staff at San Francisco General Hospital, a 397-bed urban safety-net and Level 1 trauma center in San Francisco, CA. A group of trainees collaborated with the Department of Elections to design the workflow, recruited and trained volunteers, and advertised the voting drive. On the day before election day, volunteers screened all hospitalized patients for eligibility and interest in requesting an emergency ballot and assisted them with completing it in their primary language. Ballot requests were submitted to the Department of Elections who delivered and collected ballots on election day from the hospital.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): We tracked outcomes of ballot requests for all patients who were approached and basic demographics for those who participated.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Sixty four emergency absentee ballots were requested and 47 completed ballots were returned to the Department of Elections. Among the completed ballots, 83% were hospitalized patients, 8% were family members of patients, and 9% were hospital staff. All participants who completed ballots were English speaking and approximately half (53%) were under 50 years old. Voters who requested ballots included first time voters, individuals who reported barriers to registering or obtaining an absentee ballot, and patients who had planned to vote in person before their unplanned hospitalization.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Hospital-led initiatives to facilitate participation in elections are a feasible mechanism to increase voter participation during elections. Voter assistance programs at safety-net hospitals can increase voter turnout from vulnerable patients who otherwise would not participate in an election owing to illness and structural barriers. To increase voter participation among hospitalized patients in eligible states, healthcare systems can utilize a similar model to coordinate with local elections offices to promote emergency absentee voting.

RAPID CREATION OF A MEDICAL RESPITE CENTER FOR COVID-19 POSITIVE INDIVIDUALS EXPERIENCING HOMELESSNESS

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

The convergence of two crises, homelessness and COVID-19, spurred the creation of a medical respite center through multi-agency, city-wide collaborative effort led by Cook County Health, a public safety net health system. **LEARNING OBJECTIVES 1:** Identify medical needs and support services provided for patients experiencing homelessness (patient care)

LEARNING OBJECTIVES 2: Recognize opportunities for applications of telehealth medical encounters in a respite center (systems-based practice)

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

The temporary medical respite center, based in a community center in a geographically underserved area of Chicago, operated in May 2020 during the first COVID-19 peak. Cook County Health led implementation of the project in partnership with city government agencies and community-based organizations. The primary objective of the program was to provide low barrier to entry medical respite housing for persons experiencing homelessness and with asymptomatic or mildly symptomatic COVID-19 infection. The program welcomed individuals with complex medical problems, including hemodialysis, chronic medical and behavioral conditions, and substance use disorders. Physicians and nurses performed onsite medical monitoring, which were not billable encounters as the health system is not a HRSA designated healthcare for the homeless provider. Combination of onsite and telehealth enabled patients to receive primary care, behavioral health, and care coordination services, and billable telehealth qualified patients for the federal 340B program for discounted drug pricing.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Completion of COVID-19 isolation was the main outcome. Data on use of medical, behavioral health, and support services during the stay was collected. Patients completed satisfaction surveys upon discharge. Health system utilization of respite center patients was compared with that of other homeless patients in the health system through review of electronic health record.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): All clients (51) completed the full isolation period. Majority of clients were male (82%) and Black (69%), with median length of stay of 7 days, and median duration of homelessness of 12 months. Majority of clients rated their stay as "excellent" (26 of 35, 74%). Behavioral health successes included telehealth initiation of buprenorphine, naloxone training. Telehealth visits totaled 75 encounters. Almost all respite center patients (49) had at least one documented encounter with the health system in the past two years. But they had fewer visits and diagnoses compared to other homeless patients, even though respite center patients reported high prevalence of chronic medical conditions to onsite clinicians.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): The medical respite center provided COVID-19 isolation for medically complex homeless patients. It used a hybrid onsite and telehealth model to provide primary care, mental health, and substance use disorder treatment, and care coordination. The program reached homeless patients whose medical problems had previously been under-recognized by the health system.

REMOTE CONTROLLED TRIAL: INNOVATING FOR REMOTE, RATHER THAN BEDSIDE, RECRUITMENT TO SUSTAIN A HOSPITAL-BASED RCT DURING COVID-19

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): COVID-19 halted most NIH-funded clinical trials without compensatory funding; rapid innovation was required to meet trial milestones.

LEARNING OBJECTIVES 1: Describe the remote iteration of CommunityRx-Hunger (CRxH) for families' basic needs during a child's hospital discharge.

LEARNING OBJECTIVES 2: Identify factors that facilitate implementation of the CRxH intervention delivered remotely.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): CRxH is an evidence-based intervention that connects parents of a hospitalized child to community-based resources for food insecurity and related needs. CRxH includes: 1) education about food insecurity and other common health-related social risks; 2) review and delivery of a "HealtheRx," a personalized list of community resources; 3) activation of resources and connection to a navigator; and 4) a series of text messages over a 3 month period. A double-blind randomized controlled trial (RCT) was designed and pretested (July 2020; N=20) to assess the impact of CRxH vs usual care (ie, information about food resources in the hospital and referral to social work as needed) on adult and child health and psychosocial outcomes. We aimed to enroll parents of children admitted to a large urban children's hospital. Pandemic-related restrictions to in-person research activities required collaboration between remote researchers and in-person hospital staff to conduct the RCT. The iterated protocol included: 1) use of phone- and text-based recruitment, rather than bedside, 2) electronic consent, 3) phone-based baseline data collection, and 4) videoconference-based intervention delivery. Child Life Specialists, who routinely interact with patients and families, dispatched tablets to parents in the intervention group and provided technical support to facilitate digital intervention delivery. Nursing staff delivered a hard-copy "booster" HealtheRx alongside discharge materials.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Informed by the pretest, we aimed for screening and enrollment rates of $\geq 70\%$ and item missingness or refusal rates $< 10\%$. Fidelity to intervention protocols was assessed in terms of full intervention delivery (ie, via videoconference during hospital stay with evidence of booster HealtheRx) or partial delivery (ie, HealtheRx emailed and texted to the parent upon discharge). We aimed for a one-week follow-up survey retention rate of $> 80\%$.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Since November 2020, we screened 57% of parents approached (N=103) and enrolled 69% of parents consented (N=27, 13 cases, 14 controls). Most loss to enrollment after consent resulted from earlier than expected discharge. Missingness/refusal rates were low (0%-6%). Eight parents received the full intervention and 5 received a partial intervention. Retention at 1 week was 88%.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Rapid iteration of an in-person trial protocol to a hybrid design that relies on standard clinical workflows was largely feasible due to a strong internal network of stakeholders who were engaged well before the COVID-19 crisis. Intervention fidelity findings highlight opportunities for better integration into existing clinical operations.

THE IMPACT OF COVID-19 ON HUMAN RIGHTS CLINIC PERFORMING FORENSIC ASYLUM EVALUATIONS

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): How can human rights clinics continue offering forensic medical and physical evaluations to people seeking asylum during the COVID-19 pandemic?

LEARNING OBJECTIVES 1: Objective: To recognize gaps in access to forensic asylum evaluations during the COVID-19 pandemic and find best practices in trauma informed care.

LEARNING OBJECTIVES 2: Objective: To appraise the socio-medical needs of people seeking asylum in the US as a particularly vulnerable population during the COVID-19 pandemic through care coordination.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

The UCSF Human Rights Cooperative is an outpatient student-run clinic that offers forensic evaluations for asylum seekers to document medical and psychological sequelae of trauma and persecution. The COVID-19 pandemic impacted our ability to offer these specialized, trauma-informed evaluations in person. Also, shelter-in-place orders closed most immigration courts, placing clients' legal hearings in flux. A highly vulnerable population, clients seeking asylum face greater social and economic needs as a result of the pandemic. We integrated trauma informed telehealth practices to deploy a unique hybrid model to continue meeting the needs of people seeking asylum throughout the pandemic.

To minimize in person contact and infection risk, we used a workflow of best practices for rapport building, informed consent, history taking and psychological assessments utilizing a video platform. We paired this remote component with expedited in person evaluations focusing on physical examination and forensic photography with structured precautions in place. We enhanced support of clients through phone follow up assessments at 3 month intervals to connect clients to health services, screen for housing, food, and wage insecurity, in addition to assessing for social isolation and interpersonal violence.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Number of evaluations completed since March 2020

Number of evaluations completed using in person vs telehealth vs hybrid settings

Number of referrals made during post-evaluation social determinants of health follow up

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): We performed 23 asylum evaluations since the March 2020 Shelter in Place Order. All psychological evaluations (5/5) were performed solely via video. All medical evaluations (18/18) included a telehealth history and psychological evaluation, and an in-person physical examination; no physical evaluations occurred exclusively by telehealth. 14 clients were enrolled in the post-evaluation follow-up program and were connected to ongoing services. All of these clients are awaiting court hearings for their asylum claim.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Forensic evaluations help document medical and psychological trauma for people seeking asylum in the US. Though these evaluations require a high degree of sensitivity for clients who are survivors of trauma and torture, evaluations can be adapted to telehealth and provide lessons on maintaining both physical distancing and trauma-informed best practices. Asylum seekers are a particularly vulnerable group, and telephonic follow-up allowed services to be arranged remotely during the pandemic.

THEY SAW THE SIGN: A QUALITY IMPROVEMENT PROJECT TO IMPROVE MULTILINGUAL SIGNAGE AT A LARGE, URBAN ACADEMIC MEDICAL CENTER

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

Does the University of California San Francisco (UCSF) Mount Zion campus have signage that is accessible to patients with limited- English proficiency?

LEARNING OBJECTIVES 1: Describe the state of patient-facing, multilingual signage at the UCSF Mount Zion (MZ) Campus.

LEARNING OBJECTIVES 2: Develop patient-centered best practices for language accessible signage at UCSF.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

The UCSF MZ campus is an urban, academic medical center spanning 6 blocks and 9 buildings and includes >20 distinct primary care and specialty outpatient clinics, laboratory space, radiology suites, a COVID-19 urgent care and inpatient unit, and surgery center. Data from our primary care practice show that 11% of established patients prefer a non-English language and 18% of visits are for patients who prefer a non-English language. Our top five non-English languages for patient care are Cantonese, Mandarin, Spanish, Russian, and Vietnamese. Signage in healthcare settings is critical for patient wayfinding and patient-centered care. Anecdotal information suggests that improvements in signage are needed on our campus to better serve patients with limited English proficiency (LEP). This project assesses the signage on our campus and engages University and community stakeholders in advocating for comprehensive guidelines to ensure that language accessibility is central to the design and implementation of signage.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION):

- Document and classify the current state of patient-facing signage on our campus.

- Compile best practices for healthcare signage through literature review and discussions with peer institutions.

- Engage patients with LEP in semi-structured interviews to better understand their experience with signage at UCSF.

- Understand and document the process by which signage is designed and implemented at UCSF and engage stakeholders regarding implementation of linguistically inclusive signage.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

The signage on our campus is heterogeneous and includes health system-designed signs, commercially available signs, and “home-grown” signs made by individual clinics. We documented a total of 506 signs across the campus, representing 232 unique sign designs. Only 9% (n=46) of signs included a non-English language. 53% (n=269) of English-only signs included a related, universally intelligible symbol, though it is unclear if patients with LEP would be able to understand the sign’s full message based on the symbol alone. We learned that our institution does not have standardized guidelines for signage and our Wayfinding team works in isolation from our Patient Experience team.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?):

We learned that signage is heterogeneous on our UCSF Campus which is likely explained by the lack of a centralized “Sign Team”. While about 11% of patients on our Campus have LEP, most signage does not include a non-English language and only about half of signs include a symbol. Our next steps include engaging patients with LEP and working with University stakeholders to improve signage and centralize the process for signage design and implementation.

VOTING IS HEALTHY: GRADY HOSPITAL'S VOTER ENGAGEMENT CAMPAIGN

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

Given the proven association between public policy and population health, an interdisciplinary team at Grady Memorial Hospital in Atlanta established a health-system-wide campaign to increase voter registration and turnout for the 2020 general election.

LEARNING OBJECTIVES 1: Recognize challenges associated with voting for underrepresented populations in Georgia.

LEARNING OBJECTIVES 2: Describe the links between voting and health outcomes.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

Interdisciplinary team at Grady Memorial Hospital, a large county safety-net hospital in Atlanta, Georgia. This team included nurses, residents, marketing staff, physicians, and students as well as the voter outreach manager from Georgia Equality, a nonprofit involved in non-partisan voter advocacy.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION):

We worked to create a website and promotional materials to increase voter registration among Grady staff and patients. Our team was able to create a website for the Voting is Healthy campaign that provides a nonpartisan landing page for patients. In addition, we established a voter registration hotline for Grady patients and staff, as well as badges for Grady faculty to wear and discharge messaging to encourage voting. In future iterations of this campaign, we plan to gather quantitative data to determine the impact on voter engagement and turnout.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

In a short amount of time, the Voting is Healthy campaign mobilized to deliver several effective materials to increase voter registration at Grady.

Our team was able to create a website for the Grady Votes campaign that will provide a nonpartisan landing page for patients. In addition, we established a voter registration hotline for Grady patients and staff, as well as banners and badges for Grady faculty to wear to encourage voting.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?):

Given the proven association between public policy and population health, this voting campaign should be replicated in future elections to increase voter registration and civic engagement at Grady Memorial Hospital.

“LEAP”ING OVER HEALTH INEQUITIES: A QUALITY IMPROVEMENT INITIATIVE TO IMPROVE CONGESTIVE HEART FAILURE CARE ON AN INPATIENT GENERAL MEDICINE SERVICE

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

Previous work at our major academic medical center found that compared to White patients, Black and Latinx patients with a primary diagnosis of congestive heart failure (CHF) were significantly less likely to be admitted to our specialized cardiology service rather than our general medicine service (GMS) and that CHF patients admitted to GMS had lower 30-day cardiology follow-up and higher 30-day readmission rates, disproportionately affecting our Black and Latinx patients.

LEARNING OBJECTIVES 1: To highlight the importance of using a critical race theory framework to inform the development of a quality improvement initiative

LEARNING OBJECTIVES 2: To understand that using a health equity lens in implementing a quality improvement initiative can lead to the improvement in care for all patients

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): We conceived of the Longitudinal Equity Action Plan (LEAP), which included: 1) a documentation support tool in the electronic medical record to review criteria for cardiology consultation and guideline recommended therapies, 2) enhancements to patient education by nursing and nutrition, 3) social work consultation with CHF-specific social determinants of health screening and interventions, including ride assistance and purchasing of a scale for select patients, 4) electronic referral to facilitate cardiology follow-up scheduling, 5) tools to support discharge documentation and, 6) post-discharge medication reconciliation calls by a pharmacist. To support LEAP, a project coordinator communicated with care team members and tracked the completion of interventions. All patients admitted to GMS with a primary diagnosis of CHF from September 2019 to March 2020 were included.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): We tracked several outcomes including 30-day readmissions, 30-day post-discharge cardiology follow-up, nursing education, social work and nutrition consultation, appropriate discharge documentation and adherence to guideline-directed therapy. For the primary analysis, we performed a controlled pre-post study design and compared all outcomes of patients admitted with CHF to GMS during the intervention period to the year prior to the LEAP intervention (pre-intervention group), as well as to CHF patients admitted to cardiology throughout entire period (control group).

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Patients in the LEAP intervention group had significantly lower 30-day readmission rates compared to the pre-intervention group (19.2% vs. 24.6%; $p=0.024$). Patients in the LEAP intervention group had significantly higher 30-day post-discharge cardiology follow-up visits scheduled compared to the pre-intervention group (56.5% vs. 42.0%; $p=0.003$), though there was no difference in attendance of these visits. There was also a significant improvement in rates of nursing education, social work and nutrition consultation ($p<.0001$ for all).

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): By using a health equity lens, we were able to show meaningful improvement in care for all CHF patients on GMS. More resources are necessary to improve post-discharge follow-up and establishment of care with ambulatory cardiology providers.

Innovation in Healthcare Delivery (IHD) - Health Policy, Economics, and Finance

CODING IS CRITICAL! THE IMPACT OF VALUE-BASED PAYMENT EDUCATION

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Value-based payment (VBP) systems are used to improve quality and cost-effectiveness of healthcare, but few clinicians receive adequate coding education which leads to a lack of resources for patient care and may adversely impact quality and utilization metrics.

LEARNING OBJECTIVES 1: Systems-based practice: Providers will understand how diagnosis capture impacts key elements of value-based care including risk-adjustment, metrics (e.g., quality or utilization), patient outcomes, and revenue available for patient care.

LEARNING OBJECTIVES 2: Practice-based learning: With support from clinical documentation improvement specialists (CDIS), providers will learn to recognize and apply diagnosis codes to ensure each condition is addressed and appropriately managed.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): We developed a program to promote accurate and complete coding of a patient's medical complexity. This includes two pillars: 1) learner-focused, clinician-led education through site visits, webinars and required e-learning; 2) deployment of CDIS to provide "on-the-ground" support and pre-charting while rectifying miscoded diagnoses. We piloted the program in an academic primary care group with urban and suburban ambulatory locations in Maryland. We adopted an interdisciplinary approach reflecting the input of CDIS, nurses and physicians. We used formative evaluation to update educational content and refine the scope of our program.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): We performed a baseline needs assessment of provider comfort with coding and risk adjustment. We are conducting post-intervention surveys of our impact on knowledge of coding and VBP concepts. We are also tracking changes in hierarchical condition category (HCC) diagnosis capture and risk adjustment factors (RAF) that indicate medical complexity across our population. We are seeking ways to evaluate the impact of our program on other VBP domains.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): We included 248 providers in the initial needs assessment; 152 (61%) responded with 73% indicating interest in coding education. We performed a quantitative analysis of 1983 unique patients who were continuously enrolled in our managed Medicare program before (2018) and after (2019) implementation of our program. There was a statistically significant increase in captured RAF (0.702 to 0.955, $p<0.05$) and HCC diagnoses (1499 to 3402, $p<0.05$). Persisting diagnoses increased (66% to 87%) while the number of patients without HCC diagnoses decreased (45% to 24%). Revenues available for patient care increased as a result of this program.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Improving diagnosis capture leads to more accurate risk adjustment which can be used to allocate medically appropriate resources to our complex patients. We were able to demonstrate significant improvement in key VBP metrics using education and an interdisciplinary approach to coding. Additional work is needed to understand the impact of such programs on quality, utilization, and other value-based outcomes.

IMPLEMENTATION OF IMPACT (ILLINOIS MEDICAL PROFESSIONAL ACTION COLLABORATIVE TEAM) TO ENABLE HEALTHCARE WORKERS TO TRANSLATE VALUES INTO ACTION DURING AND BEYOND THE COVID-19 PANDEMIC

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

Although healthcare worker voices are critical to the national discourse, engaging in both traditional and social media advocacy during the pandemic is challenging given increased responsibilities and concerns regarding attacks and harassment online.

LEARNING OBJECTIVES 1: IMPACT (Illinois Medical Professionals Action Collaborative Team) formed to facilitate rapid health professional responsiveness to systemic problems highlighted by the pandemic, with an aim to counter misinformation and bolster public health.

LEARNING OBJECTIVES 2: IMPACT formed to facilitate communication between health professionals and the public, and to facilitate rapid-cycle, evidence-based advocacy to policymakers.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

Physicians on social media, from different institutions and specialties, formed IMPACT. Together, with students and other professionals, they created 1) an “anchor” website (www.impact4hc.com) 2) Social media campaigns with original hashtags, data figures, and infographics in English/Spanish to promote masking, distancing, and vaccinations 3) Blog/video stories from health care workers 4) Advocacy letters, petitions and opeds with signatures obtained by leveraging local health professional Facebook groups (Physician Mommies Chicago, >2200 members; Illinois COVID-19 Medical Collective, >2800 members). Partnerships connected people to knowledge (Dear Pandemic, Bump Club & Beyond) and resources (GetMePPEChi, MasksNowIL).

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION):

Reach: 1) Website traffic 2) Social media reach (followers, impressions, views) and Engagement: petition and letter signatures

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

Eight letters were sent to Illinois policymakers with over 2000 total health care worker signatures advocating for stay-at-home orders/masking, PPE for health care workers, guidelines for reopening, and greater transparency and an accelerated timeline for vaccination. A Change.org petition for a national mask mandate garnered >112,000 signatures. To date, 11,000 individuals accessed our website for a total of 33,000 page views. IMPACT social media accounts have nearly 3000 followers across Facebook/Twitter/Instagram with posts garnering over 200,000 impressions a month. An original hashtag (#6ftApartNotUnder) has >4000 tweets and >2million impressions. A #WhiteCoatsforBlackLives Virtual March, though Zoom bombed, received > 1 million impressions on Twitter and >3,000 views on Facebook. Our bi-weekly Facebook Live Q&A videos with Bump Club and Beyond (nationwide network of >100K moms) have >1500 views each. IMPACT has written over 25 op-eds in the Chicago Tribune, Health Affairs, Newsweek, and more. Members were featured/quoted in the Wall Street Journal, the Atlantic, the New York Times, and numerous television/radio appearances locally (recurring Fox32 Chicago segment) and nationally (NPR, Good Morning America, CNN).

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?):

IMPACT, an interdisciplinary, grassroots team, enables health professionals to leverage social and traditional media to effectively amplify health care worker voices and advocate for public health. Future work will examine the effectiveness of these interventions.

Innovation in Healthcare Delivery (IHD) - Hospital-Based Medicine

HOSPITALIST PERCEPTIONS OF A NOVEL 'CONTINUITY OF CARE' SCHEDULING MODEL

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Hospitalist continuity is considered an effective measure to improve patient safety and throughput; however, little is known about hospitalist perceptions of continuity schedules.

LEARNING OBJECTIVES 1: Practice-Based Learning and Improvement
LEARNING OBJECTIVES 2: Systems-Based Practice

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

We implemented a scheduling model that increased weekend continuity in response to concerns about adverse events, poor care coordination, and limited discharges on the weekends. We switched from staffing inpatient teams Monday through Friday for two or four-week rotations with weekends staffed by a cross-covering hospitalist to a model of two-week rotations in either a 12-day format (Monday through the following Friday with middle weekend on) or a 5+7-day format (Monday to Friday, weekend off, Monday through Friday, weekend on).

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION):

We conducted a Likert scale survey 18 months after implementation of the continuity schedule to assess hospitalist perceptions with regards to four domains: patient care, throughput, burnout and medical education.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

Our survey generated a 73% response rate. Of those surveyed, none preferred to return to our previous scheduling model, with 75% preferring the current mix of 12-day and 5+7-day blocks. A subset (25%) preferred a theoretical ‘7-on, 7-off’ model.

Patient Care: Hospitalists overwhelmingly indicated that patients received better care when there was week to weekend continuity (87.5%). A majority also believed that patient safety was improved resulting in fewer adverse events (81.3%).

Throughput: Hospitalists were more likely to discharge patients on a continuity weekend (81.3%) and believed that they provided better care coordination for those discharges (87.6%).

Burnout: Hospitalists did not feel that fatigue impacted their ability to provide care on continuity blocks (81.3%). Most indicated that weekends on a continuity block were less stressful (75.1%) and that not having to write a hand-off on Fridays was a source of relief (81.3%). A majority (56.3%) indicated that they started to lose efficiency on day 10 of a 12-day block. Only 12.5% indicated they were somewhat likely to switch out of a scheduled 12-day block.

Medical Education: Most (62.5%) neither agreed nor disagreed that they had more time for teaching on a 12-day continuity block. Half (50%) felt that they were better able to evaluate trainees after a 12-day continuity block.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?):

Our results indicate that most hospitalists believe that increased week to weekend continuity improves patient care, reduces adverse events, and improves throughput and care coordination on the weekends. Moreover, most feel less stressed on weekends where they have patient continuity. Remarkably, none of our hospitalists preferred to return to a pure weekend cross-coverage model and only a small subset preferred a 7-on 7-off model which represents the most common hospitalist scheduling model nationally. Based on this positive response, we encourage hospitalist groups to consider alternative scheduling models such as that which we have implemented.

IMPROVING ANTIBIOTIC STEWARDSHIP OF PATIENTS WITH REPORTED PENICILLIN AND CEPHALOSPORIN ALLERGY

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

Many patients with reported penicillin allergies can safely tolerate

cephalosporins, yet often receive alternative, broader-spectrum antibiotics which are associated with worse clinical outcomes.

LEARNING OBJECTIVES 1: To understand key components of a comprehensive allergy history

LEARNING OBJECTIVES 2: To learn about graded challenges as a mechanism for managing patients with reported penicillin allergies

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

The hospital guideline at New York Presbyterian (NYP) Hospital previously required penicillin skin testing as the first step in managing patients with reported penicillin allergy for whom cephalosporins were the ideal antibiotic. However, several NYP campuses had limited access to penicillin skin testing. Cephalosporin graded challenge is a safe alternative to penicillin skin test for select inpatients. During a one-year quality improvement (QI) project, two physicians (one in infectious diseases and one in hospital medicine) aimed to increase the percentage of patients with reported beta-lactam allergies who safely receive beta-lactam antibiotics on the medicine services at NYP-Weill Cornell and NYP- Lower Manhattan Hospital. The project had four phases: 1) Update of hospital guideline to allow select patients with reported allergies to undergo cephalosporin graded challenge without pre-requisite for penicillin skin testing, 2) Education sessions for hospitalists, ID fellows, residents, PAs, and nurses focused on the classification of allergies and the safety and execution of graded challenge protocols, 3) Distribution of pocket cards and job aides to reinforce the education, and 4) Proactive screening using the Vigilanz antibiotic stewardship platform to identify patients eligible for graded challenge or change in antibiotic selection.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION):

Data were collected through the Vigilanz antibiotic stewardship software, which links data from the Electronic Medical Record. Among medicine patients with reported penicillin allergies receiving antibiotics, we measured the percentage of patients who received beta-lactam antibiotics and days of therapy of alternative antibiotics including vancomycin, aztreonam, clindamycin, levofloxacin, and carbapenems. We used pharmacy records and chart review to track the number of graded challenges performed on medicine services as well as associated adverse events.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

During the QI interventions, there was a 29% relative increase in the percentage of patients with reported allergies receiving beta-lactams (from 42% to 54%). We observed a reduction in the number of days of therapy (per 1000 patient-days) of use of alternative antibiotics from 470 to 391. There were no reported adverse events during graded challenges on the medicine floors and no change in the frequency of infectious disease or allergy consultations.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?):

Our project demonstrated that it is possible to safely treat patients with reported penicillin allergy through a combination of education of medical teams and policy changes in a program led by hospitalists and infectious disease faculty.

IMPROVING PATIENT EXPERIENCE FOLLOWING HOSPITAL DISCHARGE THROUGH PATIENT-PARTNERED CARE

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

Prior innovations meant to improve patient experience and outcomes during the transition home from hospital have focused on complex, resource-intensive models which are poorly adaptable in health-care systems worldwide.

LEARNING OBJECTIVES 1: To share an easily adaptable and feasible intervention created using novel co-design methods.

LEARNING OBJECTIVES 2: To share early results of the system-wide evaluation of the tool.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

The Patient Oriented Discharge Summary (PODS) is a tool created with patients and families to address their need for written instructions at time of discharge. PODS provides instructions in five key areas identified by patients and families as valuable during the transition from hospital to home. Following early adoption, evaluation and refinement, PODS was implemented in multiple care transition settings (academic, community, rural) and units (emergency department (ED), psychiatry, medicine, surgical, rehab, pediatric) across 21 hospitals over 18 months in Ontario (population 14.7 million).

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION):

An effectiveness-implementation hybrid design was used to collect hospital, patient and provider-level data. Implementation metrics of success included reach of PODS within the target population, mean provider workload, and provider and patient value of PODS. Effectiveness metrics of success included change in patient-centered processes, 30-day emergency department visits and readmissions. Patient experience was also measured through the Canadian Patient Experience Survey, which includes validated metrics from HCAHPS used to access quality of care transitions. Acute care hospitals implementing PODS (>50% target) were compared to hospitals who did not on the patient experience measures one year following implementation. Linear mixed effects models and generalized estimated equations were used for analysis.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

Of 65,221 discharges, 41,884 patients (64%) received PODS, reaching 78% of the target population. The majority (64%) of providers felt PODS added to their workload; however, 86% of providers and 98% of patients felt PODS added value to their discharge experience. PODS improved the use of teach-back (5.40 to 6.50 out of 10, P<0.001) and engagement of caregivers (6.30 to 7.70 out of 10, P=0.026). More patients discharged from hospitals with >50% PODS implementation had a discussion about the help needed once home (OR 1.18, P=0.024) and had received written information about symptom or health problem considerations after leaving hospital (OR 1.05, P=0.025). However, there was no improvement in understanding of medications, information on actions if worried after discharge, or 30-day ED visits and readmissions.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?):

PODS responded to a system need for an adaptable yet standardized way to deliver patient-partnered care instructions. PODS improved patient-centered processes known to improve communication and understanding of discharge instructions, but not all patient experience and utilization measures. Further refinement of PODS should address medications and urgent care needs.

IS YOUR PATIENT READY FOR DISCHARGE? IMPLEMENTING AN INNOVATIVE EMR- BASED VISUAL MANAGEMENT TOOL TO ENHANCE HORIZONTAL MULTIDISCIPLINARY CARE COORDINATION AND DISCHARGE PLANNING

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Shared understanding of a patient's readiness for discharge is essential for clinicians, social workers (SWs), case managers (CMs), nurses (RNs), and bed management staff to prioritize work. The COVID-19 pandemic upset usual workflows vital to inpatient care.

LEARNING OBJECTIVES 1: 1. To improve system-based practice by implementing an easily accessible, real-time care coordination tool designed by frontline workers to streamline horizontal communication.

LEARNING OBJECTIVES 2: 2. To adapt to changes in workflow (interrupted in-person care coordination) during the COVID19 pandemic by leveraging an electronic care coordination tool.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): Literature about visual management in hospital-based multidisciplinary throughput work is sparse. "Discharge Today" (DT) is an innovative EMR-based tool that allows real-time visual management and information sharing among staff. We report on tool implementation on the Hospital Medicine (HM) service and at a 1,100-bed urban, academic, tertiary care center. DT was built through frontline worker focus groups and prototype development, and collaboration with another center to create the electronic tool. DT was rolled out on July 27, 2020. Staff update DT in the EMR without entering unique patient charts twice daily. Clinicians assign a color-coded and labeled "discharge status" which predicts the discharge time frame based on medical stability (i.e., definitely today, tomorrow, 24-48 hours, >48 hours). SW and CM enter discharge barriers and the expected post-discharge disposition. The bed management team also accesses the tool.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Process measures included tool utilization. Outcome measures included length of stay observed:expected (LOS O/E) and discharge before noon (DBN) rate from Fall 2019 to Fall 2020.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Weekday utilization was tracked from 9/21/2020-12/23/2020 (n = 63 days). The mean daily teaching and non-teaching census were 109.1 and 83.4 patients, respectively. Mean utilization was 96.3% for the HM service.

LOS for patients admitted ≤ 30 days was evaluated; patients with very long LOS often have discharge barriers other than care coordination. Average LOS observed:expected (O/E) ratio was compared from July-October 2019 (2252 patients) to 2020 (2261 patients). A two-sample t-test was run using R (R Core Team, 2020), using $\alpha=0.05$. LOS O/E decreased for patients going home (1.48 to 1.38, $p < 0.02$), going home with services (1.35 to 1.33, $p = 0.61$), going to SNF/SAR (1.89 to 1.58, $p < 0.01$), and other disposition (1.86 to 1.54, $p < 0.02$). Our hospital-wide DBN rate decreased during the Spring 2020 and DT implementation was associated with improvement in DBN.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): An EMR-based VM tool to improve horizontal interdisciplinary communication by clearly showing a patient's readiness for discharge was successfully implemented across our HM teams. Engagement by clinicians, SW and CM was high. Tool use was associated with increased DBN and decreased LOS O/E, and improvements occurred despite normal workflow interruptions due to COVID-19 precautions.

JUST-IN-TIME CHEST TUBE EDUCATION: QUALITY IMPROVEMENT PROJECT TO REDUCE CHEST TUBE-RELATED HARM ACROSS HEALTH SYSTEM

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Internal medicine physicians and nurses on medicine-surgical floors have little comfort with managing chest tubes or troubleshooting problems when they arise, despite caring for a majority of patients admitted to our academic hospital with chest tubes.

LEARNING OBJECTIVES 1: Utilize easy-to-use technology to improve provision of care across health system for patients with chest tubes

LEARNING OBJECTIVES 2: Evaluate current provision of care for patients with chest tubes and enable easy assimilation of evidence-based management across health system

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

From January 2017 through January 2018, there were 58 unique safety event reports about patients admitted to our hospital wards related to chest tube insertion and monitoring. With 320 patients with chest tubes on the non-cardiothoracic surgery floors in 2018, these safety events had the potential to significantly impact patient outcomes. We surveyed staff across disciplines and care areas to understand drivers of chest tube-related safety incidents. We surveyed residents in internal medicine (N=39), general surgery (N=28) and cardiothoracic surgery (N=10) and nursing staff (N=90) from across med-surg floors. We found a difference between surgical and medical specialists, with only 8/37 (21%) of internal medicine residents reporting comfort with chest tube settings and all 38 CT and general surgery residents reporting comfort. Similarly, academic hospitalists reported little comfort with managing typical chest tube settings and adverse events. Further stakeholder review revealed addressing gaps in chest tube knowledge as a priority intervention. We created "Just-in-Time" chest tube education videos accessible through a QR code to troubleshoot common problems. Residents, hospitalists, and med-surg nurses were encouraged to secure the QR code to their ID badges for easy access. The QR code was also placed at nursing stations.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Safety reports regarding chest tubes and related complications were tracked in our hospital-wide safety report entry system.

Educational video use was also tracked using Google AnalyticsTM. This allowed us to assess if, firstly, our intervention was leading to a decrease in the number of chest tube-related safety events. Secondly, it allowed us to see how many people were making use of the educational videos.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Since providing staff with QR codes to access the educational videos, we noted 127 new users over the span of a three-month period. Each session was on average 2.15 minutes long. We noted a total of 231 individual sessions with an average of 1.78 sessions per user. In addition to a robust uptake of this process measure with many users viewing these videos, we also noted a decline from 58 safety reports relating to chest tubes in 2018 to a current 5 reports filed from April to October 2020.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): The use of easily accessible technology at the point of care can lead to both better education of trainees and providers on particular subject matters and lead to improved patient safety.

NPO-NO! A QUALITY IMPROVEMENT INNOVATION OF A NOVEL DIET STRATEGY PRIOR TO CARDIAC CATHETERIZATION

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Inpatients scheduled for cardiac catheterization (cath) are often kept nil per os (NPO) after midnight, despite evidence this leads to worsened patient experience.

LEARNING OBJECTIVES 1: Understand risks/benefits of reducing NPO time prior to low-risk procedures in inpatients (PC4)

LEARNING OBJECTIVES 2: Recognize an example of a multidisciplinary approach to process change (SBP2)

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

We undertook a quality improvement project to allow general medicine inpatients scheduled for cath to have a morning meal prior to their procedures. We created a multidisciplinary team including nursing, nutrition, cardiologists, and hospitalists. With IT assistance, a new diet order was generated labeled 'pre-cath'. This diet order was incorporated into general diet orders and existing ordersets for non-ST elevation myocardial infarction and acute coronary syndrome. Education on the diet process was provided to nursing and ward attending/resident staff. All patients included were admitted to general medical-surgical wards and intended to undergo cath. The new diet enabled a light breakfast the morning of the procedure and clear liquids until noon or two hours preceding the planned procedure, whichever was earlier. Patients admitted to an intensive care unit were excluded from receiving this diet, as their caths are prioritized before general ward patients and therefore may not allow four hours between breakfast and their procedures. Patients considered unsafe to receive a diet remained NPO until their procedure.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): 1) Implementation and acceptability of the novel diet; 2) patient satisfaction outcomes; and 3) balancing measure adverse events, including aspiration pneumonia and respiratory failure.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

The pre-intervention period was 7/1/19-2/13/20, and the post-intervention period was 2/14/20-12/15/20. The patient satisfaction survey was begun just prior to the COVID-19 pandemic and therefore not fully implemented. Ultimately, 120 inpatient caths were performed pre-intervention and 143 post-intervention. Overall, 230 pre-cath diet orders were placed during the post-intervention period, including for 111 post-intervention caths (77.6% of the total). Of 32 hospitalizations with caths and discharge diagnoses of acute hypoxic and/or hypercarbic respiratory failure, cardiogenic shock, unspecified bacterial pneumonia, or pneumonitis due to inhalation of food and vomit (n=14 pre-intervention, 18 post-intervention), no events were possibly related to cath.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Multidisciplinary teams can create and successfully implement a meal and clear liquid protocol for general ward inpatients requiring cath. This diet was acceptable to teams and staff and widely used. Implementing the light meal did not lead to increased safety events related to cath at a single center. Similar protocols could be instituted in many other inpatient settings. Future studies should include measures of acceptability and satisfaction.

PHYSICIAN WORKLOAD TILE: USING EHR TECHNOLOGY TO MEASURE WORKLOAD FOR SAFE INPATIENT STAFFING

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

The time needed to complete patient care tasks can easily exceed the hours of a scheduled shift for providers; we lacked ability to systematically account for workload across our inpatient teams to distribute workload and ensure safe staffing.

LEARNING OBJECTIVES 1: Recognize myriad variables contribute to workload for inpatient internal medicine teams, many of which are available as electronic health record data.

LEARNING OBJECTIVES 2: Understand that excess hospitalist workload has been associated with increases in length of stay, cost, and diminished

quality of care. Assess the value of tracking physician workload data for enhanced patient safety and clinician wellness.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): Oregon Health and Science University (OHSU) is a 570-bed hospital in Portland, Oregon. The Division of Hospital Medicine (DHM) is comprised of 9 inpatient teams with a total average daily census of 75-100.

Our division leadership partnered with hospital administration and GE Healthcare Command Centers to create a physician workload tile, a computerized electronic summary tool, which incorporates electronic health record (EHR) data at the patient and team levels to define near real-time workload estimates for all our teams. Hospitalist faculty participated in focus groups to generate lists of factors which contribute to and amplify workload intensity. We collaborated with our local informatics team to determine variables were available in the EHR. Clinician tasks were assigned average times, and the sum of these were then divided by the number of minutes remaining in the shift, resulting in a workload ratio, which is continuously calculated for each team. This data is summarized across the DHM and compiled with machine learning (artificial intelligence) to isolate signal from noise and identify risk to help trigger actions to counterbalance workload.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): 1) Perceived workload and measured workload will be congruent, as measured by comparing hospitalist survey data and tile output.

2) Objective workload data demonstrates real time additional staffing needs, eventually predicting future additional workforce needs to proactively staff.

3) Improved clinician wellness (measured in our annual wellness survey) with sense of improved workload control.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): The following variables can be compiled via available EHR data to define workloads at the patient and team levels: shift start census, type and number of admissions, number of discharges, primary language of the patient, code events, number of consulting groups, complex discharge needs, behavioral issues, geographic scatter of census, and changes in deterioration score.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Hospitalist workload can be represented using variables available in the EHR with the goal of increased patient safety and clinician satisfaction. Defining workload necessitates strategies to mitigate excess workload and to equalize workload across teams, such as deploying an on-call flexible staffing clinician and coordinating transfers of appropriate patients to partner hospitals when workloads are nearing high census threshold.

VIRTUAL BEDSIDE CONCERTS: COMBATING ISOLATION WITH INTERACTIVE MUSICAL PERFORMANCES

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

COVID-19 has created a secondary pandemic of isolation; healthcare workers (HCWs) have limited interventions to combat the physical and emotional isolation that patients face.

LEARNING OBJECTIVES 1: To recognize the important therapeutic role of interactive music in alleviating isolation experienced by patients.

LEARNING OBJECTIVES 2: To describe a model of virtual concerts that can be scaled and replicated at other institutions during the pandemic and in the post-pandemic world.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

As an innovative, humanistic intervention to combat isolation and loneliness in patients, Virtual Bedside Concerts (VBC) was developed during the pandemic. In a variety of inpatient settings, including hospitals and nursing homes, patients of all ages and clinical statuses are offered hour-long interactive, personalized concerts. Volunteer professional musicians, as well as medical students and hospital staff who are musicians, are matched with each patient and engage in live performances and conversation, on a virtual platform hosted by on-site HCWs. The majority of sessions are individual concerts; however, as an extension of VBC, family members are invited to join virtually in special group concerts.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Qualitative data in the form of open feedback and a post-concert survey is obtained from patients, musicians, and HCWs to assess the experience.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): In the first 7 months of VBC, 34 volunteer musicians performed 124 concerts for patients, comprising 96 individual concerts and 28 group concerts. Patients have enjoyed all musical genres, from "Rudolf the Red-Nosed Reindeer" to Bach's cello suites. They overwhelmingly appreciate the opportunity to connect with musicians and HCWs on a personal and musical level. HCWs are grateful for the ability to offer a humanistic, integrative treatment not available in their medical repertoire. Musicians find that they serve a therapeutic role while not on the front line. As visitation and physical gatherings are discouraged, group concerts are particularly successful in connecting patients with their family. Considerations to establish and scale VBC include: identification of patients, access to devices, connectivity, in-hospital volunteer organizers, and legal and HIPAA compliance. Despite these challenges, this program can be feasible with a coordinated effort between volunteers.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Loneliness, fear, and anxiety in the inpatient experience are not specific to the pandemic. VBC facilitates new interpersonal connections with musicians as well as a deeper level of the patient-HCW relationship beyond day-to-day conversations about clinical updates or medical treatments. Group concerts overcome geographic barriers that separate patients from family. During virtual concerts, patients find comfort in personalized music and conversation and benefit from decreased physical and emotional isolation, in a humanistic program that coordinates patients, musicians, and HCWs.

Innovation in Healthcare Delivery (IHD) - Mental Health and Substance Use

BREAKING SAD: IMPROVING CHRONIC ILLNESS THROUGH THE IMPACT COLLABORATIVE CARE MODEL FOR MANAGEMENT OF DEPRESSION IN AN URBAN UNDERSERVED

PRIMARY CARE PRACTICE

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

Does the IMPACT model improve engagement and chronic disease management in a lower socioeconomic Afro-Caribbean Central Brooklyn population?

LEARNING OBJECTIVES 1: Will interdisciplinary collaborative care (CC) embedded in primary care (PC) help patients manage depression and improve self-management of chronic disease?

LEARNING OBJECTIVES 2: Can a population health registry for patients living with depression help primary care providers (PCP) understand the impact of CC on our patients?

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

The 2010 Collaborative Care for Patients with Depression and Chronic Illnesses trial^[1] studied the IMPACTCC model for depression^[2] on chronic disease control in 14 Washington State PC clinics. This protocol-driven, patient-centered intervention significantly improved control of medical disease and depression. NYC Health + Hospitals/Kings County treats primarily Afro-Caribbean and African American patients. A 2007 study showed only 45% of African Americans and 24% of Caribbean blacks diagnosed with major depressive disorder receive treatment.^[3] In 2012, NYCH+H adopted the IMPACT model to improve diagnosis and treatment of depression in our population. PHQ-9 questionnaire is administered to all PC patients. PCP introduce patients with moderate depression^[4] (score ≥ 10) to an embedded mental health social worker (MHSW) and offer CC. Enrolled patients receive team-based counseling (MHSW, psychiatrist, PCP) with motivational interviewing, problem solving and medical therapy, and concrete resources to address social determinants of health. The NYCH+H Population Health Registry tracks screening rate and yield, enrollment, monthly contact rate, improvement rate, and need for psychiatric consultation or treatment change. 400 patients enrolled in CC at NYCH+H/Kings County between 2016 to 2019; 161 graduated (sustained PHQ-9 < 9) and were included. Patients who declined, were deceased, or lost to follow up were excluded.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): A retrospective chart review compared systolic and diastolic blood pressure, BMI and Hgb A1C values within 3 months prior to enrollment to measurements in the 3 months after graduation.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Graduates from CC had a statistically significant improvement in systolic blood pressure from 133.86 mmHg to 127.29 (p < 0.0005), an improvement of 6.566 mmHg. Diastolic blood pressures improved from 76.37 mmHg to 73.16 mmHg (p < 0.009). BMI decreased from 29.79 kg/m² to 27.12 kg/m² (p < 0.001), an improvement of 2.67 kg/m². Hgb A1C values decreased from 7.553 to 7.174; (p < 0.059); an improvement of 0.3794.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Interdisciplinary CC for depression embedded in PC improves engagement and may decrease stigma around diagnosis and treatment. Longitudinal population health registry data showed that lessons learned in the IMPACT study are applicable to our inner city, low socioeconomic status Afro-Caribbean patients with regards to hypertension, obesity, and diabetes self-management.

BRIDGING THE GAP: TRANSITIONING PATIENTS WITH OPIOID USE DISORDER TO THE OUTPATIENT SETTING

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

Addressing the gap in transition of care in admitted patients with opioid use disorder (OUD) with an interdisciplinary addiction consult team (I-ACT) to increase outpatient treatment engagement.

LEARNING OBJECTIVES 1: Identify and establish therapeutic alliance with patients with OUD to connect them with qualified outpatient health professionals to guide them to sustained recovery.

LEARNING OBJECTIVES 2: Assemble an interdisciplinary team for a holistic assessment of the patient with OUD, for the goal of sustained recovery after discharge.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

An inpatient addiction consult team (I-ACT) was formed to support opiate use remission. The team initiated treatment during medical hospitalizations with the goal of 1) increasing engagement of care, 2) improving morbidity and mortality and 3) decreasing acute care utilization. The team consists of physicians, pharmacists, a peer support specialist from Midlands Recovery Center, and addiction specialists who offered counseling services, advise on appropriate testing of comorbid conditions, and assessment for medication assisted treatment (MAT). The team also partnered with Lexington/Richland Alcohol and Drug Abuse Council, the main local resource for addiction treatment, who can prioritize discharged patients in their clinic and support care coordination.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION):

At discharge, engagement will be defined by an ongoing relationship with the I-ACT team. After discharge, engagement will be defined by participation in at least one of the following: ongoing care for addiction to include clinic visits, peer support services from MRC, or evidence of continued prescription of MAT. Engagement will be assessed before 30 days, and at 30, 60, and 180 days.

Implementation will be assessed using the RE-AIM framework.

Effect on Morbidity and mortality will be assessed by admissions for infective endocarditis, osteomyelitis, and spinal abscess as well as opioid overdose admissions.

Effect on acute care utilization will be assessed by percentage of hospital and ED admissions following discharge in 6 months following discharge.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

From October 2019 to October 2020, we received 20 total consults, 15 of which were OUD consults. Nine patients had treatment plans at discharge. In terms of engagement of care, 89% were engaged at 30 days, 67% at 60 days, 50% at 180 days. One patient saw a buprenorphine prescriber within 3 business days of discharge, which was much faster than without I-ACT assistance.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?):

Challenges included the small number of buprenorphine-waivered physicians, as well obtaining clearance of peer support specialists during pandemic visitation rules. Drivers of success were: proper identification and screening of patients, communication for interprofessional plan, patient-centered and trauma-informed care, addiction services, and community relationships.

We learned to appreciate having a nuanced consult criteria, and are continuing to refine our post-discharge tracking.

MENTAL HEALTH SCREENING AT A STUDENT-RUN FREE CLINIC IN A TIME OF TELEMEDICINE

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

With recent transitions to telemedicine in the wake of COVID-19, many standard clinic processes, such as mental health screening, have been disrupted, highlighting the need to assess current practices and develop new protocols to ensure adequate screening in vulnerable populations.

LEARNING OBJECTIVES 1: Objective #1: The first objective is to determine the impact of the transition to telemedicine on our clinic's mental health screening practices in the primary care setting and identify any unmet needs.

Objective #2: The second objective is to standardize processes by developing a new screening protocol and implementing trainings for key stakeholders at the clinic.

Objective #3: The third objective is to advocate for comprehensive mental health screening during primary care follow-up and utilize a population health-based approach to monitor the impact of the proposed intervention.

LEARNING OBJECTIVES 2: Objectives #1 and #2 reflect the ACGME core competency of "Practice- Based Learning and Improvement". All three learning objectives reflect the core competency of "Patient Care".

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

Columbia Student Medical Outreach (CoSMO) clinic is a student-run free clinic (SRFC) that provides primary care and mental health services to the uninsured and medically underserved population of Washington Heights and surrounding communities. A chart review was conducted to determine mental health screening rates between the period of September – November 2020, which coincided with our transition to telemedicine. In comparison to 2019 screening rates, there was a significant decrease in screening with the telemedicine format. Therefore, a novel screening protocol was proposed to increase standardization and offer more comprehensive screening.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION):

Chart reviews looking at the use of mental health screening tools in 2019 and 2020 were completed to assess baseline in-person clinic vs. telemedicine clinic screening practices. Following the implementation of the proposed screening protocol and stakeholder trainings, a 2021 chart review will be completed to assess the impact of the intervention.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

In comparison to the depression screening rates observed in 2019, we have observed a decrease in screening following the clinic's transition to telemedicine (Sept. – Nov. 2020). To address the decrease in screening rates, a detailed flow chart and comprehensive guide to mental health screening were created to be distributed to senior clinicians. In addition, a novel five question screening tool was created in order to add screening questions for anxiety and alcohol/substance use to screen for these conditions in addition to depression.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?):

Key lessons include the importance of ensuring standardized mental health screening practices and implementing components of collaborative care models, such as warm hand-offs, to establish continuity of care. In addition, the intervention advocates for more comprehensive screening regularly assessing mental health conditions such as depression, anxiety, and substance use, in vulnerable patient populations.

THE OVERDOSE SURGE BUS: A MOBILE, LOW BARRIER OPIOID USE DISORDER TREATMENT AND HARM REDUCTION MODEL IN PHILADELPHIA

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

Access to treatment and harm reduction services for opioid use disorder (OUD) are critical to reduce overdose deaths, but current access is limited overall and particularly lacking in many high-need areas.

LEARNING OBJECTIVES 1: To provide evidence-based treatment and overdose prevention in communities with high burden of overdose.

LEARNING OBJECTIVES 2: Increase access and lower barriers to treatment entry for a patients with limited connection to health and social services

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

Philadelphia has one of the highest overdose death rates of any US city, with 1,150 deaths in 2019. Prevention Point Philadelphia (PPP) is a harm reduction

organization offering a range of health services including buprenorphine treatment for OUD, syringe exchange, and naloxone distribution.

The mobile overdose response unit combines two initiatives to reduce overdose: 1) mobile buprenorphine induction and linkage to treatment and 2) overdose prevention interventions, including education and distribution of naloxone and fentanyl test strips. The mobile unit is staffed by faculty physicians from the University of Pennsylvania SOM with a X-waiver to prescribe buprenorphine as well as rotating medical trainees, a medical case manager, and two overdose prevention specialists. The team reviews citywide overdose data to determine areas of high concentrations of overdoses, and the mobile unit is deployed to those areas for a period of several months. The unit is out two days per week, currently at sites in West and South Philadelphia.

Patients presenting to the mobile unit are assessed by the case manager and physician, and receive same-day buprenorphine initiation, followed by weekly stabilization and maintenance visits. Patients are seen on the mobile unit for between 2-8 weeks and then referred to partner academic and community primary care sites or other treatment providers.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): 1. Number of individuals started on buprenorphine

2. Number of successful linkages to longitudinal care

3. Demographic and other characteristics of patients served

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Since September 2020, the program has evaluated and initiated buprenorphine in 80 patients. Patients were majority male (71%), mean age was 43, and most were publicly insured (83%) or uninsured (4%). Patients were 63% Black, 27% white and 4% Asian. 45% reported prior overdose. Only 42% were stably housed, 25% had a primary care provider and 3% had a mental health provider at the time of enrollment. 26 (33%) patients remain in the program, 38 (48%) completed a handoff to longitudinal care, and 16 (20%) were lost to follow-up. 90% of referrals went to primary care sites.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): A low-barrier, harm reduction- oriented treatment model is feasible and effective way to engage patients with OUD in areas at high risk of overdose. This model was able to reach a diverse group of patients who were largely disconnected from health services.

Innovation in Healthcare Delivery (IHD) – Quality Improvement and Patient Safety

A COLLABORATIVE APPROACH—USING AN INTERDISCIPLINARY PEER REVIEW TO IMPROVE THE SAFETY OF HIGH-RISK OPIOID PRESCRIPTION FOR NON-CANCER RELATED PAIN DIAGNOSES IN AN INTEGRATED ACADEMIC HEALTH SYSTEM

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Integrated academic health systems struggle to ensure the safety of high-risk opioid prescriptions for non-cancer related diagnoses

LEARNING OBJECTIVES 1: To evaluate the efficacy of an interdisciplinary peer review intervention to improve the safety of chronic opioid prescription for non-cancer related pain

LEARNING OBJECTIVES 2: To evaluate the impact interdisciplinary peer review intervention to improve provider adherence to Centers of Disease Protection and Control opioid prescribing guidelines and naloxone prescription for high-risk opioid regimens

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

An interdisciplinary peer review committee of pertinent stakeholders including social workers, pharmacists and physicians from psychiatry, addiction medicine, pain management performed a collaborative structured review of identified high risk cases. Inclusion criteria included high risk opioid prescription as defined as more than 90 morphine milligram equivalents (MME) by a UCLA primary care provider (PCP) for greater than a 90-day consecutive period for a non-cancer related pain diagnosis. Exclusion criteria included an active cancer or terminal illness, age less than 18 and those managed by an addiction medicine or pain management specialist. Cases were reviewed with a structured assessment tool prior to peer review committee discussion. Discussion including stakeholders listed above and prescribing PCPs to provide additional case history and provide additional feedback to improve the safety of the current opioid prescription. Recommendations included addition of adjunctive medications, opiate taper, inpatient pain unit referral, allied professional consult, psychological consult and educational prescriber resources.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Primary outcome measures include opioid MME at 3-month and 6-month intervals following the interdisciplinary review. Secondary outcomes include the presence of naloxone prescription and urine drug toxicology at 6 months following case review. Mixed effects models were used to assess changes over the study period.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): A total of 23 cases were reviewed. 11 of 23 cases were referred for subspecialty evaluation with either addiction medicine or pain management but only 1 referral has been completed at 12 months. 9 of 23 cases were recommended for opioid taper but only 1 had a reduction in MME at 12 months. Across all patients, mean baseline 329 MME. There were non-significant decreases in MME from baseline at 3 months (Δ -5, $p=0.5$) and 6 months (Δ -32, $p=0.07$). There was a significant decrease in MME between 3 and 6 months (Δ -27, $p=0.01$). Naloxone use significantly increased from baseline (27%) to 6 month follow-up (83%), $p < 0.01$. Of the 8 patients with a urine drug toxicology at 6 months, all were positive.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): The use of high dose opioid prescriptions for non-cancer related pain remains a pertinent issue for integrated health systems. The use of a top-down population health driven intervention requires leadership support and adequate care coordination to ensure recommendations of interdisciplinary peer review panels are fulfilled.

AN INNOVATIVE APPROACH TO FOOD INSECURITY IN MEDICAL RESIDENT CLINICS: CREATION OF A FOOD PANTRY

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

Food insecurity is a frequently encountered challenge that directly impacts patient wellness, healthcare compliance, and healthcare delivery

LEARNING OBJECTIVES 1: Patients with food insecurity may normalize running out of food and not recognize they are food insecure unless directly asked.

LEARNING OBJECTIVES 2: Developing an intervention for food insecurity with input from patients may help to ensure that the intervention is successful.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

This intervention was completed within an ambulatory practice in the city of Rochester, NY, which has a food insecurity rate of 25.9%. Comparatively, 10.5% of US citizens were food insecure in 2019.

The first aim of our study was to better understand food insecurity from the point of view of patients. We performed a qualitative assessment through semi-structured interviews with patients in our outpatient internal medicine residency clinic.

The second aim of this study was to develop a process, using what we learned from our patients, to screen for food insecurity and provide useful resources during clinic visits. This tool will also provide data on the prevalence of food insecurity in our practice and prompt providers to share resources during the visit. Resource options include an on-site food pantry for emergency food, list of local food banks, and social work referral.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): For the first aim, interviews were reviewed by all team members using thematic analysis.

For the second aim, success will be defined as creation of a food insecurity screening process for the practice. Following the completion of this process we hope to screen at least 10% of our patients for food insecurity by March 2021.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

Many patients interviewed (N=13) normalized food insecurity and did not identify it as a problem until directly questioned or asked using a standardized screening questions. When asked about difficulty making food last, patient's responded, "I diet if the food does not last." Another stated, "Sometimes I go without food, but it doesn't bother me." Most patients stated that they purchase food once a month, one citing this is when she receives food stamps and makes the end of the month an especially difficult time. These findings underscore the need to identify patients who face food insecurity through routine screening. Patients were also asked for suggestions on ways we could best provide assistance in clinic. Several expressed interest in an on-site food bank, vouchers, and resources on local food shelters. In response, we developed an on-site emergency food pantry within our residency clinic and curated list of local food resources.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Future directions for this project include working with local food banks to arrange a sustainable food supply for the pantry. By providing our patients access to healthy food, we aim to address one of the many barriers to improving health and wellbeing. We hope this approach can be adopted in outpatient practices throughout the country as an effective approach to food insecurity using patient input.

A SYSTEM-WIDE PLAN TO INCREASE ACCESS TO MEDICATION FOR OPIOID USE DISORDER (MOUD) IN PRIMARY CARE AND GENERAL MENTAL HEALTH SETTINGS

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

The opioid epidemic in the United States has generated a pressing need to enhance access to MOUD.

LEARNING OBJECTIVES 1: Describe a quality-improvement effort to extend MOUD to primary care and general mental health clinics

LEARNING OBJECTIVES 2: Examine barriers and facilitators to implementation of MOUD in target clinics

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): VA Connecticut cares for 58,000 veterans, with 710 (56%) diagnosed with OUD not receiving medication, and 366 on high-dose long term opioids at increased risk for overdose and death.

As part of the national VA "Stepped Care for Opioid Use Disorder Train the Trainer" (SCOUTT) Initiative to improve MOUD access, a VA CT team was formed, consisting of an external facilitator, leaders and providers from primary care, mental health, specialty addiction care and pharmacy. The team met monthly to identify and resolve barriers to MOUD in target clinics. Key interventions were to obtain leadership support, increase waived providers and develop processes and tools to enhance prescribing.

Leadership engagement included quarterly presentations and a 1.5 hour leadership summit. All target providers received quarterly emails with links to waiver trainings. Waiver status was incentivized by performance pay. Procedural barriers were addressed via implementation of SOPs regarding prescribing and updating EHR waiver status. Quarterly case-based presentations were offered, and templated progress notes were created. Communication with specialty addiction providers was facilitated by development of e-consultation and instant messaging options.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): MOUD receipt and prescribing provider characteristics were evaluated before and one year after implementation efforts. Patient data was extracted from the VHA Corporate Data Warehouse (CDW). Provider data was obtained from the "Buprenorphine/X-Waivered Provider Report". Chi-Square analyses were conducted on pre-post measures when total values were available.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

There was a 4% increase in eligible patients receiving MOUD, from 552 (44%) to 582 (48%) ($p = 0.04$). The number of waived providers increased from 67 to 131, the number of providers writing buprenorphine prescriptions (over 6 month span) increased from 35 to 52, and the percent of providers capable of prescribing within the EHR increased from 75% to 89% ($p=0.01$).

Initially, specialty addiction providers prescribed to approximately 68% patients on buprenorphine, with target clinic providers 24%. Upon follow-up, specialty addiction providers prescribed to 63%, with general and mental health providers 32%.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): An interdisciplinary team approach to identifying and overcoming barriers to MOUD target clinics expands access.

Key interventions include interdisciplinary leadership engagement, proactive education and incentivization of target providers, removal of procedural barriers, and development of tools to facilitate and support prescribing. These concrete interventions can help inform other institutions interested in expanding MOUD access.

BARRIERS TO BLOOD PRESSURE CONTROL IN AN URBAN RESIDENCY CLINIC: A ROOT CAUSE ANALYSIS

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

What are the specific barriers most frequently encountered in achieving blood pressure control in our large, urban residency practice?

LEARNING OBJECTIVES 1: To identify and quantify barriers to blood pressure control in our residency clinic

LEARNING OBJECTIVES 2: To use the relative contributions of these barriers to plan interventions most likely to have the largest impact on achieving blood pressure control

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): The patient population in our urban, underserved outpatient resident clinic includes 2,276 patients with a diagnosis of hypertension, out of which 1,236 are uncontrolled (defined as having a blood pressure >140/90 during their last ambulatory visit). We identified these patients by accessing the ambulatory dashboard database maintained by Christiana Care Health System. To determine the most important factors contributing to their uncontrolled hypertension, we performed chart review of 100 randomly selected charts from the uncontrolled patients. We reviewed the most recent primary care note along with subsequent blood pressure related documentation in phone/portal messages to identify the primary factor for uncontrolled blood pressure.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): We will organize our chart review findings into a Pareto diagram. Currently we are brainstorming countermeasures to address each of the barriers we identified. We will use a monthly run chart to track the percentage of patients whose BP is controlled ($\leq 140/90$) to measure the success of each intervention we implement.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): We identified the following factors as contributing to uncontrolled hypertension in our patient population: lack of follow up, non-adherence, telehealth documentation, acute pain, provider discretion, and lack of access to blood pressure cuffs. Of the 100 charts we reviewed, we excluded 13 patients who did have controlled hypertension but were inappropriately marked as uncontrolled in our database. The largest barrier to BP control was lack of follow up, accounting for 33% (29/87) of the patients. Nonadherence was the second most common factor, accounting for 18% (16/87) of patients. 15% of patients (13/87) actually did have a controlled blood pressure, but it was not captured due to being documented only in a telehealth encounter. Provider discretion was the underlying factor for 7% of patients (6/87); in these instances there were medical concerns that prohibited aggressive blood pressure control (e.g. recent syncope in an elderly patient). In 2% of patients (2/87), lack of access to a blood pressure cuff was cited as the major barrier. For 16% (14/87) of the patients, the cause of the uncontrolled hypertension could not be determined based on chart review.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Lack of follow up and non-adherence are the largest contributors to uncontrolled blood pressure in our urban, underserved residency clinic; our findings may be generalizable to other similar clinic settings. Interventions targeting these two factors will likely be the most impactful for improving blood pressure control.

DIABETES MEDICATION DECISION SUPPORT IN GIM: INCREASING PRESCRIPTIONS OF SGLT2 INHIBITORS AND GLP1 AGONISTS.

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Can a medication decision support program be implemented in a General Internal Medicine clinic to improve uptake of SGLT2 inhibitors and GLP1 agonists?

LEARNING OBJECTIVES 1: Describe an operational plan to provide input to providers on their SGLT2 and GLP1 inhibitor prescribing rates and patient level data on use.

LEARNING OBJECTIVES 2: Describe how this intervention impacted rates of SGLT2 inhibitor and GLP1 agonist prescribing as well as glycemic control clinic wide

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): Sodium-glucose cotransporter inhibitors (SGLT2 inhibitors) and glucagon like peptide agonists (GLP-1 agonists) are potent anti-hyperglycemics that have been also been found to have key benefits in heart failure, chronic kidney disease, and cardiovascular protection. Uptake of these agents has been slower in primary care compared to specialty care. Quality improvement projects to increase prescribing of these agents in primary care have not been described. We are a general internal medicine practice with 19 primary care faculty, 8 advanced practice providers, and 45 resident physicians. Our practice serves a population of approximately 11,000 patients of which 2313 have DM2 and 514 of those have an A1c of over 8.0%.

Registries were developed for each of our primary care providers in the clinic describing their overall rates of SGLT 2 and GLP1 inhibitor prescribing compared to the overall clinic population. Patient level data was provided for all of each provider's patients describing co-morbidities that may be impacted

by these new agents (Coronary Artery Disease, chronic kidney disease, and congestive heart failure), a1c, next and last office visit, and renal function. Providers were given written education on the efficacy and utility of SGLT2 and GLP1 inhibitors. Electronic Health Record based reminders were put in place to consider prescribing one of these agents for patients seen who have an A1c over 7.5% and have coronary artery disease, chronic kidney disease, or congestive heart failure. Reminders were sent to providers via email to remember to consider these agents in their patients.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): 1. Rates of SGLT 2 and GLP1 prescribing at baseline and monthly post intervention for 3 months.

2. Clinic wide A1c levels for all patients with a diagnosis of diabetes mellitus type 2 and percentage with an A1c > 8.0% at baseline and monthly for 3 months.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Baseline data has been obtained showing that 20% of patients with diabetes are prescribed GLP1 inhibitors and 10% of the population is prescribed SGLT2 inhibitors. Of patients with an A1c over 8.0%, 30% are prescribed a GLP1 inhibitor and 18% are prescribed a SGLT 2 inhibitor. 22% of our population with DM2 has an A1c over 8% and the average is 7.299
3 month data will be available in February.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): An effective and sustainable decision support system can be developed to encourage prescription of SGLT2 and GLP1 inhibitors within a GIM clinic that may produce measurable increases in SGLT2 and GLP1 prescribing and improve glycemic control among patients of an academic general internal medicine practice.

EVALUATION OF A CARE MODEL FOR NURSING HOME RESIDENTS WITH DEMENTIA

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Assess the effectiveness of the Cognitive Abilites, Life with Meaning (CALM) program to manage dementia patients with behavior problems at the skilled nursing home.

LEARNING OBJECTIVES 1: Objective 1 is to determine the effectiveness of the Cognitive Abilites, Life with Meaning (CALM) program in managing Veterans with dementia and behavior problems.

LEARNING OBJECTIVES 2: Objective 2 is to determine the effects of lack of CALM program due to COVID restriction.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

A retrospective cohort study was conducted. We identified subjects who were enrolled in the CALM program and had been residents at the San Francisco VA skilled nursing home for at least one year prior to program implementation. We examined outcomes measures during three time periods: before CALM implementation (9/1/17-8/31/18) (541 patient-months (pt-mos)), during CALM implementation (9/1/18-3/5/20) (711 pt-mos), and during the COVID-19 pandemic (3/6/20-10/31/20) (221 pt-mos). We compared incidence rates using a chi-squared goodness of fit test.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Outcome measures we assessed were the following: Number of disruptive behavior notes written, increase or initiation of psychoactive medications, number of 24/7 sitters for veterans, number of falls, decline in function and number of deaths. These outcomes measures were obtained before the implementation of CALM program, during the CALM program and after the COVID restriction which eliminated the CALM program.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): A total of 46 residents ≥ 60 years of age with dementia were enrolled in the CALM program. No one was diagnosed with COVID-19 at any point during the study. After implementation of the CALM program, there was a decrease in incidence of falls (incidence rate ratio (IRR)=0.58, $p<0.0001$) and nursing notes recording disruptive behavior (IRR=0.46, $p<0.0001$). During the COVID-19 pandemic, CALM programming ceased and isolation measures were implemented. There was an increased number of nursing behavior notes (IRR=2.26, $p<0.0001$), initiation and dose increases of psychoactive medications (IRR=4.5, $p<0.0001$), and deaths (IRR=2.9, $p=0.037$).

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): These results suggest that the CALM program led to positive outcomes in SNF patients with dementia, including decreased falls and disruptive behaviors, and could serve as a model for SNFs throughout the country. Additionally, the observed increase in disruptive behaviors, death rate, and prescription of psychoactive medications during that the COVID-19 pandemic suggest that the cessation of dementia-specific programming and isolation measures may have resounding effects on dementia patients, beyond the effects of the COVID-19 disease itself.

IDENTIFYING LOW-VALUE CARE ACROSS A STATEWIDE HEALTH SYSTEM: COLLABORATION BETWEEN QUALITY, POPULATION HEALTH, INFORMATICS, AND HEALTH SERVICES RESEARCH

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): For interventions to be effective in improving health care value, health systems need tools that accurately identify and measure services that comprise low-value care, defined as patient care with no net benefit in specific clinical scenarios.

LEARNING OBJECTIVES 1: To demonstrate the feasibility of implementing a novel tool to identify and measure low-value services in a large statewide health system.

LEARNING OBJECTIVES 2: To identify sources and contributors of low-value care across individual sites in a statewide health system.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): The University of California (UC) is a large statewide employer offering self-insured health plans to UC employees. University of California Health (UCH) spans the six UC academic health centers, and has resources and collaborations encompassing quality and population health leaders, informatics, and health services researchers. UCH implemented the Milliman MedInsight Health Waste Calculator (HWC), a proprietary algorithm-based software tool to identify low-value care and estimate associated spending. The HWC measures 48 low-value services, primarily in outpatient care, using recommendations from the Choosing Wisely Campaign, the US Preventive Services Task Force, and other clinical specialty guidelines. We applied the HWC to claims data from 2019 for the self-funded preferred provider organization (PPO) plan, which are maintained in the UCH Clinical Data Warehouse, a unique central database that includes electronic medical record data across UC medical campuses and all claims from self-funded health plans.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Outcomes included the total count of low-value services and spending on low-value services across the UC PPO and

stratified by medical center. Individual low-value services were examined and ranked to identify the top five services contributing to costs of low-value care.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

Of 43,882 members of the UC PPO, 11,174 (25.4%) received at least one low-value service. The HWC identified 50,103 eligible services and classified 35% as low-value. Total spending on low-value services ranged between \$2,209,516 and \$5,089,866, based on a more or less conservative estimate. Overall, five services comprised 65% of costs from low-value care: annual EKGs, preoperative baseline labs for low-risk surgeries, vitamin D deficiency screening, imaging for eye disease, and headache imaging. The top five services by order frequency were annual EKGs, vitamin D tests, preoperative labs, antibiotics for upper respiratory infections, and imaging for eye disease. Across the individual sites, the proportion of low-value services ranged from 31% to 39%. Annual EKGs, preoperative labs, and vitamin D tests were among the top five contributors to low-value care at each site.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Low-value care is prevalent and costly within this large statewide employer. Collaborative multidisciplinary partnerships between employers, health systems, informatics, and researchers can leverage a centralized clinical data warehouse to identify opportunities for improving the value of care for covered populations.

IMPLEMENTATION OF A DEPRESSION SCREENING TOOL IN THE AUSTIN VA RESIDENT CLINIC

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): A retrospective chart review of 75 patients within the resident primary care panel at the Veteran Affairs (VA) Austin Outpatient Clinic showed that of the 5 patients who screened positive on the PHQ-2, no PHQ-9 results were documented or addressed, even though a full PHQ-9 should follow a positive PHQ-2 according to evidence-based-guidelines.

LEARNING OBJECTIVES 1: To demonstrate an innovative, cost-effective, and efficient way to identify and treat patients with depression that can be applied to all standard primary care clinics across the United States.

LEARNING OBJECTIVES 2: To demonstrate quantitative improvements in the amount of patients successfully screened and treated for mild, moderate, and severe depression.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): The VA Austin Outpatient Clinic utilizes PHQ-2 to screen for depression annually. In the resident clinic at the Austin VA, we aimed to increase utilization of the PHQ-9 to 90% for those who screened positive on the PHQ-2 by calendar day March 2020. A collaboration was made between nursing staff, residents, and attending physicians to improve PHQ-9 completion. A total of 8 Plan-Do-Study-Act (PDSA) cycles were completed between February 2019 and March 2020. We screened every veteran seen at a primary care appointment. The most notable change in the early cycles was making the PHQ-2 a paper form rather than electronic and having it filled out by the patient instead of verbally completing it with a provider. Subsequent PDSA cycles focused on optimizing the form. Ultimately the PHQ-2 and PHQ-9 were on the same one-sided paper, with clear instructions for the patient to continue from the PHQ-2 to the PHQ-9 if indicated.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): For each PDSA cycle we recorded how many received a PHQ-2 form and we measured the percentage of those who completed a PHQ-9 form when they had screened positive on the PHQ-2 form.

Adjustments were made in subsequent cycles to increase the percentage rate of those who completed a PHQ-9 form. We also kept additional metrics such as what treatments or interventions the veterans already received or were initiated at the time of screening positive.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): By March 2020, the follow-up rate of PHQ-9 after the PHQ-2 screening was 90%. We have successfully reached our goal of completing 90% PHQ-9 following PHQ-2 screening in the primary care setting. Based on the data from Cycles 5-8, 92.4% of patients who scored high risk for severe depression (PHQ-9 score of 15 or greater) were either receiving some form of treatment or started on treatment. The data will serve as foundation for future projects as we monitor subsequent PHQ-9 scores to assess efficacy of treatments and identify opportunities for further improvements.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): When implementing screening tools, it is important to create a system that automatically triggers the follow up process. In addition, seemingly simple tools such as paper forms, can be powerful in improving outcomes. Finally, small changes to paper forms can make huge impacts on completion and return rates, as well as how data entry and collection proceed.

IMPROVING DIABETES CARE THROUGH COMMUNITY PARTNERSHIP: COST EFFECTIVE PATIENT-CENTERED RETINOPATHY SCREENINGS AT A FEDERALLY QUALIFIED HEALTH CENTER

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): How can care teams in low resource settings improve evidence-based care for patients with diabetes?

LEARNING OBJECTIVES 1:

Understanding Social Determinants of Health (SDOH) to improve diabetes-related screenings among underserved patients at a Federally Qualified Health Center (FQHC).

LEARNING OBJECTIVES 2: Understanding regional resources and developing non-traditional ways to enhance care coordination.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

In 2020, Pharmacists, a Physician Assistant, the QI Director, and a lead Physician formed an Integrated Diabetes Management Team (DMT) to improve care for diabetic patients at Sacramento County Health Center (SCHC). One Quality Improvement intervention that DMT focused on was increasing retinopathy screenings.

Patients at SCHC are referred outside for retinopathy screenings in the absence of a retinopathy camera. A thorough review of HealthNet managed Medi-Cal Gaps in Care report and patient charts revealed that scheduling delays (exacerbated by SDOH and fewer in-person visits due to COVID-19) were a major barrier to completion of retinopathy screenings.

DMT designed an intervention in partnership with the University of California Davis Health's (UCD) FQHC Program for Health Net patients assigned to SCHC. Midtown Clinic, which had available retinopathy screening appointments, was identified as the clinic partner. Patients without screenings were identified; their referrals were quickly processed, and the program contacted patients, in English and Spanish, to book same-day appointments at the Midtown Clinic. Through this workflow, many patients were scheduled for screenings in a short amount of time.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Outcome measures included number of retinopathy referrals ordered at SCHC for eligible patients and number of completed retinopathy screening appointments.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): A total of 162 patients met the eligibility criteria at project start (October). Of these, 65 (40%) had completed eye screenings by October, leaving 97 (60%) patients with a care gap (based on HN claims data).

Among 97 patients without retinopathy screenings, 60 (62%) had referrals ordered by the end of October, an additional 29 (30%) had referrals ordered between November and December, and 8 (8%) patients did not have referrals. In December, the new collaboration between UC Davis Midtown Clinic and SCHC began, whereby patients could directly schedule (same day) appointments. This resulted in 32 patient appointments successfully scheduled within the month.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Adaptable workflows that address barriers and meet patient's needs can promote adherence to quality metrics. In our case, psychosocial and structural barriers prevented many from completing appointments despite referrals for retinopathy screenings by providers. Through a new workflow facilitating quick appointment scheduling (dedicated retinopathy appointment line and same-day appointments), we increased retinopathy screening rates by 20% within a month. In a low-resource setting, effectively using regional resources can help develop cost-effective population health initiatives to improve DM-care.

IMPROVING UTILIZATION OF SGLT2 INHIBITOR THERAPY AT A LOCAL VA: A RESIDENT-LED QUALITY IMPROVEMENT PROJECT

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Sodium-glucose cotransporter-2 (SGLT2) inhibitors are underutilized in local resident VA continuity of care (COC) clinics despite literature showing favorable clinical outcomes.

LEARNING OBJECTIVES 1: Recognize that SGLT2 inhibitors are associated with a reduced risk of major adverse cardiovascular events in patients with type 2 diabetes (T2DM) and cardiovascular disease (CVD).

LEARNING OBJECTIVES 2: Increase utilization of SGLT2 inhibitor therapy in patients who meet criteria for use.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

Team members included 11 Internal Medicine residents, 2 pharmacists, and 2 faculty mentors. Providers reviewed their patient panels in the Iowa City VA Medical Center resident COC clinic to identify candidates for empagliflozin. VA inclusion criteria required patients have a history of T2DM and CVD, and be receiving metformin or another diabetic agent. Exclusion criteria included history of allergic reaction, A1c greater than 10%, end-stage renal disease on dialysis, pregnancy or nursing status, pancreatic disorder, frequent urinary tract infections (UTIs), or urinary retention. Over 6 months, candidates were contacted via scripted letter, telephone call, or face to face in clinic to discuss the benefits and risks associated with empagliflozin. Patients were prescribed empagliflozin if they were agreeable after a discussion with their provider.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION):

Our primary outcome was the rate of SGLT2 inhibitor utilization at 6 months, which was quantified via McNemar's Chi-Square test. Process measures included patient communication and lab monitoring. Balancing measures were rate of deprescribing, acute kidney injury (AKI), UTI, genital infection, hypoglycemic events, and diabetic ketoacidosis.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

511 patients' charts were reviewed, and 44 patients were eligible for empagliflozin based on the defined inclusion and exclusion criteria. Of the 44 candidates, 1 patient (2.3%) already had empagliflozin on his/her

medication list prior to our intervention period. 17 additional patients were prescribed empagliflozin over a 6-month period. Of those 17 patients, 5 required deprescribing due to adverse events (4) or noncompliance (1). Adverse events included polyuria (1), hypovolemia (1), or AKI (2) in the setting of concomitant diuretic therapy for chronic heart failure (HF). At the end of the study period, 13 of 44 eligible patients (29.5%) were prescribed empagliflozin, a statistically significant increase from 2.3% prior to our intervention ($P=0.0015$).

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): This quality improvement project may guide future interventions aiming to increase SGLT2 inhibitor utilization for patients with T2DM and CVD. Further monitoring of this patient population is required prior to making associations between empagliflozin and clinically significant parameters such as A1c, glomerular filtration rate, body mass index, or rate of HF hospitalizations. Providers should exercise caution when prescribing empagliflozin in patients on diuretics and consider close monitoring for AKI. Collaboration with pharmacy helps maximize appropriate SGLT2 inhibitor utilization.

INCREASING HIV PREP PRESCRIPTIONS AT THE SAN FRANCISCO VETERANS AFFAIRS DOWNTOWN CLINIC: A TRAINEE-DRIVEN INTERPROFESSIONAL QI PROJECT

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): In Oct 2019, only 34% of patients at high risk of HIV acquisition at the San Francisco Veterans Affairs Health Care System's (SFVAHCS) Downtown Clinic (DTC) were prescribed pre-exposure prophylaxis (PrEP), which can prevent HIV transmission with 96% efficacy.

LEARNING OBJECTIVES 1: To identify barriers to PrEP prescription and design and implement interventions targeting them.

LEARNING OBJECTIVES 2: To evaluate the effect of interventions on provider and staff prescribing behaviors and perceptions.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

Our trainee-driven quality improvement (QI) project occurred in 2019-20 at the DTC, which serves a socioeconomically diverse group of veterans living near downtown San Francisco, including the Castro, Tenderloin, and South of Market neighborhoods (the city's three areas of highest HIV prevalence in 2019). Using Lean principles, our team of physicians, psychologists, a nurse practitioner, a nurse and a pharmacist performed a root cause analysis identifying barriers to PrEP prescription. These included ones related to providers (discomfort taking patient sexual history, unfamiliarity prescribing PrEP), patients (unawareness of PrEP indications, stigma surrounding PrEP) and policy (SFVAHCS prescription privileges limited to subspecialist teams). We developed interventions targeting: 1) provider education: role playing of patient sexual history taking and a prescriber pocket reference guide for PrEP; 2) patient outreach: letters mailed to all patients describing PrEP and clinic posters and paraphernalia; and 3) advocacy for policy change: successful petitioning for prescribing privileges for all primary care providers.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION):

We measured change in PrEP prescriptions after our interventions and surveyed DTC providers and staff to assess perception change regarding PrEP. In the survey, participants ranked agreement to statements before and after the interventions using a 5-point Likert scale (1=strongly disagree, 5=strongly agree). Nine participants took the survey, 5 of whom were trainees.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): After our intervention, the number of DTC patients prescribed PrEP increased by 111% from $n=18$ in Oct 2019 to $n=38$ in April 2020. In Feb 2020, the SFVAHCS ranked first among all 142 VA sites nationally for increased PrEP prescriptions compared to the prior month. Additionally, after our intervention there was a large increase in participant reported comfort in counseling patients on risk/benefits of PrEP (mean score=2.89 pre to 4.22 post), understanding of indications (3.33 pre to 4.56 post), knowledge about PrEP initiation and monitoring (2.5 pre to 4.6 post), and comfort with initiation (2.2 pre to 4.6 post).

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Through a trainee-driven interprofessional QI project targeting provider education, patient outreach, and policy change we were able to increase HIV PrEP prescriptions and increase provider and staff comfort, understanding, and knowledge related to PrEP. Through projects like this and a continual readdressing of barriers to PrEP prescription, the primary care community can make HIV transmission increasingly rare.

INPATIENT TELEHEALTH INITIATIVE IMPROVES PATIENT CONNECTION DURING COVID-19

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Hospital visitor restrictions implemented in response to the COVID-19 pandemic have isolated patients and exacerbated caregiver stress by limiting social connection.

LEARNING OBJECTIVES 1: To facilitate higher degrees of connection and engagement between patients and their support networks through a structured service that coordinates social video conferencing visits.

LEARNING OBJECTIVES 2: To inform about sustainable practices for the use of hospital-managed video conferencing devices as a new precedent for connecting hospitalized patients with their communities.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

Resident physicians and medical students at the University of California, San Francisco (UCSF) implemented a video conferencing service called "Connecting During COVID" across three UCSF-affiliated hospitals: a quaternary referral center, a county hospital and trauma center, and a Veterans Affairs federal facility. Primary providers paged the consult service with patient information, and the Connecting During COVID team would independently coordinate the video call, assist call recipients with downloading and troubleshooting software, and provide tablets and necessary equipment to patient rooms.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION):

Demographic and clinical characteristics of the patients who participated were retrospectively collected from the electronic health record. Recipients of the video calls (e.g., loved ones) were surveyed by phone using a structured questionnaire to evaluate the degree of connection and engagement promoted through the video calls.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

190 unique patients with a median age of 69 years participated in the video calls, 52.6% of whom had repeat calls. The clinical acuity of patients varied: 51.6% of patients had intensive care unit needs and 22.6% received a palliative care consult. The median length of hospital stay was 13 days, with 13.2% of patients passing away in the hospital and 77.4% being discharged. English was the preferred language for 71.5% of patients and 89.2% of patient loved ones. 102 of patient loved ones completed the survey, agreeing that the video visit helped in communicating (mean score 4.6 out of 5), the video visit was preferable to the standard use of a bedside phone (mean score 4.6 out of 5), and the video visit helped them feel more connected (mean score 4.5 out of 5).

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?):

Inpatient telehealth provides high levels of connection and engagement for patients and their support networks during the COVID-19 pandemic and potentially beyond. Institutions should continue to invest and develop the telehealth infrastructure to provide equitable services that address access barriers to technology and promote social wellbeing.

PREVENTING LOSS TO FOLLOW UP IN AN INTERNAL MEDICINE RESIDENT VA PRIMARY CARE CLINIC

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): In November 2019, 28% of Veterans receiving care at a resident primary care clinic were found to have no planned follow up with in the next year.

LEARNING OBJECTIVES 1: Physicians should be aware of their clinic's scheduling process to ensure patients receive appropriate follow up. (System based practice)

LEARNING OBJECTIVES 2: Through the implementation of a resident QI project, regular follow up in a resident continuity of care clinic improved by 20%. (Practice based learning and improvement)

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

Seven residents were part of a pilot intervention to reduce the number of Veterans in their panel without a scheduled follow up or an appointment recall/reminder by 30%. To quantify how many patients fell into this category, the residents performed a chart review of their entire patient panel every 10 weeks to see if patients had a scheduled appointment, an appointment recall/reminder, or neither. During this period residents meet with key stakeholders including patients, staff providers, schedulers, and nurses to learn about the scheduling process. Residents started an intervention to change the culture from relying on post-appointment calls or letters to a culture where patients schedule their next appointment at the clinic desk before leaving.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): The AIM of the project was to reduce the percentage of patients without a scheduled appointment or appointment recall in the pilot resident continuity of care clinics by 30% by March 2020. The primary outcome measure was the percentage of veterans without a scheduled appointment or a scheduled recall/reminder. A balance measures was the number of patients seen each week in each clinic.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

Prior to the intervention 28% of patients did not have planned follow up. After March 2020, the percentage of patients without planned follow up decreased to 21.26%. Telephone appointments were initiated in July 2020 due to the COVID-19 pandemic. By December 2020 the percentage of patients without planned follow up had increased to 42.80%.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?):

Many studies demonstrate the importance of regular follow up in primary care. However, ensuring regular follow up is often difficult. This project demonstrates that providing regular and consistent care requires the input from multiple members of the health care team. We learned that physicians should be aware of their clinic's scheduling process and how they fit into this process to ensure appropriate follow up. Furthermore, this project was started just prior to the COVID-19 outbreak and thus provides an insight in to how COVID-19 has affected primary care.

Our intervention demonstrated that asking patients to schedule their next appointment prior to leaving the clinic decreased the total number of patients who had no planned follow up by 20% which was statistically significant. Unfortunately, after our intervention was finished, we observed that the percentage of patients without scheduled follow up increased to 40%. This is likely due to implementation of telephone visits and cancellation of appointments due to COVID-19.

QUALITY IMPROVEMENT (QI) PROJECT TO IMPROVE INTERNAL MEDICINE (IM) RESIDENTS' KNOWLEDGE ABOUT CERVICAL CANCER SCREENING AT MCLAREN-FLINT

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

Does targeted educational intervention improve internal medicine residents knowledge regarding cervical cancer screening guidelines as measured by a difference in aggregate and mean score pre- and post-educational intervention?

LEARNING OBJECTIVES 1: Increase IM Residents knowledge about cervical cancer screening post educational intervention by 10% from baseline. Baseline will be determined by administering pre- intervention knowledge survey questionnaire.

LEARNING OBJECTIVES 2: Improve screening rates for cervical cancer at our Internal Medicine Residency group clinic for eligible women from baseline of 50% by 10%. This will be determined following complete roll out of the project including improvement in attitude and skill in subsequent PDSA cycles.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

The first PDSA cycle of our QI project primarily focused on assessing knowledge regarding cervical cancer screening. A standardized knowledge questionnaire completed by residents at baseline, prior to intervention. In the action phase of the project, residents were assigned a clinic article regarding updated cervical cancer screening guidelines which was discussed in detail by faculty preceptors. An hour-long detailed presentation was made on the current screening guidelines and review of available evidence to all participating residents. The same questionnaire was used to assess post intervention knowledge following article discussion and lecture presentation.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION):

Participants scores from knowledge survey questionnaire graded and entered into data collection spreadsheet pre and post intervention. Data analyzed using SPSS statistical software. Aggregate and mean score values before and after educational intervention calculated as a group. Difference in mean values pre and post intervention compared using paired t-test to evaluate significance of improvement in knowledge.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

A total of 36 IM residents participated in the project, with an 80% response rate. Pre-intervention aggregate knowledge score was 88 with a mean and standard deviation of 3.03± 0.94. The post- intervention aggregate knowledge score increased to 109, with a mean and standard deviation of 3.76± 0.43. The mean post intervention knowledge score increased by 23.8% from the baseline, with a paired t-test showing a p-value of 0.00013.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?):

Knowledge of Cervical cancer screening guideline was shown to significantly improve following a targeted intervention among IM residents by about 23% from baseline. The improvement shows the effectiveness of targeted teaching intervention and hence the recommendation to integrate into IM residents' curricula.

SUPPORTING A LEARNING HEALTHCARE SYSTEM – USING AN ONGOING UNANNOUNCED STANDARDIZED PATIENT PROGRAM TO CONTINUOUSLY IMPROVE PRIMARY CARE RESIDENT EDUCATION, TEAM TRAINING, AND HEALTHCARE QUALITY

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): In order to describe quality improvement (QI) methods for health systems, we report on 10-years of using Unannounced Standardized Patient (USP) visits as the core of a program of education, training, and improvement in a system serving vulnerable patients in partnership with an academic medical center.

LEARNING OBJECTIVES 1: Consider methods for supporting learning healthcare systems

LEARNING OBJECTIVES 2: Identify performance data to improve care
DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): The IOM defines a Learning Healthcare System (LHCS) as one in which “science, informatics, incentives and culture are aligned for continuous improvement and innovation” and where “best practices are seamlessly embedded in the delivery process and new knowledge is captured as an integral by-product of the delivery experience.” As essential as electronic health records are to LHCS, such data fail to capture all actionable information needed to sustain learning within complex systems. USPs are trained actors who present to clinics, incognito, to portray standardized chief complaints, histories, and characteristics. We designed and delivered USP visits to two urban, safety net clinics, focusing on assessing physician, team, and clinical microsystem functioning.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Behaviorally anchored assessments are used to assess core clinical skills (e.g., communication, information gathering, patient education, adherence to guidelines, patient centeredness, and patient activation). Team functioning assessments include professionalism and coordination. Microsystem assessment focuses on safety issues like identity confirmation, hand washing, and navigation. Data from these visits has been provided to the residency, primary care teams, and to leadership and have been used to drive education, team training, and QI.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): 1111 visits have been sent to internal medicine and primary care residents and their teams/clinics. At the resident level, needs for additional education and training in depression management, opioid prescribing, smoking cessation, and patient activation were identified and informed education. Chart reviews found substantial variation in ordering of labs and tests. At the team level, USPs uncovered needs for staff training, enhanced communication, and better processes for eliciting and documenting Social Determinants of Health (SDoH). Audit/feedback reports on provider responses to embedded SDoH combined with targeted education/resources, were associated with increased rates of eliciting and effectively responding to SDoH. In the early COVID wave, USPs tested clinic response to a potentially infectious patient. Currently, USPs are being deployed to understand variability in patients’ experience of telemedicine given the rapid transformation to this modality. Finally, generalizable questions about underlying principles of medical education and quality improvement are being asked & answered using USP data to foster deeper understanding of levers for change.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): A comprehensive USP program can provide unique insights for driving QI and innovation and help sustain a LHCS.

Innovation in Healthcare Delivery (IHD) - Resiliency and Wellness

HEALING THE HEALERS: A MODEL FOR MUSIC LEARNING AS TRAUMA-INFORMED CARE FOR CLINICIANS

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): COVID-19 has caused extreme fatigue and trauma in front-line clinicians, exacerbating burnout rates as high as 45% in hospitalists pre-pandemic; trauma-informed care, including the therapeutic use of music, is as imperative for clinicians as it is for patients.

LEARNING OBJECTIVES 1: Recognize the role of trauma-informed care for front-line clinicians, as implemented in an innovative 1:1 instrumental music learning program

LEARNING OBJECTIVES 2: Develop tools to replicate similar programs for clinician resilience in other institutions, during and after the pandemic

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

While current literature focuses on the positive role of passive music listening, Boston Hope Music Teaching Project (BHMTTP) is an innovative program using instrumental music learning as a therapeutic tool to care for clinicians. Musician-teachers from the New England Conservatory were matched with hospital medicine clinician-learners from Massachusetts General Hospital based on instrument specialty, personality, and interests for a 6-week pilot. Teachers received trauma-informed care training by a hospital music therapist upon enrollment. Participants were encouraged to connect weekly in 1:1 virtual lessons. A platform for discussion between teacher-learner partners and program-wide community-building was also established.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): Assessment during and after the pilot included video journals, moderated teacher-learner conversations, group reflections, and a post-pilot survey. Of 18 learners initially enrolled, 14 completed the pilot (2 left due to COVID-19 infection) and 13 continued post-pilot (1 left the hospital). All 8 teachers continued.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): BHMTTP created meaningful relationships that provided support while honing or developing new skills for the clinician-learner. The inherent teacher-learner relationship in music lessons allowed for the natural delivery of trauma-informed care, providing a safe space for clinicians to access difficult emotions. They discovered an outlet for creative escape and vulnerability which built resilience, thus impacting personal satisfaction and patient care. Furthermore, musician-teachers came to understand their value in healing the healers during the pandemic response. Teachers and learners experienced greater collegial connections and inter-institutional community-building.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): BHMTMP addresses significant, timely problems of clinician burnout and trauma, as well as the musical community's ability to contribute to the pandemic response. This scalable model utilizes music's known therapeutic benefits in the novel context of trauma-informed care for clinicians to provide wellness through meaningful relationships and supportive communities. While BHMTMP was launched during the pandemic, it will remain broadly relevant in the future. In addition to expansion to other units, specialties, hospitals, and musical communities, BHMTMP is an innovative model that can combat burnout and care for clinicians everywhere.

Innovation in Healthcare Delivery (IHD) - Veterans Affairs

IMPLEMENTING SUICIDE SCREENING IN HOSPITALIZED MEDICAL AND SURGICAL PATIENTS AT SAN FRANCISCO VA MEDICAL CENTER

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): In May 2018, the VA Office of Mental Health and Suicide Prevention outlined minimum requirements for suicide risk screening and assessment, but as of Fall 2019, only patients admitted through the Emergency Department (ED) at San Francisco VA Medical Center (SFVAMC) were being screened for suicide ideation (SI) using the mandated, standardized, evidence-based protocol; no patients were being screened accordingly at discharge in the inpatient Medical/Surgical Units, thus falling short of the requirements and failing to identify patients whose hospital course may have triggered novel SI absent at time of admission.

LEARNING OBJECTIVES 1: Improve the confidence and proficiency of nurses in executing a new nursing-centered intervention quickly and effectively using a "trickle-down" framework of nursing education.

LEARNING OBJECTIVES 2: Provide an example of the importance of interprofessional teams in the successful implementation of health systems improvement endeavors.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): To spearhead the implementation, an interprofessional team - led by an ED nurse with prior experience in implementing a similar suicide screening protocol in the ED - was formed with nursing unit leaders, nursing education leaders, police services, psychiatry consult team members, and a first-year medical student quality improvement (QI) team. The team determined that unit nurses would be the best personnel to directly administer the suicide screen. However, a baseline survey of unit nurses revealed that they had limited awareness of the new mandate, insufficient knowledge about best practices for discussing suicidal ideation, personal discomfort with the subject, and concerns over workflow disruptions, all of which manifested in an average self-rated confidence level of 30% in administering the suicide screening protocol. To quickly and efficiently prepare the nurses, the working group taught the mandated protocol to self-identified Unit Champions for each inpatient unit, who then taught it to their colleagues in their respective units. A supplemental handout with an easy-to-follow flow map was distributed for posting and later reference, and a standardized screening template was published into CPRS to facilitate nursing workflow.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): The main outcome measure was a post-intervention self-rated confidence level of unit nurses in administering the suicide screening protocol.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): A follow-up survey conducted 2 months after the launch date of the new suicide screening protocol showed a mean self-rated confidence level among nurses to be 75%, which was significantly higher than the baseline confidence level ($P=0.0023$).

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): An interdisciplinary team was formed to quickly and efficiently address a nationally identified gap in care by using a "trickle down" training approach centered on a core group of nursing champions, who, in conjunction with supplemental resources, were critical in enabling all unit nurses to confidently carry out the mandated, standardized, evidence-based suicide screening protocol in the inpatient Medical/Surgical Units at SFVAMC.

INNOVATING TO PRESERVE PRIMARY CARE CONTINUITY DURING COVID-19 USING VIDEO VISITS AT THE AUSTIN VA CLINIC

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE): Given the tremendous disruption to patient care and continuity caused by the Covid-19 pandemic, can video visit technology (VVC) be added to traditional telephone visits to add an additional layer to our care model?

LEARNING OBJECTIVES 1: To evaluate system-level limitations during a global pandemic and how to best utilize existing technology to overcome barriers to care.

LEARNING OBJECTIVES 2: To analyze patient-centered approaches to preventative care utilizing novel technologies enabled by the Covid-19 pandemic.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): The Internal Medicine residents at Austin VA Clinic enrolled patients into VVC in Spring 2002 in response to disruptions in care for veterans in our large outpatient VA clinic. VVC is a secure, pre-existing, browser-based virtual visit platform with minimal software requirements. Our intervention was shaped by a prohibition on in-person visits and a response by residency leadership to a lack of a virtual care model at the Austin VA. All pre-existing visits were changed by nursing staff to telephone visits; during these visits, residents educated veterans on the benefits of VVC and invited them to enroll. An anonymous survey was also designed to capture veteran perspectives on video visits.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): The net increase in successfully completed VVC visits in resident clinic.

A multiple choice survey assessing patient response and favorability to video appointments with data sufficient to determine further VVC utilization and interventions in our resident clinic.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

Prior to March 2020, our Internal Medicine resident clinic had no VVC visits. By the end of August 2020, our clinic had completed 181 video visits. During these six months, selected veterans were surveyed regarding their care delivery ($n=50$). 98% of veterans had a device at home capable of completing a VVC visit. 90% were willing to make video visits a regular part of their healthcare moving forward. 66% stated that video visits could replace most of their non-urgent care. 82% of those surveyed were either already enrolled or willing to be enrolled in VVC. Data was also collected on the presence or absence of healthcare monitoring devices in a veteran's home, and 46% of patients had a blood pressure cuff.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Outpatient clinics can and should quickly pivot models of care to account for changes in healthcare delivery requirements;

existing technologies should be utilized to fill gaps in care and are often overlooked and underutilized.

Given our survey data, many veterans likely have devices capable of allowing virtual medical care and utilization of the VVC platform should be continued. Utilizing a virtual model of care as an additional tool within our healthcare infrastructure may have a role in replacing some types of outpatient visits. We are planning a second phase of this intervention to replace all blood pressure follow-up visits with VVC, as it requires less transport, time, and disruption to patients.

STANDARDIZING VA CERVICAL CANCER SCREENING RESULT NOTIFICATION AND FOLLOW UP THROUGH EMR MODIFICATION AND AUTOMATION

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

The Veterans Health Administration (VHA) requires each hospital to maintain a standard workflow for addressing abnormal cervical cancer screening results. At James J. Peters (JJP) Veterans Affairs (VA) Medical Center in the Bronx, existing processes are varied, time-intensive, and un conducive to population health management.

LEARNING OBJECTIVES 1: Create a standard workflow for reporting and follow up of cervical cancer screening results.

LEARNING OBJECTIVES 2: Create an electronic medical record (EMR) tool to streamline this workflow and code data to automatically set due date for next cervical cancer screening.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS): We convened stakeholders in outpatient cervical cancer screening at JJP: Primary Care, Gynecology, Informatics, Preventive Medicine, Nursing, and System Redesign. The group identified a need for a standard EMR workflow for reporting Pap smear results, documenting communication of results, setting next cervical cancer screening due date, and ordering referral for colposcopy. We drafted note language and designed a Pap smear result notification dialogue box through close collaboration between an internist/preventive medicine resident and an informaticist.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION): The Pap smear result notification tool is evaluated on simplicity relative to prior processes (fewer mouse clicks and dialogue boxes), inclusion of all required steps, and accessibility to all providers, standardizing the workflow.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED): Our intervention met the aim of streamlining the Pap smear result reporting and follow up process, achieving the utility of the previous process within a single dialogue box and with fewer mouse clicks. Additional benefit includes coding of data for population health management. The previous steps of the process, though unique to each provider, included drafting a result note, drafting a patient letter if not reached by telephone, setting an EMR due date for next Pap smear in a separate dialogue box (some providers did not complete this step and due date would default to 3 years), and ordering Gynecology consultation in a separate dialogue box, as needed.

The new tool comprises single-click, modular, coded options for each test finding (i.e., insufficiency of sample, ASCUS, dysplasia, and HPV) and for next Pap smear due date or follow up with Gynecology for colposcopy. Clicking all that apply generates an EMR result note and a patient letter, sets the EMR due date for next Pap smear, and places a Gynecology consult, as needed.

This tool is accepted by Primary Care and Gynecology and has replaced the previous process, standardizing Pap smear result reporting and follow up at JJP

VA Medical Center in the Bronx. We additionally present an evaluation of time to patient notification of result before and after implementation.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Multidisciplinary collaboration between physicians and informaticists can yield elegant EMR modifications that reduce complexity while meeting the needs of physicians in a changing primary care landscape. Informatics tools that incorporate automation are particularly promising.

UTILIZING CLINICAL SURVEILLANCE TECHNOLOGY TO CAPTURE MISSED CT CHEST RESULTS AT A VA MEDICAL CENTER

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

Can clinical surveillance technology (CST) be harnessed to identify abnormal CT chest findings at risk of being missed by front-line providers?

LEARNING OBJECTIVES 1: To appreciate the value of CST in preventing important data from "falling through the cracks" in a high-complexity healthcare system.

LEARNING OBJECTIVES 2: To consider how trends in missed CT chest findings highlight areas of interest for further systems-based improvement.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

The volume of clinical alerts sent to front-line providers creates the potential for missed test results. In a survey of VA primary care providers (PCPs), 70% reported more electronic health record (EHR) alerts than they could effectively manage, and over half felt at-risk for missing test results (Singh et al 2013). We designed a language-based algorithm using the clinical surveillance program Theradoc to capture CT chest results requiring follow-up, and to identify those potentially missed by front-line clinicians. Specifically, our algorithm captured all CT chest reports from the Philadelphia VA containing the terms "follow up", "further workup", "further evaluation", and "growth", and excluding the terms "no follow", "no additional follow", "no growth", and "possible malignancy" (tracked by a separate system within our institution). We reviewed scans on a daily basis to identify those that had not been documented in the medical record at two weeks after study completion, and notified the ordering provider and/or PCP of results. In addition, we set pending alerts to monitor for completion of recommended follow-up studies.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION):

The following data was collected and analyzed: (1) number of CT chest reports captured by Theradoc algorithm, (2) percent of reports requiring provider notification by study team, (3) percent of reports documented in the medical record following study team intervention, and (4) percent of follow-up studies completed.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

From 9/24/20-12/3/20 (10 weeks) we reviewed 233 CT chest reports. 89 of these reports were considered false-positives and an additional 24 did not warrant follow-up based on clinical review. Of the remaining 120 studies, we identified 17 (14.1%) that had not been communicated to patients or documented in the medical record two weeks after study date. The majority (82.3%) of these potentially missed results were pulmonary nodules. Notably, 41% were ordered by clinicians other than the PCP or relevant subspecialist. After notifying front-line providers, 11/17 (64.7%) of these test results were subsequently documented in the medical record. We set 95 alerts for pending future studies with ongoing monitoring for completion.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?): Missed test results can lead to delayed care and patient harm. CST can function as a safety net to capture abnormal studies and help ensure timely communication and follow-through. In addition, incidental findings identified during emergency room, inpatient, or subspecialist workup

may be at higher risk of getting lost to follow-up, and represent an important target for future process improvement work.

Innovation in Healthcare Delivery (IHD) - Women's Health

A NEW YORK CITY STUDENT-RUN WOMEN'S HEALTH CLINIC IN THE COVID-19 ERA: A NOVEL HYBRID MODEL FOR CARE

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

The COVID-19 pandemic necessitates innovative gynecologic clinic models to provide care to low-income and minority patients with low health literacy and decreased access to preventative services for myriad reasons, including structural racism.

LEARNING OBJECTIVES 1: To demonstrate rapid development of a comprehensive gynecologic care hybrid telehealth model in a student-run free clinic for uninsured, low-income patients during the COVID-19 pandemic. (Systems-Based Practice)

LEARNING OBJECTIVES 2: To examine the outcome of this novel model on no-show rates. (Patient Care)

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

We present a clinic model that integrates telehealth visits and abbreviated in-person appointments to maintain access to gynecologic care during the COVID-19 pandemic. Our patient panel consists of 53 uninsured women residing in New York City. At each telehealth session, 4-5 patients are evaluated by third- and fourth-year medical students overseen by an attending gynecologist. Following the initial telemedicine visit, 5-6 patients are scheduled for an in-person appointment within the same month at an outpatient gynecology office visit. For patients with advanced gynecologic needs, we established a direct referral system to an affiliate resident-run gynecology clinic for procedures such as colposcopy and endometrial biopsy.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION):

We tracked the number of patients who received in-person procedural care during the pandemic and compared the no-show rate of telehealth visits to in-person visits prior to COVID-19.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

We scheduled 41 patients for telehealth visits and 24 patients for in-person visits between June and December 2020: The no-show rate was 17% (7/41) for telehealth visits and 21% (5/24) for in-person visits and 18% (12/65) when combined. This is a decrease from the overall no-show rate of 20% in 2019 (16/80), though not statistically significant. Two no-shows from each 2020 telehealth and in-person clinics were patients who also had no-shows in 2019. Additionally, between March and December 2020, we referred and successfully performed procedures for 10 patients at our affiliate resident-run clinic. We re-established care for 6 patients previously lost to follow up.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?):

This is the first known report of a hybrid telehealth model used for gynecologic care in a student-run clinic. Initial telemedicine visits enable direct triage of patient health, prioritizing acute patients for subsequent in-person evaluation, while also facilitating continued preventative well-woman assessments and new patient visits. Recognizing that the physical exam and preventative screenings such as pap smears are central to gynecologic care, we believe this hybrid model successfully increases access to care without compromising its quality, ultimately exhibiting a slight decrease in no-show rates which demonstrates the feasibility of this model to provide care for

our patient population. In sum, by implementing this format, we continue to provide effective, accessible gynecologic care to our patients, while minimizing risk of exposure to COVID-19.

RESIDENT KNOWLEDGE AND PRACTICES OF MENSTRUATING PATIENT HEALTH AND ACCESS TO HYGIENE PRODUCTS

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STATEMENT OF PROBLEM OR QUESTION (ONE SENTENCE):

Some physicians feel uncomfortable in counseling their patients on menstrual health, yet many patients are unable to advocate for lack of access or understanding.

LEARNING OBJECTIVES 1: Examine resident knowledge of menstrual health, hygiene product preferences and access.

LEARNING OBJECTIVES 2: Recognize inadequate hygiene product access, identify product availability in clinic and offer options.

DESCRIPTION OF PROGRAM/INTERVENTION, INCLUDING ORGANIZATIONAL CONTEXT (E.G. INPATIENT VS. OUTPATIENT, PRACTICE OR COMMUNITY CHARACTERISTICS):

Intervention was implemented in Detroit Medical Center Internal Medicine (IM), Internal Medicine- Pediatrics (Med-Peds), and Pediatrics Residency Programs. Wayne Qualtrics survey tool was used to evaluate knowledge and clinic practices regarding menstruating patient health before and after a lecture. A pre-survey was used to assess knowledge, comfort level and testament of inquiry in patient encounters. A lecture was given to discuss current data about access to hygiene products, the need for sustainable rapport around menstruating health, product selection and access, and methods of hormonal contraception use for menstrual regulation or induced amenorrhea. Lastly, a post-survey with similar questions was administered to assess improvement in knowledge base, changes in practice and increase in use of the clinical resources.

MEASURES OF SUCCESS (DISCUSS QUALITATIVE AND/OR QUANTITATIVE METRICS WHICH WILL BE USED TO EVALUATE PROGRAM/INTERVENTION):

Success was measured as an increase in provider comfort level and frequency of addressing menstrual health during visits and increased use of clinical resources.

FINDINGS TO DATE (IT IS NOT SUFFICIENT TO STATE FINDINGS WILL BE DISCUSSED):

Pre-survey included all three programs with 109 participants. Lectures and post-survey were given to IM and Pediatric residents with 22 survey completions. At least 95% felt at least "somewhat knowledgeable" of menstrual health in the post-survey compared to 67% initially. Initially, 51% of trainees asked patients about menstruation compared to 72% in the post-survey. 89% of residents "never" asked patients about access to menstrual products versus 64% after the lecture. The data shows a reduced number of them "never" asking about access to menstrual products which meets the goal of improved inquiry in practice. This study is incomplete as the Med-Peds residents have not received the intervention. The plan is to perform a chi square analysis once all post surveys are completed.

KEY LESSONS FOR DISSEMINATION (WHAT CAN OTHERS TAKE AWAY FOR IMPLEMENTATION TO THEIR PRACTICE OR COMMUNITY?):

Physician knowledge of menstrual health can be enhanced with formal training that surrounds product preference and supply. Most clinics have resources to offer patients, often unknown to trainees. Multiple interventions are needed to improve menstrual product access and menses regulation for patients. One lecture, particularly in virtual format, is insufficient to emphasize long-term learning and practice change. Visual cues and verbal reminders in clinic can emphasize this. Also, incorporating these aspects of menstrual health into medical student training as part of a taking a complete history would be beneficial. The topic of menstrual health advocacy still needs improvement; however, this ongoing study shows that educational interventions can create better support for our patients.

Innovation in Medical Education (IME) – Career Development

BLAZING THE PATH: BUILDING A PROFESSIONAL DEVELOPMENT CURRICULUM FOR INTERNAL MEDICINE RESIDENTS

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LEARNING OBJECTIVES 1: Residents will outline an individual strategy, timeline, and plan for the job search and/or fellowship application, effectively engage and manage new mentoring relationships within field of interest, and develop and nurture peer mentorship.

LEARNING OBJECTIVES 2: The curriculum will provide timely and effective feedback for future needs/direction for professional development within the residency program.

SETTING AND PARTICIPANTS: The initiative takes place at a large residency program at a tertiary care center of a large, multi-hospital enterprise over 160 internal medicine trainees. Sessions are held virtually and in person.

DESCRIPTION: After reviewing the literature, national and local needs assessments, we initiated a new curriculum called “The Career Development Workshop Series.” We sought advice from other programs, our local fellowship Program Directors, job recruiters, and research mentors. We provide information and skill training on fellowship and job search preparation, research opportunities, and mentorship. Our curriculum includes targeted sessions and just-in-time modules for different PGY levels, peer mentorship opportunities, tips on job search and contract negotiations, fellowship preparation, mentorship panels, personal statement workshops, individual mock interviews and a live mock interview with debriefing.

EVALUATION: We collected data from the local fellowship program directors, research mentors, and residents. Every resident participated in at least one of the voluntary sessions. Sessions were highly attended. 22 residents (8 PGY2, 11 PGY3) filled out the survey in September 2020. 19/20 residents “agreed” that the “Career Development Series is a valuable curriculum, 100% “agreed” that the Fellowship Timeline Session(s) “provided the guidance and skills to adequately prepare for fellowship applications, and 100% felt that the Personal Statement Workshop was “helpful and provided important skills that helped me improve my personal statement.” Fellowship program directors have reported that the use of mock interviews has created more polished and prepared candidates and noticed a difference in the enhanced interview skills of our residents. Residents reported that the peer mentoring sessions were extremely helpful in identifying research mentors.

DISCUSSION / REFLECTION / LESSONS LEARNED: Despite hosting a number of mentorship programs and research opportunities, residents responded to both the ACGME and internal surveys in 2018-2019 requesting more guidance establishing mentorship and preparing for fellowship and job applications. Based on feedback, there are plans to continue and expand the series to include other skill sets including finding/maintaining mentorship, performing/leading research projects, and developing skills to become physician educators and leaders. We hope to align goals with teaching faculty in order to recruit mentors and allow faculty to develop their skills in feedback, teaching, and mentoring. We hope to expand upon faculty development to create well-informed advisors to mentor, coach, and sponsor resident success.

CREATING CLARIFY IN CHAOS: A RISING CHIEF BOOT CAMP TRAINING USING MENTORSHIP & EXPERIENTIAL LEARNING ACTIVITIES

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LEARNING OBJECTIVES 1: Address leadership and administrative skills necessary for the chief year while promoting teamwork and bonding amongst rising chiefs.

LEARNING OBJECTIVES 2: Objectives for the session included describing teaching strategies, steps to manage multiple administrative tasks, evaluation/development of remediation plans, Kern’s 6-step approach to curriculum development, and best practices for teambuilding, and managing conflict.

SETTING AND PARTICIPANTS: This educational retreat took place at a tertiary care center with an internal medicine residency program of over 160 trainees held in an afternoon session in April 2020, during the transition phase for rising chief residents. Participants included six rising chief residents and nine former chief residents. Sessions were held virtually and in person.

DESCRIPTION: This highlights an innovative, timely, and collaborative project to provide a “Chief Year Boot Camp” using the counseling and mentorship of former chief residents to address universal skills and navigation of the local environment in a safe, fun, and interactive environment.

Former chiefs were asked to identify topics they felt were important to address. Once topics were chosen, appropriate former chief residents and faculty members were selected. A Question & Answer panel was held aimed to focus on the challenges that former residents faced and practical tips on how to navigate the year successfully.

EVALUATION: Rising chiefs provided feedback in sessions with the program director and the director of professional development. Overall, it was very well received from the rising chief residents, the program director, and all of the presenters. The rising chiefs unanimously expressed appreciation for protected time to focus on their development and reported that the bonding experience with the former chiefs served as a source of support. Presenters felt there was significant engagement with discussion and questions. Many additional topics were brought to light for future sessions.

DISCUSSION / REFLECTION / LESSONS LEARNED: We are proud of this innovation during a time of high COVID stress and limited resources. Given its success, we plan to deliver the course annually, even once the APDIM course is running. Although this series of targeted educational workshops will not replace the value of large national conferences, our model is highly useful in delivering focused content, setting expectations for the chief resident role, and providing chief residents with mentorship from former chief residents who trained at their institution.

I plan to send a survey to both the chief residents and the faculty members/former chiefs who had participated in the session. Outcomes will include survey results from the rising chief residents and former chief residents involved, a detailed description of the activities of the training, and the insights developed by the chief residents regarding the principles of effective teamwork, leadership, and approach to conflict management. Further evaluation is needed to assess the impact over time and its generalizability to other organizations.

FACULTY DEVELOPMENT CURRICULUM FOR EARLY INTEGRATION OF TELEHEALTH IN RESIDENCY AND OPTIMIZED SUPERVISION OF REMOTE ENCOUNTERS

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LEARNING OBJECTIVES 1: Describe real-time teaching techniques for resident preceptors unique to the telemedicine encounter.

LEARNING OBJECTIVES 2: Identify best practice supervision strategies for telemedicine visits that enhance resident education and patient care.

SETTING AND PARTICIPANTS: Telemedicine is now an essential component of medical training, yet attending physicians are faced with new challenges in precepting remote encounters and a formalized curriculum is needed to optimize telemedicine education and improve supervision strategies. The medical practice at Kaiser Permanente Mid-Atlantic States has a strong focus on telehealth, with over 780,000 video visits in 2020. We integrate tele dermatology and remote monitoring programs into daily practice and the faculty are proficient with telemedicine best practices. In addition, our residency program has incorporated telemedicine from the first week of orientation due to the Covid-19 pandemic, and first year residents now conduct about one-third of their outpatient encounters remotely.

Our objective is to describe a formal faculty development curriculum developed for teaching telemedicine in the outpatient setting and for optimizing supervision strategies during remote encounters.

DESCRIPTION: Methods used in creating this curriculum included a comprehensive literature review of leveraging telemedicine in medical education.

We conducted a needs assessment with precepting faculty via online questionnaire. Our curriculum comprises an interactive faculty education workshop with five main modules: Ethics and Equitable Access, The Remote Physical Exam, Medical Decision Making, Professionalism and Communication, and Models for Supervising Remote Encounters. Unique features of our curriculum include a medical decision-making unit on teaching when to escalate care. We present remote patient education strategies such as integrating online patient learning modules during wait times and enhancing visual teaching strategies through use of integrated EMR. We introduce novel precepting strategies such as anticipatory teaching and planning based on chief complaint to avoid patient wait times. We conclude by presenting a framework for evaluating residents in telemedicine.

EVALUATION: We evaluated this faculty-development curriculum with pre- and post-implementation surveys. The following specific competencies needed for teaching the practice of telemedicine were considered: practice-based learning, systems-based practice, and interpersonal and communication skills. The survey focused on acquisition of skills teaching the remote physical exam, improvement in comfort precepting, communication, likelihood of incorporating skills into teaching practices, and suggestions for improvements.

DISCUSSION / REFLECTION / LESSONS LEARNED: We propose a curricular framework for faculty development in telemedicine. This faculty training incorporates not only modifications of previous education strategies, but also enhancements unique to the mode of delivery of care such as fundamental changes to precepting models and patient education strategies.

IMPLEMENTATION OF A COLLEAGUE-TO-COLLEAGUE FEEDBACK SYSTEM IN AN ACADEMIC HOSPITALIST GROUP:

AN EVALUATION OF THE DESIRE FOR, BARRIERS TO, AND SUCCESS OF A NOVEL PEER FEEDBACK SYSTEM

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LEARNING OBJECTIVES 1: Recognize the significant desire for feedback among hospitalists and the paucity of available feedback platforms.

LEARNING OBJECTIVES 2: Consider how a novel, online feedback form can facilitate practitioners' professional growth and foster a division culture rooted in collaboration.

SETTING AND PARTICIPANTS: Oregon Health and Science University is a 570-bed hospital in Portland, OR. The Division of Hospital Medicine is comprised of ~45 physicians (and 5 PAs) that staff 9 inpatient teams: 4 hospitalist only and 5 teaching teams.

DESCRIPTION: Multiple formal platforms exist at our academic center to provide feedback to our medical students, residents, and fellows. We consider feedback imperative for the growth of learners, yet the Hospital Medicine faculty, at a continuing medical education level, have no active mechanism to provide regular feedback to colleagues regarding clinical care, medical decision making, or documentation tasks that affect patients or other providers.

We first assessed practitioners' desire for feedback and current barriers to providing feedback to peers. Using this data, in tandem with focus group themes, we created a web-based survey with mobile application access through which our providers can provide real-time, written feedback on colleagues' medical decision making, transfer center triage, documentation, and off-service work such as interim summaries. Use of the form is voluntary and anonymous; and faculty can fill out as many surveys as they prefer. Information gathered is compiled and distributed by our administrative team at quarterly intervals.

EVALUATION: Our pre-survey demonstrated only 10% of faculty were mostly or completely satisfied with the quantity of feedback they receive from peers. 78% of our group reported getting feedback less than quarterly; no faculty reported getting feedback more than monthly. 68% of the group felt that more peer feedback would be somewhat or extremely helpful for their professional growth. Perhaps most interestingly, members of the group reported discussing the performance of a peer with a different colleague more often than they talked to the peer for whom they had feedback. Faculty reported that their major barriers to providing feedback to peers were the lack of an available

system by which to provide feedback, and anxiety that feedback may be received poorly.

After implementing the ad-hoc feedback survey, including a tutorial at the hospitalist monthly meeting, placement of QR code links in all faculty member offices and email reminders with the link included, we found only about a dozen surveys were completed in the first few weeks. We are continuing to collect data at the time of submission.

DISCUSSION / REFLECTION / LESSONS LEARNED: Despite reported desire for consistent, formal feedback among providers in an academic hospitalist group, barriers to providing or receiving feedback continue to exist despite implementation a novel feedback tool. Cultural inertia and time constraints are hypothesized ongoing barriers.

ONLINE RESOURCE URL (OPTIONAL): https://ohsu.ca1.qualtrics.com/jfe/form/SV_9srF2U4BKomF9rL

Innovation in Medical Education (IME) - Clinical Practice

NOT CRACKING THE BONE; SCREENING FOR OSTEOPOROSIS

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LEARNING OBJECTIVES 1: Improve the awareness of the importance of screening for osteoporosis (PC).

LEARNING OBJECTIVES 2: Investigate the barriers that affect the rate of screening for osteoporosis (PC, ICS, PBL)

SETTING AND PARTICIPANTS: This study is designed to identify eligible female, age 65 and older, who received a screening DXA scan in a university based outpatient teaching clinic. This is a retrospective cross-sectional study to analyze 109 encounters from August 2012 to present.

DESCRIPTION: Osteoporosis is a concerning health issue as it is associated with an increased risk of fragility fractures and ensuing morbidity and mortality. The United States Preventive Services Task Force recommends screening for osteoporosis in all women aged 65 years and older by Dual Energy X-ray Absorptiometry (DXA scan). Despite these guidelines, the screening rate remains as low as 12%. We conducted a follow up study examining the role of education in improving the rate of osteoporosis screening among eligible post-menopausal women.

EVALUATION: The initial study in January 2012 showed the rate of osteoporosis screening of 53.2% among our clinic's post-menopausal female. This follow up study was focused to review the osteoporosis screening rate after implementing changes. Data was obtained using a pre-defined questionnaire focusing on patient demographics, prior DXA scan, medications, history of fractures, calcium and vitamin D levels and supplementation. Office note review determined whether the test was ordered and if not, why. 1,988 total visits were recorded in our continuity clinic. Inclusion criteria required established care (defined as patients seen at least 3 times in our practice) and female sex, and age 65 or older. 77 out of 109 eligible females (70.6%) had DXA done. This is a significant improvement compared to our previous study, which recorded a 53.2% screening rate (P= 0.001).

Introducing clinic performance dashboard and electronic medical record in 2013 had a major role in improving the rate of screening for preventive measures. Every quarter we would post and share the clinic performance (poster) and the rate of improvement with our trainees. We also noticed a lack of documentation by auditing our trainees' written documentation. Of 22 patients, 45% did not have DXA ordered while 55% did. Of the 22 patients who did not have the DXA scan, 72.7% lacked a documented reason for not obtaining it and 42% lacked any orders.

DISCUSSION / REFLECTION / LESSONS LEARNED: The rate of bone mineral density screening with DXA scan in our teaching clinic has improved to 70.6%. This may be related to educational didactics, electronic health record reminders (began September 2013) or residents' quarterly dashboard review. We found a need to improve our written documentation, as the majority of unscreened patients had no documentation stating why the test was not done. Studies like this can help reduce preventable morbidity and curtail health care costs.

Innovation in Medical Education (IME) - Health Equity and Social Determinants of Health

A NEIGHBORHOOD RESOURCE WALK FOR TEACHING SOCIAL DETERMINANTS OF HEALTH

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LEARNING OBJECTIVES 1: Increase internal medicine resident awareness of factors that influence their patients' health, including racism, food access and housing.

LEARNING OBJECTIVES 2: Identify nearby organizations that contribute to the health of the community.

SETTING AND PARTICIPANTS: Our resident-based teaching clinic serves a predominantly African American population, many of whom reside in the nearby Hill District, a historically black neighborhood in Pittsburgh. Despite the clinic's proximity, residents have traditionally had limited interaction with the community outside of the clinical setting. This lack of familiarity may limit awareness of their patients' social needs and impact the quality of care provided. The goal of this project is to improve resident understanding of issues faced by the community they serve.

DESCRIPTION: PGY1 residents on their ambulatory block participated in a 1-hour attending-led walk around the neighborhood to identify local resources. These included a community center, dental clinic, food bank, addiction treatment center, homeless shelter and drop-in center. We discussed the history of the neighborhood, structural racism - divestment and forced displacement - and food desert status. Residents had a chance to consider how the built environment may affect their own patients.

EVALUATION: Six residents participated in the neighborhood walk from September through December 2020. All residents completed a post-walk survey. Only one resident had been to the Hill District prior to the walk. All residents felt the experience improved their understanding of their patients: "(It) allowed me to see certain struggles they faced, it created a picture of the situation, rather than being a distant idea". All residents noted they would change their clinical practice because of the walk: "keep in mind... patient's circumstances when counseling about lifestyle modifications". Many cited one of their favorite parts as the walking itself: "the fresh air and exercise was awesome!". Recommendations for improvement were to increase the frequency or length of the walk and to add another type of community experience.

DISCUSSION / REFLECTION / LESSONS LEARNED: The neighborhood resource walk was very well-received. Residents demonstrated strong interest in better understanding their patients and increasing their knowledge of community resources. Several residents remarked on their desire to volunteer outside of clinic. Many drew on previous experiences to consider with insight and maturity how structural racism may impact the patient-provider relationship. By having a clinic attending lead the walk, residents were encouraged to transfer their experience into their clinical practice. Interestingly, many residents commented on the benefits of the walk itself, suggesting the time spent learning outside may contribute to wellness. Future steps will focus on inclusion of community members in the walk, which was limited this year due to the COVID-19 pandemic.

CENTERING KEY VOICES: ALLYSHIP FROM THE PERSPECTIVES OF RESIDENTS OF COLOR

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LEARNING OBJECTIVES 1: Understand the importance of centering the perspectives of residents of color in discussions of allyship. (Interpersonal and Communication Skills)

LEARNING OBJECTIVES 2: Describe potential strategies for successful allyship in medicine. (Professionalism)

SETTING AND PARTICIPANTS: The setting is focus groups conducted over Zoom at an academic urban medical center. The participants are Internal Medicine and Family Medicine residents who identify as people of color (Black, Latinx, Asian Pacific Islander, Indigenous or Native American).

DESCRIPTION: In order to elucidate how residents of color perceive allies and their experiences with allyship in the sphere of clinical medicine and medical training, we developed an open-ended question guide and recruited Internal Medicine and Family Medicine residents of color to participate in focus groups. Hour-long focus groups are being conducted with four to five residents of color and one member of the research team to ask questions. Given the relative lack of literature on allyship from the perspective of medical professionals of color, we created a discussion guide with the goal of drawing out broad themes of allyship. The discussion questions center on residents' definition of allyship, experiences with both successful and unsuccessful allyship, characteristics of a successful ally, and suggestions for potential allies. **EVALUATION:** Members of the research team will develop a preliminary codebook, followed by coding of a single focus group transcript to ensure intercoder reliability. We will use a constant comparative method to identify and expand new themes.

DISCUSSION / REFLECTION / LESSONS LEARNED: Physicians of color have long experienced discrimination in the workplace, and there is a growing body of literature about physician and trainee experiences with patient bias. Recognition of the bias physicians and trainees face has led to interest in allyship, or how members of the majority group can support and work with members of minority groups during challenging interactions. Additionally, recent events such as the Black Lives Matter protests have left many white and non-Black people of color in medicine asking how they can better support Black and minority colleagues. Despite this renewed interest in allyship, there is scarce literature on allyship in the medical field, and none of it focuses on allyship from the perspective of people of color. For allies to effectively support and empower people of color in medicine, they must first understand what people of color view as successful allyship. As medical schools and residencies develop workshops on allyship in medicine, it will be critical to understand allyship from the lens of people of color so that their voices can lead the discussions. Our focus groups provide the first steps in centering the views of residents of color in conversations of allyship. Further studies may focus on perceptions of allyship by people of color in other roles in the healthcare field, from medical students to medical assistants and front desk staff.

HISTORICALLY INFORMED MEDICAL CARE: REVISITING HISTORICAL RACIAL INJUSTICES TO EDUCATE AND CHALLENGE NEGATIVE STEREOTYPES THAT CONTRIBUTE TO INEQUITABLE CARE AND HEALTH DISPARITIES

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LEARNING OBJECTIVES 1: Medical Knowledge: To evaluate literature regarding healthcare disparities and how awareness of provider bias can improve health outcomes in diverse populations

LEARNING OBJECTIVES 2: Practice-Based Learning and Improvement: To explore root causes of the distrust of minority populations for Healthcare systems and how it contributes to healthcare disparities with a goal for every provider to do an evaluation of one's own patient care, appraisal and assimilation of scientific evidence regarding race in medicine to ensure equitable and socially just care.

SETTING AND PARTICIPANTS: Cleveland Clinic Internal Medicine Residency Program (IMRP) Participants: all residents in the internal medicine program

DESCRIPTION: The IMRP at Cleveland Clinic is among the largest and most diverse in the country, composed of residents from different countries around the world. Because of varying backgrounds, residents may begin caring for diverse patients without an understanding of the racial history that underscores the healthcare system in this country and health seeking behaviors of our patients.

The goal of this project was to challenge the implicit, and at times, explicit biases that resident physicians may hold. These biases although unintentional

and often subconscious, influence the type of care that is provided and can lead to poorer health outcomes. Our goals were:

- to educate all internal medicine residents in the program on the history of racism in the United States.
- to provide evidence through literature to highlight that systemic racism is still deeply embedded in the care provided to minority patients to this day and to enable residents in the program to consistently challenge and evaluate their own biases in order to provide the most equitable care to the patients we care for.

This was accomplished through a series of educational talks exploring historical racial injustices like the Tuskegee experiment, Marion Sims, and Henrietta Lacks and contrasted to present day literature showing different and often suboptimal treatment recommendations for minority patients.

EVALUATION: Surveys will be sent to residents assessing:

- their knowledge of the aforementioned historical events of racial injustice prior to attending the sessions.
- residents' insight on the usefulness of the intervention
- whether the newly acquired knowledge will change their clinical practice and attitudes towards minority patients.

DISCUSSION / REFLECTION / LESSONS LEARNED: Conversations about race are often challenging to initiate. From an informal survey among residents, most were unaware of historical medical events and figures such as Henrietta Lacks, Marion Sims, and the Tuskegee Experiment. These historical events have left long-lasting marks on Healthcare in the US and leaves patients hesitant to engage with the healthcare system. This hesitance can often be labeled as non-compliance, which becomes memorialized in the electronic medical record and further negatively affects their care. Educating residents about these events ensure inclusivity is maximized and bias is minimized in our clinical practice.

IMPROV VIRTUAL WORKSHOP TO IMPROVE THE MEDICAL STUDENT-PATIENT RELATIONSHIP FOR DIVERSE POPULATIONS AND ADVANCE HEALTH EQUITY

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LEARNING OBJECTIVES 1: Students demonstrate active listening, non-verbal communication, and empathy

LEARNING OBJECTIVES 2: Students describe how these skills translate into the care of patients facing health disparities

SETTING AND PARTICIPANTS: 60 randomly chosen MS1s at a single institution. 90-minute improv Zoom session Fall 2020 part of required Health Disparities Course.

DESCRIPTION: Improv is an unscripted theatrical form in which actors create new characters and scenes. Trainees are often called to care for a diverse patient group with complex social needs and barriers to care. Effective communication requires cultural humility and conversational openness. Improv has the potential to strengthen this conversational openness. Medical improv - utilizes improv concepts and exercises for medical training—improves learner's communication, active listening, teamwork, and the ability to deal with uncertainty. However, little research has explored the impact of medical improv on the care of underserved patients and the advancement of health equity.

Students were divided into 6 groups led by 3 clinicians/scientists with improv training and a professional improv comedian. Students performed interactive improv games like "Yes Circle": one student describes an object and other students build on this description, practicing agreement, observation, and active listening. The instructor debriefed each exercise, tying improv concepts and skills to clinical care (e.g., active listening to engage patients; how "stage fright" can develop empathy for patients who find healthcare uncomfortable).

EVALUATION: 37 students (62%) completed a post-survey with a 5-point Likert scale (1=strongly disagree, 5=strongly agree) and open-ended questions. 35% identified as white, 12% Black, 9% Latinx, 34% Asian. Students reported improvement in listening and observation skills (mean 4.22&4.32), and the environment was safe and promoted peer bonding (mean 4.76&4.43). Students did not agree that the session included a discussion about systemic inequities (mean 2.84) but did find it helpful in caring for patients with different life experiences (mean 3.95). Overall students rated this workshop as Very Good (4.19, 4=very good, 5=excellent). Students reported they enjoyed the creative thinking and getting to know their classmates but felt the sessions were too short and there was not enough discussion of clinical skills application.

DISCUSSION / REFLECTION / LESSONS LEARNED: This virtual improv workshop improved self-reported MS1 listening and observation skills. Students enjoyed the workshop and found it helpful in relating to those with different life experiences. This workshop did not fully demonstrate students connecting the improv exercises to the care of underserved patients. This may be due to limited time for debriefs and lack of clinical examples of the learned skills. Future iterations of this curriculum will need a more standardized approach to debriefing and may utilize a case-based discussion or video. Further teaching should hone focus on the application of improv skills to the care of underserved patients.

TEACHING SOCIAL DETERMINANTS OF HEALTH: AN INNOVATIVE CLERKSHIP-BASED CURRICULUM

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LEARNING OBJECTIVES 1: Despite the growing movement to incorporate social determinants of health (SDH) into medical school curricula, a recent systematic review demonstrated that SDH training rarely occurs during core clerkships. It is primarily limited to preclinical and elective courses. The objectives of this curriculum are:

1) For students to practice the integration of SDH and fundamental Internal Medicine (IM) skills with the goal of improving patient care and systems-based practice

LEARNING OBJECTIVES 2: 2) For residents to consolidate SDH knowledge and develop pedagogical skills

SETTING AND PARTICIPANTS: The participants in the needs assessment were faculty leads across UCSF, medical students in the IM clerkship, and IM residents. We piloted the curriculum at Zuckerberg San Francisco General (ZSFG) Hospital, one of three sites for the IM clerkship. The curriculum took place during 1 hour sessions 4-5 times during the IM clerkship with groups of 3-6 students. Each session was delivered by an IM resident with an interest in health equity and medical education.

DESCRIPTION: Our targeted needs assessment evaluated stakeholder attitudes toward SDH pedagogy through interviews with faculty and through focus groups with students and residents. Focus group participants reflected on the experience of students in addressing SDH, existing SDH training, and areas for curricular development. The needs assessment confirmed that stakeholders value SDH training and suggested strategies to accomplish our learning objectives. The curriculum is composed of interactive patient case presentations involving fundamental IM topics with a guided discussion of relevant SDH. Educators prepare cases that emphasize frameworks and skills used to address SDH, including de-stigmatizing language, community resources, and impacts on clinical management.

EVALUATION: We evaluated the curriculum through anonymous student surveys completed at the end of the clerkship. Students assessed the accomplishment of core learning objectives, and shared strengths of the curriculum and suggestions for improvement. We will conduct focus groups with students and residents to further demonstrate the impact of the curriculum and areas for growth.

DISCUSSION / REFLECTION / LESSONS LEARNED: Existing SDH pedagogy lacks rigor in multiple domains of learning theory: behavioral, in which complex tasks are simplified into steps; cognitive, wherein students build upon conceptual frameworks; and socio-cultural, where guided participation in patient care facilitates learning. Learners and educators reported a

lack of time and curricular support to disseminate complex skills for addressing SDH. Though stakeholders felt that SDH skills are gained primarily through experience, they were concerned that unguided learning would detract from biomedical curricular objectives and could perpetuate a feeling of helplessness in addressing SDH. In early evaluations, students reported that this curriculum effectively incorporates SDH into real patient cases, normalizes the importance of SDH, and creates a safe near-peer learning environment.

TRAINING MEDICAL STUDENTS TO UNDERSTAND THE IMPACT OF POVERTY USING A VIRTUAL WORLD POVERTY SIMULATION

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LEARNING OBJECTIVES 1: Recognize structural, psychological, and social barriers faced by individuals experiencing poverty when accessing health care and essential resources

LEARNING OBJECTIVES 2: Define community resources available to help address health-related social needs

SETTING AND PARTICIPANTS: Virtual world poverty simulation (VWPS), 160 first-year medical students (MS1), January 2020

DESCRIPTION: Poverty is associated with factors contributing to health inequities. Medical students receive insufficient training to understand the impact of poverty on health. Live poverty simulations have been found to improve knowledge and perceptions. However, they require multiple personnel, a large space, and significant time to complete. Virtual worlds can support problems found in conventional learning methods, such as time constraints, and require fewer resources. We developed a 60-minute VWPS to train MS1 to understand the impact of poverty. The VWPS featured five families experiencing poverty and six agencies offering resources. MS1 played the role of a family member. Service agencies were staffed by a faculty facilitator. To develop the virtual world, we partnered with Virtway, a platform that provides virtual 3D online experiences. 160 MS1s participated and voluntarily completed a pre- and post-survey assessing knowledge and attitudes about poverty.

EVALUATION: 283 pre- and post-surveys were completed and results were compared with t-tests. Students reported statistically significant improvements in knowledge of local resources available for people experiencing poverty ($t(281) = 3.1, p = 0.002$), agreement that students should explore patients' health-related social needs ($t(281) = 2.35, p = 0.02$) and agreement that students should connect patients to resources ($t(281) = 2.21, p = 0.03$). Participants with no experience either working with patients in poverty or experiencing poverty personally reported the greatest sense of "being there" during the simulation ($p < .001$) and were significantly more likely to report that the simulation adds value to their training as a provider ($p < .001$).

DISCUSSION / REFLECTION / LESSONS LEARNED: It was feasible to develop and implement a VWPS for MS1. Once the VWPS was developed, the resources needed to run it were minimal compared to live poverty simulations. Strengths include ease to incorporate into the curriculum and positive impact on MS knowledge and attitudes towards poverty. In times of COVID19 pandemic, it provides an engaging and safe environment to teach about poverty. Data is limited to self-reported changes in knowledge and attitudes.

TRANSFORMING INTERPROFESSIONAL EDUCATION THROUGH STUDENT HOTSPOTTING: ADDRESSING SOCIAL DETERMINANTS OF HEALTH AMONG ATLANTA'S HIGH-NEED, HIGH-COST PATIENTS

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LEARNING OBJECTIVES 1: To address the socio-contextual challenges faced by high-need, high cost patients and their communities by executing

patient-driven care plans and developing community-level interventions to address common root causes of healthcare overuse.

LEARNING OBJECTIVES 2: Integrate real-world, service-based learning opportunities into graduate student curricula to foster interprofessional, team-based collaboration for patient-centered care.

SETTING AND PARTICIPANTS: High-need, high-cost patients (HNHC) are medically and socially complex individuals who account for 5% of the population but incur 50% of healthcare expenditures. Atlanta Interprofessional Student Hotspotting (AISH) is a multi-institutional service-based learning program composed of 80 students from ten health professional programs at four Atlanta-area institutions. Interdisciplinary student teams partner with HNHC patients at Grady Memorial Hospital (Grady), Atlanta's safety-net hospital, to address the socio-contextual determinants of their health.

DESCRIPTION: In coordination with Grady, prospective patients are identified in two ways: through the health system's Transitions of Care Clinic, or based on their risk of having at least one emergency department (ED) visit per month for multiple months within the next six months. Teams recruit patients through telephone interviews into the six-month Hotspotting program. Students use standard interviews and the "five whys" approach to help patients identify root causes of their repeated admissions. Students then assist patients both with determining their health goals and leading the development of personalized care plans. Leveraging their interdisciplinary strengths and perspectives, students and patients together navigate the barriers to patients' stated goals by building trusting relationships, helping access necessary social resources, and iteratively improving health literacy. Beyond this work directly supporting HNHC patients, AISH students develop community-level initiatives to better address the most common multifactorial challenges faced by enrolled patients and their communities.

EVALUATION: To evaluate the program's impact on patient participants, students: 1) track and analyze monthly hospitalizations, emergency room visits, and outpatient appointment compliance among HNHC participants, 2) administer the 20-Item Short Form Survey (SF-20), and 3) collect patient reflections pre- and post-program to evaluate the impact on patients' quality of life. To understand growth and civic learning among students, we collect student reflections and the Interprofessional Collaborative Competencies Attainment Survey (ICCAS).

DISCUSSION / REFLECTION / LESSONS LEARNED: AISH takes an innovative approach to interprofessional education that enables students to actively develop a comprehensive understanding of the interactions between patients' health and their communities. By fostering dedicated opportunities for collaboration across disciplines, students grow into practice-ready professionals equipped to navigate the complexities of healthcare.

Innovation in Medical Education (IME) - Hospital-Based Medicine

INPATIENT PERIOPERATIVE MEDICATION MANAGEMENT:

A CURRICULUM FOR INTERNAL MEDICINE RESIDENTS

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LEARNING OBJECTIVES 1: Improve resident comfort managing patients in the perioperative period

LEARNING OBJECTIVES 2: Identify and address gaps in resident knowledge of perioperative medical management

SETTING AND PARTICIPANTS: Our curriculum was delivered to PGY-2 and PGY-3 internal medicine residents during their junior hospitalist and medicine consult rotations. Content was delivered during one-hour sessions occurring weekly for four consecutive weeks and repeated with each rotation. Topics included antihypertensives, antihyperglycemics, and antihemostatics.

DESCRIPTION: Content was decided upon based on review of the ACGME and ABIM core competencies as well as local needs. Four 1-hour sessions were delivered during each one month rotation, one per week. During each session, residents received some didactic instruction, examined high-yield journal articles, and applied knowledge while solving practice vignettes. A pre- and post-survey was administered during the first and last session.

EVALUATION: The curriculum was administered beginning in February 2020. Surveys assessed resident knowledge and comfort using multiple choice

and likert-like questions. At the time of data analysis, 28 of 33 participants had completed both the pre- and post-survey (85%). Residents strongly felt that perioperative care was an important part of internal medicine (4.26 on a 5 point scale) and patient care (4.53/5), but did not feel prepared to manage patients in the perioperative period (3.0/5). After receiving the curriculum, scores on the 10-question multiple choice section improved by 2.7 correct questions (pre-survey: 4.6±1.6, post-survey: 7.3 ± 1.3; $p < 0.0001$). Overall, the curriculum was well-received. Resident-reported satisfaction was high for each session (S1: 4.8 out of 5; S2: 4.7/5; S3: 4.3/5; S4: 4.6/5).

DISCUSSION / REFLECTION / LESSONS LEARNED: Poorly managed medical conditions are a leading cause of surgical readmissions and can lead to significant patient harm. Perioperative Medicine, focused on this high-risk time, is a required competency of both the ACGME and ABIM. Despite this, implementation of curricula across training institutions is variable, and assessment of curricular impact is lacking.

Here, we show that implementation of a perioperative medication management curriculum resulted in significant improvement in resident knowledge. Our residents agreed that this is an important competency of internal medicine training. Despite this, prior to receiving our curriculum residents did not feel prepared to manage patients perioperatively. These findings show that our curriculum meets an essential need for internal medicine trainees. The curriculum was continued during COVID-19, suggesting durability during educational stressors.

Innovation in Medical Education (IME) - Medical Education and Education Scholarship

"INTERSECTIONS OF SOCIAL SYSTEMS, RACE, AND HEALTH IN AMERICA: A HISTORICAL PERSPECTIVE": AN EDUCATIONAL PILOT INTERVENTION ASSOCIATED WITH IMPROVED ANTI-RACISM ADVOCACY

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LEARNING OBJECTIVES 1: Analyze and challenge historical and current theories and systems that perpetuate racism and influence healthcare and health outcomes to this day.

LEARNING OBJECTIVES 2: Devise and implement advocacy strategies we can use as physicians to address the historical complicity of the medical profession in racist policies and social systems that affect health.

SETTING AND PARTICIPANTS: Over the Fall 2020 semester, second year medical students ($n=17$) enrolled in a new elective educational pilot that consisted of weekly virtual seminars with small and large group discussion and community panels.

DESCRIPTION: Weekly socratic seminars explored six social systems: criminal justice, education, housing, healthcare, migration, and employment. Preceding each session, students were assigned a unique historical multimedia assignment to discuss in small groups for the first hour before posing discussion questions for large group discussion in the second hour. Large group discussions were facilitated by faculty experts in sociology, civil rights, health equity, and medicine. Seminars challenged students to investigate how historical discrimination against minority groups contributes to current health and health care disparities. Panels featuring local community leaders were interspersed between seminars to illuminate local manifestations of inequity. At the end of the course, students also completed short essays reflecting on course efficacy, their comfort navigating conversations about race, and physician advocacy.

EVALUATION: We surveyed the students with the Anti-Racism Behavioral Inventory (ARBI) pre- and post- course to assess changes in anti-racist behaviors. The ARBI is a validated instrument in which a higher score indicates increased anti-racism behavior. Results were compared to changes in ARBI scores from a control group of students ($n=37$) who did not take the class, with a similar demographic make-up to the class. Students who took the elective demonstrated a significant increase in ARBI scores ($M=4.29$, $SD=7.30$; $t(16)=2.42$, $p=0.014$), while students who did not take the course did not ($M=1.43$, $SD=6.98$; $t(36)=1.25$, $p=0.110$). The change in ARBI scores among

class participants was largely driven by changes on the "individual advocacy" subscale ($M=3.24$, $SD=5.41$; $t(16) = 2.46$, $p=0.013$). The post survey also captured open-ended feedback on the course, which was reviewed for themes.

DISCUSSION / REFLECTION / LESSONS LEARNED: This initial pilot led to significant increases in individual anti-racist advocacy behavior and was universally lauded by enrollees. Students especially praised the untold history within assignments and the panels with Black community organizers. Suggestions for improvement included incorporating more time with healthcare providers to discuss application of material in medical practice, use of fewer unique assignments and more narrative- focused readings, and more personal, longitudinal relationships with panelists. Upon completion of formal evaluation of the course, a second pilot will run in the Fall of 2021.

ONLINE RESOURCE URL (OPTIONAL): <https://tinyurl.com/PSOMelective>

A CRITICAL CURRICULUM: EMPOWERING INTERNAL MEDICINE RESIDENTS TO CARE FOR COMPLEX AND VULNERABLE PATIENTS

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LEARNING OBJECTIVES 1: Understand the key elements of a patient centered medical home (PCMH) and interdisciplinary team to provide comprehensive care.

LEARNING OBJECTIVES 2: Identify biopsychosocial barriers and address social determinants of health to mitigate preventable readmissions and decrease length of hospital stay.

SETTING AND PARTICIPANTS: Fifteen PGY-2 categorical Internal Medicine residents and 6 PGY-3 primary care Internal Medicine residents. The curriculum takes place in both inpatient and ambulatory settings at the UCLA Ronald Reagan Medical Center and UCLA Santa Monica Hospital for categorical and primary care residents, respectively.

DESCRIPTION: The UCLA Extensivist Program was established in 2017 as a PCMH for complex and vulnerable patients within an integrated health system. The Extensivist interdisciplinary team is composed of internists, care coordinators, pharmacists, registered nurses, and social workers. Extensivist patients have high risk conditions (e.g., end-stage renal disease, congestive heart failure), frequent hospitalizations (>2 in 1 year) and/or ED presentations (>4 in 1 year), and psychosocial barriers to care (e.g., co-morbid depression, high medication cost). Extensivist physicians provide longitudinal ambulatory care and inpatient consultations when patients are hospitalized.

The Extensivist curriculum is a novel training program that empowers trainees to foster comfort and skills to care for complex patients while also maximizing high value care. The curriculum helps train residents to evaluate root causes of health care utilization, the role of biopsychosocial barriers, and how to effectively lead an interdisciplinary team.

EVALUATION: An 18-question confidential online survey before and after the year-long intervention is distributed to residents receiving the curriculum and those who are not (control). The survey evaluates self-reported attitudes, knowledge and skills regarding providing care to vulnerable and complex patients. Pre- and post-curricular responses will be compared and analyzed for differences by resident and between groups.

Forty-nine residents have completed the pre-curricular survey ($21/21 = 100\%$ in the intervention arm and $28/38 = 73.6\%$ in the control arm). Only $6/49 = 12.2\%$ residents strongly agree or agree that they have the skills to successfully transition medically and/or socially complex patients between inpatient and outpatient settings. A vast majority of residents ($42/49 = 85.7\%$) feel guilty that they are not able to provide optimal care to their most vulnerable patients.

DISCUSSION / REFLECTION / LESSONS LEARNED: Most residents do not feel they have the skills to care for our most vulnerable patients; there is a need for curricula that provides trainees with the necessary skills to care for them. We have leveraged the UCLA Extensivist program to provide a novel clinical experience that highlights comprehensive and interdisciplinary care. This curriculum is adaptable to other Internal Medicine programs aiming to teach residents specific skills to provide comprehensive care to a vulnerable, complex patient population.

ADAPTATION OF A 5 A'S OBESITY COUNSELING IN PRIMARY CARE CASE FOR A LIFESTYLE BEHAVIOR CHANGE LEARNING EXERCISE FOR FIRST-YEAR MEDICAL STUDENTS

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LEARNING OBJECTIVES 1: After completion of the case discussion, first-year medical students will be able to list and describe the lifestyle counseling goals for each of the 5 A's of the behavioral counseling approach.

LEARNING OBJECTIVES 2: After completion of the case discussion, first-year medical students will be able to create an evidence-based action plan based on the 5 A's behavioral counseling approach.

SETTING AND PARTICIPANTS: Participants are all first-year medical students (n=121) at the Johns Hopkins University School of Medicine completing a 3-day introductory course "Topics in Interdisciplinary Medicine: Obesity, Nutrition and Behavior Change."

DESCRIPTION: We adapted a 5 A's (Assess, Advise, Agree, Assist, Arrange) obesity counseling case originally intended for primary care providers to use among first-year medical students and expanded the behavioral counseling focus to address multiple lifestyle changes. All selected behaviors are central to chronic disease management (nutrition, exercise, sleep, tobacco use, stress, and medication adherence). Students were assigned to small groups (n=20) with each group led by a faculty facilitator with expertise in lifestyle behavior change counseling. The case-based learning activity was 90 minutes in duration and began with a case presentation and a review of the 5 A's behavioral counseling framework. Students were then further divided into 6 discussion pods. Each pod was assigned one of the aforementioned behavior change topics and asked to use the 5 A's approach to develop an evidence-based action plan. Pods were provided with reference materials and pod discussions were supported by faculty facilitators. Students then rejoined their small group to present their pods' findings and together composed a comprehensive lifestyle behavior change plan for the case patient. The activity concluded with a debriefing where students shared reflections from the experience.

EVALUATION: Evaluations will be completed by medical students via survey. We additionally plan to gather qualitative feedback from faculty members in a focus group to assess the effectiveness of the case and its alignment with our established learning goals and objectives. We will use medical student and faculty feedback to further improve and refine this case-based learning activity.

DISCUSSION / REFLECTION / LESSONS LEARNED: The 5 A's tool is an evidence-based approach commonly used for weight management counseling in the primary care setting. We sought to introduce this tool and its application to lifestyle behavior change in a case-based format to first-year medical students. Our goal is to establish a foundation for future physicians to comprehensively address lifestyle behavior change to manage chronic disease. Evaluations from learners and faculty will be key in further refinement of this case-based approach.

ADVANCING CLINICIAN-EDUCATION SCHOLARSHIP FOR JUNIOR FACULTY IN A VIRTUAL WORLD WITH LIMITED RESOURCES

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LEARNING OBJECTIVES 1: To describe a faculty development program aimed to enhance educational scholarship for junior clinician-educators (PBLI)

LEARNING OBJECTIVES 2: To describe approaches to overcome barriers of limited resources and social distancing in program implementation (PBLI)

SETTING AND PARTICIPANTS: The Advancing Clinician-Educator Scholarship (ACES) Faculty Development Program is a year-long certificate program for junior clinician-educators in Yale's Department of Internal Medicine. Costs are minimized by having only program director support (0.2 FTE) and recruiting 20+ volunteer faculty throughout the University with specific content expertise. All sessions and mentoring take place virtually and content

materials are housed online. Two cohorts with ten participants from 5 divisions have participated in this program.

DESCRIPTION: Participants are chosen based on the feasibility of their educational project, time commitment to the program, and support of their Division Chief. Participants must have 20% protected time, including two hours weekly to attend educational sessions and 4 hours per week to work on scholarly projects.

ACES is a hands-on, interactive program focusing on developing, administering and disseminating educational scholarship. The program director provides 1:1 mentoring for each participant in their educational niche and along with volunteer faculty provide educational content through weekly seminars addressing: library research skills using educational search engines and databases; the 6- steps of curriculum/program development; survey designs; qualitative research including focus groups and mixed methods; virtual technology and animation in medical education; statistics in medical education; abstract writing, poster design, and the 10-minute oral presentation; writing for publication; peer mentoring through research in progress meetings; answering journal reviewer critique; and submitting an IRB proposal.

Participants complete and receive feedback on regular assignments corresponding to each phase of their project: needs assessments, goals and objectives, educational strategies, evaluation instruments, IRB applications, and a scientific abstract.

EVALUATION: Self-rated proficiency in all skill areas significantly increased from pre-post assessments (all p<0.01). All participants felt adequately mentored, rated the facilitation highly, and felt confident that they had attained the skills necessary to carry out educational scholarship. Two faculty projects to date have been presented as abstracts.

DISCUSSION / REFLECTION / LESSONS LEARNED: The ACES program provides young clinician-educators with the tools to produce educational scholarship. To overcome budget constraints and limited resources, the program cost was limited to program director FTE support and used volunteer medical and non-medical faculty at the university who are experts in different content areas. While COVID restrictions slowed some projects, it provided the opportunity to focus on "doable" initiatives that include virtual content and online assessment for participant scholarship.

A FACULTY DEVELOPMENT PROGRAM TO EFFICIENTLY TRAIN AND INCREASE USE OF POINT-OF-CARE ULTRASOUND AMONG HOSPITALISTS

William Novak
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LEARNING OBJECTIVES 1: To understand a novel faculty development approach toward growing Point-of-Care Ultrasound skills.

LEARNING OBJECTIVES 2: To appreciate how a faculty development program can help facilitate the integration of Point-of-Care Ultrasound into clinical care and bedside teaching rounds.

SETTING AND PARTICIPANTS: Despite an increasing number of trainees familiar with Point-of-Care Ultrasound (POCUS), there remained insufficient clinical use and supervision due to a lack of formal POCUS training among our attending faculty. Traditional POCUS faculty development programs largely use a multi-day "bolus" approach which can be resource-intensive and disruptive to clinical schedules. Moreover, retention of POCUS skills quickly wanes without subsequent skills reinforcement. The primary goal of our innovation was to increase the core POCUS skills of our hospitalist faculty by implementing novel faculty development methods. Our secondary goals were to demonstrate an increasing integration of POCUS by inpatient resident teams into both clinical care and bedside teaching rounds.

DESCRIPTION: We instituted a series of twenty-four hands-on noon hour training sessions for twenty teaching hospitalists over a two-year period. Pre-session video work replaced didactics using a "flipped classroom" model. Residents that had completed a POCUS rotation helped serve as hands-on POCUS instructors for the faculty across eight standardized patient stations during each session. Our focused, "drip" method was a dramatic shift from most approaches to faculty POCUS training, guided by a theoretical framework for the acquisition of expert performance. We aimed to increase training

efficiency and skills retention by: (1) focusing on six core POCUS views with the greatest relevance; and (2) building on prior conceptual and theoretical work in medical education, including scaffolding learning in small “chunks”, providing opportunity for deliberate practice with direct observation and feedback, and utilizing quizzes for test-enhanced learning.

EVALUATION: Our work resulted in the development of novel assessment tools, including a direct observation tool to assess imaging acquisition skills and on-line quizzes utilizing clinical vignettes and hand-held POCUS clips to assess image interpretation and clinical decision-making skills. Assessment results illustrate excellent faculty skills acquisition. Additionally, we have detailed a steady increase in the integration of POCUS into our clinical teaching services through sequential faculty and resident surveys, rotation evaluations, ultrasound machine logs, and intermittent diary sampling of teams.

DISCUSSION / REFLECTION / LESSONS LEARNED: Our supportive, low stakes faculty development setting has enabled hospitalists to overcome initial perceived barriers to learning and integrating POCUS and has provided a solid foundation of core POCUS skillsets for our faculty. Given its successes, we plan to continue the program and assessment strategies for new faculty during the upcoming academic years.

A MULTI-INSTITUTIONAL SURVEY ON THE PARALLEL CURRICULUM IN UNDERGRADUATE MEDICAL EDUCATION

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LEARNING OBJECTIVES 1: Identify and quantify the types and prevalence of third-party resources used by medical students and faculty for pre-clinical Microbiology and Internal Medicine (IM) Clerkship.

LEARNING OBJECTIVES 2: Identify perceptions of and preferences for third-party resources by medical students compared to course and clerkship directors.

Analyze demographic differences and cost burden in third-party resource use.

SETTING AND PARTICIPANTS: The survey will be a cross-sectional study at 3-4 medical schools recruiting 600-800 fourth-year medical students (MS4) and directors of preclinical Microbiology and IM clerkship at each institution (6-8). Surveys take place online, take 20 minutes to complete, and are available over 4 weeks. Student information will be deidentified prior to data analysis.

DESCRIPTION: The parallel curriculum consists of third-party learning resources - those which students access on their own for self-directed learning. Primary learning resources are planned curricula such as lecturers, rounds, syllabi, and PBL that are medical school directed or provided. Third-party resources have grown exponentially and medical students appear to prefer them over primary curriculum for learning medical content and preparing for standardized exams. As these often require direct payment or subscription, they can promote an achievement gap in subject exams, clerkships, and preclinical courses between those who can afford to pay for better quality and/or more resources and those who cannot.

EVALUATION: MS4 surveys include demographics, third-party resources used in preclinical Microbiology and the IM clerkship, perceived importance of these resources compared to primary resources, perceived necessity, and cost burden. Directors' surveys include perceived importance and necessity of third-party resources compared to primary resources and demographic data. We anticipate using descriptive, univariate (e.g. chi-square for dichotomous variables comparing directors and MS4s perceptions), and multivariate regression. This study received IRB approval at University of Pittsburgh School of Medicine and 2 institutions have been recruited. Survey distribution is planned for Jan - Feb 2021 with data analysis completed by Apr 2021 prior to conference date.

Pilot study data show students spend more time studying from third-party resources than primary resources for preclinical microbiology, IM shelf, Step 1, and Step 2 CK. On a scale from 0-100% preference of third-party resources, they preferred third-party resources in studying for preclinical microbiology

course (80%), Step 1 (95%), Step 2 CK (90%), and the IM shelf (90%). Third-party resources were not preferred in applying IM to patient care (30%).

DISCUSSION / REFLECTION / LESSONS LEARNED: This survey takes place prior to Step 1 becoming pass/fail. We plan to repeat the survey after the change and the probable shift in emphasis on Step 2 CK.

Knowing the specific resources students use and prefer can help faculty evaluate them for quality and learning theory, highlight deficiencies, and ensure equitable access.

A MULTIMODAL COURSE TO ENHANCE CLINICAL REASONING AND LEARNING SKILLS FOR MEDICAL STUDENTS WITH ACADEMIC DIFFICULTY

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LEARNING OBJECTIVES 1: To describe evidence-based interventions used in a clinical reasoning course designed to improve both clinical reasoning and learning skills for learners with academic challenges

LEARNING OBJECTIVES 2: To explain the efficacy of the Fundamentals of Clinical Reasoning course.

SETTING AND PARTICIPANTS: Three medical students from a large multicampus medical school participated in the pilot offering of the Fundamentals of Clinical Reasoning course.

DESCRIPTION: The optimal interventions for students who struggle with medical knowledge and clinical skills remain uncertain. Our institution has typically addressed such learners with an ad-hoc, variable approach. As an alternative, we created a six-week “Fundamentals of Clinical Reasoning.” course for students from late M2 through M4 years. The primary goals were to: 1) enhance history taking, physical examination, differential diagnosis, and patient-centered communication; 2) develop frameworks for clinical knowledge organization; and 3) improve students' study skills. The clinical reasoning component, grounded in medical education literature, addressed metacognition; illness scripts; vertical study of chief complaints; concept mapping; patient-centered communication; self-regulated learning (SRL); and hypothesis-driven physical exam. The evidence-based learning skills component of the class addressed SRL, metacognition, cognitive principles of learning; interpersonal communication; and positive psychology. Learning modalities included small group discussions, daily assignments, standardized patient exercises, and clinical precepting; students spent about 30 hours weekly on course material and received extensive individualized feedback. All activities other than precepting were conducted online due to the COVID-19 pandemic.

EVALUATION: Eight students were recommended by their academic advisors for the course; four enrolled and four successfully completed it. All participants completed a 12-item pre- and post-course self-assessment regarding confidence performing various clinical tasks—such as constructing a differential diagnosis. On a 5-point Likert scale where 1 was “never comfortable” and 5 “always comfortable,” the mean score across the 12 items was 3.25 at the start and 3.85 by the end. All students who completed the course evaluation would recommend the course to peers.

DISCUSSION / REFLECTION / LESSONS LEARNED: We successfully piloted a largely virtual clinical-reasoning and learning skills course for students with academic difficulty. Students reported improved skills and satisfaction with the course. This course was uniquely designed to support a heterogeneous group of learners in a systematic, replicable manner and to address clinical-reasoning and learning skills within the same course. The course is less resource-intensive and more content-rich than prior individualized support plans. The course will now be offered each term. Outcomes data including clerkship grades, USMLE scores, and match rates will be analyzed for participating learners and compared with non-participating referred students.

AN AMBULATORY COVID-CARE CURRICULUM TO ADDRESS THE NEED FOR CONTINUED RESIDENT EDUCATION DURING A GLOBAL PANDEMIC

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LEARNING OBJECTIVES 1: The COVID pandemic has resulted in dramatic changes to internal medicine (IM) residency training. An ambulatory COVID-care curriculum was created to address the increasing cases of outpatient COVID patients enrolled at a university hospital IM resident training facility. The program includes:

1. Teaching IM residents evidence-based evaluation and management of outpatient COVID patients.

LEARNING OBJECTIVES 2: 2. Demonstrating practice-based learning as information of COVID management evolves.

3. Creating a multidisciplinary approach to the outpatient management of COVID.

SETTING AND PARTICIPANTS: All categorical IM residents at SUNY Upstate Medical University in Syracuse, NY, participated in aspects of the curriculum during their continuity clinic week.

DESCRIPTION: The ambulatory COVID curriculum combines didactic and clinical experiences. A weekly conference covers ambulatory COVID management in a case-based format and includes topics such as COVID testing and triaging and monoclonal antibody infusion. The conference also covers workflow and clinic protocol updates.

PGY2 residents work with a faculty preceptor to triage cases deemed by staff to be concerning for COVID via telemedicine. The team determines a care plan with the patient and follows the patient throughout the rest of the week. Patients needing ongoing care are reassigned to a new resident the subsequent week.

PGY3 IM residents rotate through an outpatient clinic for known or suspected COVID patients (the Seasonal Illness Clinic). In-person evaluations are provided by the resident and a senior faculty member.

The ambulatory COVID curriculum is a multidisciplinary effort involving all staff within the clinic. The clinic works with hospital care management to deliver timely supplies to patients at home. The clinic collaborates with other primary care clinics to staff the Seasonal Illness Clinic and provide monoclonal antibody infusions.

EVALUATION: The ambulatory COVID curriculum was started November 23, 2020. 190 patients have received care. All 107 categorical IM residents have participated in the case-based conference. All 36 PGY2 residents have participated in the COVID triage rotation and 12 PGY3 residents have rotated through the seasonal illness clinic. The COVID curriculum has overall been well-received by residents.

DISCUSSION / REFLECTION / LESSONS LEARNED: Given how quickly our understanding of COVID is changing, we have found a dedicated noon conference during residents' clinic week has been important to review real case scenarios, complex medical-decision making, and workflow changes. Flexibility from the entire clinic staff has been essential to implement this curriculum. Establishing a COVID triage and follow-up team required teamwork, communication, and utilization of new aspects of our electronic health record to manage patients as a clinic.

As we have been tracking patients with COVID during this pandemic, we have a growing database of patients. We plan to add a research component to our curriculum to address the lack of outpatient data in COVID

A NIGHT (FLOAT) TO REMEMBER: CLOSING A CRITICAL GAP IN MEDICAL EDUCATION

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LEARNING OBJECTIVES 1: Understand the meaningful contribution of nocturnal medicine towards preparing a student for their first year as a physician.

LEARNING OBJECTIVES 2: Identify the necessary components of a successful undergraduate night float rotation.

SETTING AND PARTICIPANTS: Our novel night float elective is an inpatient internal medicine rotation for medical students in their final year of training. Medical students on the night float team admit patients from the emergency department, evaluate ill or decompensating patients on the medical floors or ICU, and respond to pages from nurses and physicians that are directly related to patient care. These unique experiences are valuable learning tools for intern year, and are closely guided by the resident and attending physicians.

DESCRIPTION: Night float and cross coverage teams are increasingly relied upon across residency programs to provide safe, quality care overnight, when the hospital functions with less staff and ancillary services. Our unique elective focuses on learning overnight management of acute issues and diagnostic dilemmas in preparation for a fourth year medical student's upcoming intern year, as well as admitting patients from the emergency department and stabilizing them for handoff in the morning. Specific goals for the medical student rotator include identifying and anticipating acutely decompensating patients, responding to pages about overnight patient care issues, and assuming greater responsibility in admitting and managing patients from our emergency department, ultimately providing a foundation for their first year as a physician. This elective is among the first of its kind and builds on daytime experience and knowledge to care for our patients when they are at their most vulnerable.

EVALUATION: Post-rotation surveys are collected electronically at the end of each rotation and outcome data is synthesized anonymously on a semester-to-semester basis. The survey reflects on both the medical student's subjective and objective experience, including understanding and meeting objectives, evaluating and caring for patients suffering different acute illnesses, and exposure to interprofessional teamwork and communication. Currently, 100% of students strongly agreed to having an improved understanding of common patient conditions a medical resident may encounter overnight, adequate exposure to receiving and answering pages overnight, and feeling more comfortable communicating with medical staff regarding patient hand-offs and cross-cover issues.

DISCUSSION / REFLECTION / LESSONS LEARNED: Night float rotations for medical students are few and far between, and dedicated teaching for common cross-cover issues is even rarer. We seek to normalize teaching and learning overnight and put forth methods for providing a rich educational experience for soon-to-be physicians even when time is limited. As we move away from overnight coverage being viewed as merely a duty, investing time and faculty development into providing a structured, intentional curriculum should be a priority across all institutions.

AN IMMERSIVE VIRTUAL MULTIDISCIPLINARY CLINICAL EXPERIENCE DURING COVID: THE VALUE OF A CASE MANAGEMENT ELECTIVE FOR MEDICAL STUDENTS

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LEARNING OBJECTIVES 1: Increase residency readiness by providing a collaborative education model and teaching medical students the framework of case management, utilization management, and skills to improve complex transitions, and management of social determinants of health.

LEARNING OBJECTIVES 2: Provide students with an engaging virtual learning opportunity founded on interdisciplinary exposure, trauma-informed care, and first-hand practice navigating patient care plans and patient advocacy.

SETTING AND PARTICIPANTS: Clinical phase medical students were embedded within multidisciplinary teams including social work, case management, and specialty organizations. Faculty include Nursing Case Managers, social workers, and a Utilization Management trained physician.

DESCRIPTION: Hospital Based Case Management Skills and Practice is a 2-week virtual elective, to accommodate physical distancing, that provides students experience in holistic care of the hospitalized patient. Students advocate for patients by identifying their social needs, coordinating their care, and reviewing their follow-up plan by telehealth. This work is focused on trauma informed care and social determinants of

health. At the end of each day, there is a debriefing session with a case manager for feedback and questions.

EVALUATION: 10 students evaluated the course using a mixed-method evaluation form. Half “agreed” they received high quality teaching while the rest “strongly agreed.” Comments were overall positive. Students reported that “discussions helped [them] stay engaged and interested.” and appreciated the remote platform and the opportunity to “impact...patient care in a supported way.” Additional comments revealed a better understanding of “the various challenges and resources that can affect patients...” Upon completion of the course, inclusion of the elective generated overwhelmingly positive reviews from the Case Management team. Evaluations of student performance were completed by faculty.

DISCUSSION / REFLECTION / LESSONS LEARNED: Conventional residency training has interns navigating the complexities of case management while also learning patient care skills which is often overwhelming. Through this elective medical students are able to focus deeply on case management skills to prepare to navigate the complexities of healthcare delivery systems for residency readiness. Our multidisciplinary team created an elective to further residency preparedness despite removal from in-person rotations during COVID-19. The course is novel offering education on patient-centered care from case management, social work, and specialty organizations, a truly multidisciplinary experience, all founded on trauma-informed care. Students rated this experience as beneficial, providing them a nuanced understanding of care barriers. By demystifying these complicated topics, students will be more equipped with care coordination experience at the start of residency. Given the overwhelmingly positive response from students, and case management, we recommend incorporating such a course into medical education curricula.

A NOVEL COMPENSATION MODEL FOR OFFICE-BASED TEACHING OF MEDICAL STUDENTS IN A MULTI-SPECIALTY COMMUNITY PRACTICE

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LEARNING OBJECTIVES 1: Create an equitable and affordable system of time allocation and compensation to enable high-quality medical student teaching by community-based clinicians

LEARNING OBJECTIVES 2: Create a learning environment for medical students in which community-based faculty have sufficient time to teach and model professional behavior in the provision of excellent patient care

SETTING AND PARTICIPANTS: Multispecialty group practice in which 130 preceptors in multiple specialties teach ~200 medical students each year in introductory clinical courses and core clerkships

DESCRIPTION: Prior to 2013, our multispecialty group practice had a tradition of medical school faculty appointments for physicians who provided office-based medical student teaching. The practice supported faculty with an informal commitment to maintain their compensation, via monetary stipend. As clinical productivity demands increased steeply over time, however, both recruitment and retention of clinical faculty became challenging. From 2013-2018, many physicians declined teaching roles, and some longstanding faculty stopped teaching despite acknowledged rewards in professional satisfaction. We developed a new model for medical student teaching compensation that was implemented in 2019. Rather than focusing on direct financial payments, the model allows clinicians to adjust their schedules to reduce encounters during teaching sessions, based on estimated time required to teach during clinical practice. Preceptors are credited with the corresponding amount of clinical activity (encounters and RVUs) to compensate for this teaching time along with small stipends for time required for other teaching tasks (such as feedback). We worked closely with faculty and administrators to implement the model equitably across specialties.

EVALUATION: The implementation of the compensation program was associated with improvement in faculty recruitment and retention. Faculty feedback indicated that the new program gives them more time to teach and permits them to demonstrate the professional behavior and high-

quality patient care they aspire to model for students. Students rated their experience highly in evaluations and bestowed multiple teaching awards on our faculty. The organization’s leaders endorsed the program and have maintained their strategic and financial support (even despite the severe challenges imposed by Covid-19).

DISCUSSION / REFLECTION / LESSONS LEARNED: Despite the recognized need for high-quality venues for office-based medical student teaching, recruitment and retention of faculty in busy community practices is a challenge. Our new affordable compensation model focused on making teaching time- and income-neutral for clinicians and was associated with the reversal of a worrisome reduction in recruitment and retention of faculty. Continued support from institutional leaders during a concurrent period of financial stress indicates their assessment of the value of teaching for the organization’s mission. This experience provides lessons likely applicable to multiple other organizations facing similar challenges.

A NOVEL SEXUAL HEALTH CURRICULUM FOR FIRST YEAR INTERNAL MEDICINE RESIDENTS

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LEARNING OBJECTIVES 1: Perform comprehensive sexual history and sexually transmitted illness (STI) screening based on patient risk.

LEARNING OBJECTIVES 2: Counsel appropriately when discussing STI results, safe sex practices, and expedited partner therapy (EPT).

SETTING AND PARTICIPANTS: Given the COVID-19 pandemic, our curriculum was adapted to case-based didactics via Zoom-webinar. The curriculum was developed for PGY-1s with significant outpatient clinic, such as internal medicine (IM) or medicine/pediatrics (Med/Peds). The facilitator was a faculty member, but could be a chief resident or resident with expertise in sexual health. The virtual sessions were interactive and residents were encouraged to participate in the case discussions via the mic or chat function.

DESCRIPTION: This curriculum is a 60-minute session intended either as an independent curriculum or as an addition to an existing ambulatory curriculum. The curriculum assumes the learners have some understanding of basic sexual health and focuses more on complex aspects for high-risk patients including efficient sexual history taking, collection of STI testing, and comprehensive counseling. A pocket card was created to accompany the didactics.

EVALUATION: We administered a pre-assessment survey to IM and Med/Peds PGY1 residents in Spring 2019 and received responses from 21 out of 41 (51%). In the pre-assessment survey, the majority (87%) of respondents reported feeling comfortable with sexual history taking but less comfort with more advanced techniques. We also performed a preliminary analysis using the SlicerDicer analytics tool in our Epic EHR to determine the rate of chlamydia screening in women age 13-24 and found the rate of screening in our clinic to be 28%. Based on these results, the curriculum content was adjusted to focus on history taking and screening for higher risk patients. The post- curriculum assessment in Fall 2020 was completed by 19 out of 33 residents (58%). Percentage correct on knowledge score increased from 49.5% to 74.9% post curriculum. Respondents reported increases in comfort (scale 1= very low comfort, 5= very high comfort) with counseling methods such as positive STI results (mean pre 2.8, post 3.5, p<0.01) and safe sex practices (mean pre 2.9, post 3.5, p<0.01), although modest improvement in comfort with EPT (mean pre 2.1, post 2.5, p=0.07).

An increase in self-reported comfort with collecting site-specific testing (vaginal, mean pre 2.3, post 3.6, p<0.01; rectal, mean pre 2.1, post 3.1, p<0.01; pharyngeal, mean pre 2.2, post 3.42, p<0.01) was also seen. We will check the chlamydia screening rates 6 months following the curriculum.

DISCUSSION / REFLECTION / LESSONS LEARNED: This curriculum demonstrated improvement in knowledge and comfort with sexual history taking, STI screening, and counseling. Comfort with EPT counseling improved, but not significantly which could be addressed with role-playing exercises. We imagine our curriculum as part of a larger continuing education

for sexual health that begins in medical school and continues throughout an individual's career.

ONLINE RESOURCE URL (OPTIONAL): <https://bit.ly/2LkCBe2>

BREAKING DOWN SILOS WITH INTERPROFESSIONAL CASE CONFERENCES

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LEARNING OBJECTIVES 1: Break down silos present between departments by sharing and discussing resources and services available in various departments and how to access them

LEARNING OBJECTIVES 2: Learn from each other's expertise about various aspects of caring for persons living with HIV and how we can create an even more collaborative care system

SETTING AND PARTICIPANTS: Setting: Fenway Community Health Center, Boston Massachusetts Nurses, medical assistants, financial services, patient service coordinators, internists, family medicine physicians, advanced practice providers, social workers, therapists, pharmacists, outreach public health workers, dentists, optometrists and health professional trainees training at Fenway Health

DESCRIPTION: Fenway Health cares for a large population of people living with HIV. This is quarterly case conference, originally in person and transitioned to virtually during the pandemic, was started with the goal of increasing collaboration between departments. The cases (which are fictional but representative of common clinical scenarios) have so far included: Elderly with HIV, Women with HIV, newly diagnosed HIV, dental issues in people with HIV, HIV and hepatitis C coinfection. Participants are sent the case ahead of time as well as questions targeted to their discipline. The discussion itself is usually led by the author or another educational leader and lasts 1 hour. While there is some didactic content (presented at a level for all attendees to understand) most time is spent facilitating discussion around the questions sent prior to the conference.

EVALUATION: Qualitative feedback from participant surveys

DISCUSSION / REFLECTION / LESSONS LEARNED: This interdisciplinary case discussion has been very well attended with between 50-100 participants at each session. This platform has achieved its goals of facilitating discussion between disciplines and breaking down silos in addition to increasing knowledge on HIV care. Some sample feedback comments include: "It's great to have a case consult meeting across depts and disciplines to help us think collaboratively". "the interactive, interdisciplinary model is great for discussion and to learn a little more about other departments and where we can support each other". The participants have been engaged in the discussion despite the large size and change in format. After the first year of facilitating these conferences we realized that having other departments not just participate but lead a discussion from their expertise can add more variety to the discussions and thus the dental department led a discussion and upcoming we will have optometry leading one. We have learned that there usually is not enough time within the 1-hour period to complete the discussion and people have requested it to be longer. Unfortunately, due to operational time constraints we are unable to provide a longer session at this time but are thinking of ways to increase frequency or add other elements to continue to discussion after the conference.

BUILD A BETTER CHECKOUT TO IMPROVE AMBULATORY TEACHING

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LEARNING OBJECTIVES 1: Background

The format for patient presentations in hospital settings is well established (SOAP); however, guidance for presenting in clinic is not uniform. In a needs assessment, we found that residents and preceptors had different views and expectations about the content and order of patient presentations in resident continuity clinic.

LEARNING OBJECTIVES 2: Objective To examine the impact of an innovative approach for presenting in clinic: Problem-Based Checkout (PBCO).

SETTING AND PARTICIPANTS: University and VA-based teaching clinics (>20,000 visits/ year), single academic medical center.

Internal medicine and med-peds residents.

DESCRIPTION: Innovation: After formative assessment, we developed PBCO where residents frame the context and main reasons for visit first, followed by a mini-SOAP presentation for each problem in order of importance.

Time: October 2019 (pre) - October 2020 (post).

Data source: survey, 5-point Likert scale for primary (confidence [content, order], efficiency, organization) and secondary outcomes (format changes [based on preceptor, patients' problem], time spent, teaching, confidence in plan, satisfaction, and clinic importance).

Analysis: Kruskal-Wallis (pre/ post) with Bonferroni correction ($p < 0.0125$, $p < 0.007$; primary and secondary outcomes; respectively).

EVALUATION: During the study period, 111 residents completed pre and 110 residents completed post surveys (~equal distributions of PGY 1, 2, 3) for a participation rate of 85% ($n=130$).

Confidence on the content that is expected, confidence in the order of the presentation, and organization improved (all $p < 0.001$); however, not the efficiency of checkout ($p=0.02$). For example, residents felt confident/ very confident of the content of the presentation in 47% ($n=51$, pre) vs. 71% ($n=77$, post). Similarly, residents felt confident/ very confident in the order of the presentation in 38% ($n=41$, pre) vs. 65% ($n=70$, post). Residents felt organized/ very organized in 32% ($n=35$, pre) vs. 63% ($n=67$, post).

After PBCO implementation, we observed more teaching ($p=0.002$); for example, teaching points were offered often/ always in 50% ($n=54$, pre) vs. 68% ($n=73$, post). We observed more uniform format of presentations (less changes), based on preceptor ($p=0.002$) or patients' problem ($p < 0.001$). We observed no differences in time spent ($p=0.09$), confidence in plan ($p=0.02$), satisfaction ($p=0.25$), and clinic importance ($p=0.12$).

DISCUSSION / REFLECTION / LESSONS LEARNED: We found that implementation of a structured, standardized approach to presenting in clinic, Problem-Based Checkout (PBCO), was associated with an increase in resident confidence of what is expected (content, order), organization, and more uniform format of presentations without increasing the time for checkout. Furthermore, the standardization of what is expected during clinic presentation was associated with an increase in faculty teaching.

ONLINE RESOURCE URL (OPTIONAL): PBCO Toolkit

<https://www.uab.edu/medicine/gim/education/problem-based-checkout-pbco>

BUILDING CAPACITY FOR ADDRESSING GENDER BIAS: A TRAIN-THE-TRAINER PROGRAM TO PROMOTE GENDER EQUITY

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LEARNING OBJECTIVES 1: Define and recognize gender-based microaggressions

LEARNING OBJECTIVES 2: Develop communication skills and engage in deliberate practice to promote gender equity in the clinical environment

SETTING AND PARTICIPANTS: A survey of interprofessional trainees at our VA medical center revealed that 72% of respondents had experienced expressions of gender bias, harassment or microaggressions. The majority reported greater than 3 episodes in the past year. To improve the clinical learning environment for trainees, faculty, staff, and patients, a working group was convened. We developed a Train-the-Trainer Gender Equity Program for staff from diverse backgrounds. Staff members were invited to participate in and subsequently lead workshops to improve gender equity. Here we report data on the effectiveness of this program for rapidly building our medical center's capacity for delivering

interprofessional gender equity workshops and preliminary data on workshop efficacy.

DESCRIPTION: Gender equity workshops were delivered via 90-minute video conferences. The first Train-the-Trainer workshop was co-led by 3 primary care faculty with advanced training in group facilitation skills and addressing gender bias. Each workshop consists of a check-in, setting ground rules, generating a group definition of gender microaggressions, literature review, case elicitation, and role-play of preventative and upstander language to address gender microaggressions. Subsequent workshops were co-facilitated by participants in the Train-the-Trainer workshops with pre- and post-workshop coaching by the original faculty facilitators.

EVALUATION: Between May and December, 89 interprofessional participants completed the Train-the-Trainer workshop and 11 trainers co-facilitated subsequent workshops for new participants. Workshop participants represented a diversity of health professions: 40% physicians, 22% nurse practitioners, 9% administrators, 7% nurses, 7% pharmacists, 6% psychologists, 4% social workers and 8% divided among others. Preliminary evaluations from this pilot phase (N = 7) were positive, the mean overall rating was 4.85 on a 5-point Likert scale and 100% of participants reported that this session will lead to a change in their practice.

DISCUSSION / REFLECTION / LESSONS LEARNED: Our goal was to improve gender equity in our clinical learning environment through faculty and staff development. The train-the-trainer model has allowed us to deliver more workshops to a diverse group of faculty and staff and has helped to build educational capacity for facilitating and reinforcing preventative and upstander skills to address gender bias. We rapidly increased our pool of gender equity workshop facilitators from an original 3 content experts, thereby expanding the reach of our curriculum across a broader number of settings and with diverse groups of faculty and staff. We intentionally ensured representation of diverse workshop facilitators and participants in terms of professional, racial/ethnic, and gender identities. Next steps include collecting data to assess the workshops' impact on trainees.

BUPRENORPHINE WAIVER TRAINING FOR MEDICAL STUDENTS: CHALLENGES AND MISSED OPPORTUNITIES

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LEARNING OBJECTIVES 1: To evaluate the integration of buprenorphine waiver training at a large, regional medical school.

LEARNING OBJECTIVES 2: To explain the barriers medical students face when attempting to obtain buprenorphine waivers after graduation.

SETTING AND PARTICIPANTS: Buprenorphine is an effective treatment for opioid use disorder, but requires special certification ("waiver") in order to prescribe. Recent efforts have focused on incorporating buprenorphine waiver training into medical school curriculum so new physicians have the capacity to deliver this life-saving treatment upon graduation. However, little is known about whether providing this training results in residents' obtaining their waiver or prescribing to patients with opioid use disorder. Fourth-year medical students at a large medical school with 6 regional campuses were offered buprenorphine waiver training during their final course before graduation. During our initial year we trained 61 graduating medical students (approximately one-quarter of the class). Almost half of participants were planning on entering internal medicine or family medicine residencies and 44% (n=27) anticipated practicing in a rural setting.

DESCRIPTION: Training was delivered using a standardized recorded online and live, in-person ("half-and-half") curriculum from the American Society of Addiction Medicine. Participants were surveyed approximately 1 year later (after finishing internship) to determine the whether they were able to obtain and use their buprenorphine waiver to treat patients with opioid use disorder.

EVALUATION: Of the 61 participants, 72% (n=44) completed the 1-year follow-up survey. Only 36% (n=16) of respondents successfully obtained their buprenorphine waiver but over half of these (n=9) were able to use their waiver to treat patients with opioid use disorder. Of the 64% (n=28) of respondents unable to obtain their buprenorphine waiver most reported structural barriers as the underlying reason (e.g. 71% cited the lack of an individual DEA number

and 43% cited not having an unrestricted medical license; respondents could select more than one reason). Concerningly, 57% (n=16) of those unable to obtain their buprenorphine waiver had an opportunity to treat a patient with opioid use disorder but were unable because they lacked a waiver.

DISCUSSION / REFLECTION / LESSONS LEARNED: Despite completing the necessary training before graduation, the minority of respondents in our sample were able to obtain their waiver to prescribe buprenorphine during internship. As a result, some trainees missed opportunities to treat patients with opioid use disorder. Structural barriers to obtaining a buprenorphine waiver during residency should be addressed to ensure learners have opportunities to prescribe buprenorphine during this critical period of training.

CHALLENGES AND SOLUTIONS FOR CREATING AN INCLUSIVE CURRICULUM: A REPORTING SYSTEM FOR IDENTIFYING MISUSE OF SOCIAL CONSTRUCTS IN MEDICAL EDUCATION CURRICULUM

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LEARNING OBJECTIVES 1: Identify common instances of the inappropriate use of race, gender, and other social constructs in the undergraduate medical education curriculum.

LEARNING OBJECTIVES 2: Develop a system to catalogue and respond to the inappropriate use of social constructs in curriculum.

SETTING AND PARTICIPANTS: The Warren Alpert Medical School of Brown University (AMS) created a system to identify, track and respond to the misuse of social constructs in the formal curriculum across all four years of medical school.

DESCRIPTION: In 2017, as part of an effort to improve the learning environment, the Offices of Medical Education and Student Affairs at AMS created a confidential reporting system for tracking instances of "Curricular Opportunities" – the inappropriate use of race, gender, and other social constructs as identified by students experiencing the curriculum. Curricular opportunities are submitted through a Qualtrics form; students are given the option of submitting anonymously or confidentially (including contact information for follow-up). Each submission is reviewed by our medical education leadership team and is recorded in a database, along with planned or completed responses. Students who submit forms confidentially are able to receive follow-up. Aggregate data is reviewed annually by the Medical Curriculum Committee and regular email summaries are distributed to students.

EVALUATION: Since 2017, 130 unique curricular opportunity forms have been submitted. Of those 130 reports, 59 relate to inappropriate use of race, 26 relate to inappropriate use of gender or gender stereotypes and 19 relate to depictions of disability (intellectual or medical). Seven of the 130 reports were not considered to meet the definition for curricular opportunity forms. The remaining reports (n=19) were considered to be in the "other" category of miscellaneous topics.

Common actions taken to address these curricular opportunities include: discussions with course leaders / individual lecturers / small group leaders with plans for changes for the next year, the removal of inappropriate information from lecture slides or handouts, and, in rare cases, no longer inviting a lecturer or small group leader to teach students.

DISCUSSION / REFLECTION / LESSONS LEARNED: Strengths of this reporting system include the use of existing, easily accessible survey software; a coordinated administrative response to curricular opportunities; recording of identifying patterns in aggregate data; and, holding faculty and administration accountable for the appropriate use of social constructs in the curriculum.

Limitations include a single institution's experience, inability for closed-loop communication with anonymous reports, and student reports of faculty mistreatment as curricular opportunities.

A reporting system using easily accessible survey software programs can be designed to suit any institution. A coordinated response team that includes key

stakeholders in curricular and student affairs, alongside faculty development, is key to successful implementation.

CLOSURE OF SURGICAL AND INTERVENTIONAL SERVICES IN A TEACHING HOSPITAL: IMPACT ON INTERNAL MEDICINE TRAINEES AND THE MEDICINE/SUBSPECIALTY SERVICE WORKLOAD

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LEARNING OBJECTIVES 1: Evaluate the impact of unavailability of surgical/interventional services in a teaching hospital on professional experience and education of trainees from Internal Medicine and Medical subspecialties.

LEARNING OBJECTIVES 2: Assess the effect of closure of operating rooms and cardiac catheterization laboratory on hospital quality measures and workload of non-surgical services.

SETTING AND PARTICIPANTS: Setting: Major quaternary-care teaching hospital that underwent closure of operating rooms (OR) and cardiac catheterization laboratory (CCL) for 6 months due to flooding/sterilization issues and planned upgrades.

Participants: Medical students and postgraduate trainees from academic programs of Internal Medicine and its subspecialties (hereby referred to as trainees)

DESCRIPTION: We report the effect of OR/CCL closure on education of non-surgery trainees, and on hospital quality measures (QM) and inpatient workload for Medicine/medical subspecialties (WL-Med).

EVALUATION: Trainee feedback was obtained by an electronic anonymous survey using a visual analog scale (-50 to +50) and free-text boxes. Student's t-test or Mann Whitney U test compared survey results. Of 281 trainees who had worked at the affected site during closures (M 5.7 weeks, SD=4.0), 172 (61.2%) responded to survey; 57% were PGY1-3, 54% were women. The most significant impacts reported were negative on education, professional development, satisfaction with rotations, and perceived quality of patient care (p<.001 for all). Negative impact was higher for PGY1-3 on professional development (p=0.012) and for students and PGY1-3 on their education (p=0.022). WL-Med and QM were compared across same date period in the year prior and year after, using negative binomial regression and maximum likelihood event count time series analysis. During the OR/CCL closures, daily bed occupancy was 40%-60%, as compared to 65-100% in prior year. Admissions/month during the closures declined by 12.3% (Surgery -23.4%, Medicine -10.3%, p<0.0001), with near-complete recovery next year. Total bed-days of care/month declined by 22.3% (Surgery -28.9% and Medicine -20.3%, p<0.0001). WL-Med decreased significantly: 3,380 fewer patient encounters (-38% from prior year). This negative impact was felt across each specialty: -8% for Gastroenterology, -14% for Hematology/Oncology, -28% for Hepatology, -31% for MICU, -33% for General Medicine, -42% for Renal, -50% for Cardiology, and -74% for Infectious Diseases.

DISCUSSION / REFLECTION / LESSONS LEARNED: We learned that OR/CCL unavailability decreased the inpatient workload and inpatient census of not just surgical/interventional services, but also IM and all subspecialties. Trainees of these academic program reported negative impact on their education and professional development, and on quality of patient care. This institutional experience provides opportunities for academic programs and hospitals to develop contingency plans for unanticipated interruption in services, as the impacts can be globally on workload and academic trainees in unexpected, interdependent ways.

COLLABORATIVE ENGAGEMENT OF CLINICAL UNCERTAINTY IN THE COVID ERA: THE VIRTUAL PI COLLEAGUE GROUP PILOT

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LEARNING OBJECTIVES 1: To describe how primary care physicians (PCPs) collaborate with clinician colleagues in managing case-based clinical uncertainty using virtual platforms

LEARNING OBJECTIVES 2: To explore the impact of collaboration in managing case-based uncertainty using virtual platforms

SETTING AND PARTICIPANTS: Starting in 2005, 10-25 Practice Inquiry (PI) Colleague Groups met regularly in primary care settings located in health centers, academic faculty practices, Kaiser clinics, hospital-owned practices, group practices, and residency programs. PI Colleague Groups are facilitated, practice-based venues for clinicians to discuss current patients with any type of clinical uncertainty (e.g., diagnostic, management, combination). PI groups afford a safe space to explore uncertainty using a 3-phase process: telling the uncertainty story, asking questions to open new frames, and crafting syntheses to create different care options. In Spring 2020, most groups stopped meeting face-to-face. Beginning Summer 2020, PCPs, nurse practitioners, and physician assistants in ten, One Medical Group offices in San Francisco, Palo Alto, Washington DC, and New York began holding regularly scheduled PI groups using video technology.

DESCRIPTION: Holding PI meetings via virtual platforms presents obstacles not dissimilar to seeing patients virtually: establishing rapport, reading emotions, and tuning out distractions are ubiquitous challenges. Furthermore, in-person meeting incentives (e.g. sharing lunch) are gone. Moving to virtual platforms raises several questions. What is the impact of virtual PI on the clinicians? How do COVID-related constraints affect clinicians' perceived clinical uncertainty which, in turn, could affect patient behavior? What kinds of uncertainties are presented? What are benefits of virtual PI? (e.g., ease of attendance) The "Virtual PI Colleague Group Pilot" was initiated to collect qualitative and quantitative data about the meetings, patients presented, and clinician viewpoints on virtual PI.

EVALUATION: Data Collection Instruments include an 8-item form for documenting the PI process and a 5-item questionnaire emailed to group participants and facilitators. Starting July 2020, the first author (who attended all virtual meetings) began data collection using the 8-item form. Following each meeting, group facilitators review the forms for accuracy. The form is sent to three authors (SR, ES, MS) to code; the fourth author (MG) adjudicates coding differences. A one-time 5-item questionnaire is emailed to participants and facilitators; data is analyzed using a similar approach. (See website for instruments and coding schema.)

DISCUSSION / REFLECTION / LESSONS LEARNED: Preliminary analysis of 11 patients presented reveals:

4 males, 7 females

Median age (range): 37 (24-75)

4/11 COVID-related uncertainty, 3/4 post-COVID symptoms

4/7 non-COVID: unexplained pain

7/11 virtual platform constraint, most prevalent: physical exam

Median group attendance is 6 (range 5-15). Two groups have met twice in 6 months. 20 more meetings are planned through March 2021.

ONLINE RESOURCE URL (OPTIONAL): practiceinquiry.org

COMMUNICATING WITH EMPATHY: A LOOK AT STUDENT PERFORMANCE IN ADVANCED COMMUNICATION SKILLS IN THE ERA OF COVID

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LEARNING OBJECTIVES 1: Assess empathy & communication skills for 2 scenarios frequently encountered by internal medicine physicians

LEARNING OBJECTIVES 2: Compare in-person & web-based performance on advanced communication skills

SETTING AND PARTICIPANTS: Two advanced communication objective structured clinical examinations (OSCE) were administered via in-person (n=29) or web-based platform (n=34) to 4th year medical students pursuing internal medicine.

DESCRIPTION: In the breaking bad news (BBN) OSCE, students disclosed a diagnosis of cancer and in the informed consent (IC) OSCE, they sought consent for blood transfusion. Standardized Patients (SP) underwent frame-of-reference training using a recorded encounter.

The Empathy and Clarity Rating Scale (ECRS) was used to evaluate communication skills (5=desired, 1=unsatisfactory). SPs assessed the in-person cohort while the web-based group was assessed by faculty. Students self-assessed performance using ECRS and rated their comfort using a 5-point scale (1=completely uncomfortable, 5=comfortable doing independently).

EVALUATION: Assessors' ratings indicated that students performed well on both OSCEs with minimal adjustment needed to reach the desired level (BBN M=4.24, IC M= 4.01).

Student self-assessments reflected their belief that their communication needed minimal adjustment, though that finding differed by cohort. For BBN, the in-person cohort rated themselves significantly lower than the web-based cohort (IP M=3.79, W M=4.32, p<.001) while there was no significant difference for the IC OSCE (IP M=4.32, W M=4.48).

Comparing students to assessors, in the IC case, students in both cohorts rated themselves significantly higher than their assessors (p<.05 for both cohorts). For BBN, the in-person cohort rated themselves significantly lower than the assessors while the web-based cohort rated themselves significantly higher. Similarly, students in-person rated their comfort level in BBN lower than students in the web-based cohort (IP M=3.31 and W M=3.92, p=.03).

DISCUSSION / REFLECTION / LESSONS LEARNED: The COVID-19 pandemic called for adapting how OSCEs are delivered and created a natural experiment to study in-person versus virtual advanced communication skills. Faculty and SPs rated students above 4 on almost all items in the ECRS, indicating that minimal adjustments are needed to achieve the desired level of competency. Although we expected that communicating over a web-based platform would cause greater challenges, our results suggest that students can perform as effectively on web-based OSCEs as they do in-person. Since students rated themselves higher and were more comfortable breaking bad news virtually, this platform can potentially be used to scaffold the skill. Similarly, using different scenarios may be necessary, as students overestimated their ability to communicate empathetically for informed consent compared to their assessors. As we expand the volume of patient care delivered via telehealth, evaluating student communication skills in the virtual setting is critical.

CRITICAL CARE PEARLS - A RESIDENT EDUCATIONAL MINI-LECTURE SERIES FOCUSED ON CRITICAL CARE

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LEARNING OBJECTIVES 1: This study focused on improving resident-driven evidence-based patient care in critical care medicine reflecting the practice-based learning and improvement ACGME core competency.

LEARNING OBJECTIVES 2: The goal of the mini-lecture series was to present landmark trials and key guidelines in critical care topics with use of board style questions aligning with the medical knowledge ACGME core competency.

SETTING AND PARTICIPANTS: Critical care education is a pivotal component in internal medicine residency training. To our knowledge, there is a paucity of data in the evaluation of formal didactics improving residents' critical care medical knowledge. We hypothesized that a weekly evidence-based teaching pearl would increase residents' subjective knowledge and confidence with management of core critical care topics.

DESCRIPTION: Residents were sent an anonymous pre-study survey assessing their confidence in management of the following core critical care topics: sepsis, shock, ventilators, acute hypoxic respiratory distress syndrome (ARDS), hypercapnic respiratory failure (HCRF), pulmonary edema, and diabetic ketoacidosis (DKA). The survey was a 5-point Likert Scale ranging

from 1 (not at all confident) to 5 (extremely confident). A series of teaching pearls was presented during protected didactics on a weekly basis focusing on the components mentioned above. The contents included recent review of updated evidence-based guidelines, key landmark trials and high-yield practical applications. A post-study survey was used to reassess residents' confidence.

EVALUATION: This study included 28 pre-study and 15 post-study responses. The percentage of residents that ranked their confidence a 4 or 5 on the Likert Scale increased in each of the critical care management topics: sepsis (pre 43%, post 80%), shock (25%, 75%), ventilator management (7%, 33%) ARDS (11%, 60%), HCRF (25%, 87%), pulmonary edema (39%, 67%), and DKA (61%, 87%). 87% of residents reported the critical care mini-lecture series was very or extremely helpful and likely applicable to other areas of subspecialty learning.

DISCUSSION / REFLECTION / LESSONS LEARNED: Critical care education within internal medicine residency is a foundation for well-trained internists. We found the utilization of a simple 5-minute evidence-based critical care pearl greatly improved residents' subjective knowledge and confidence in core critical care topics. Additionally, 87% of the residents found the mini-lecture series was helpful in advancing their medical/practical knowledge. Subjectively, we also found resident participation was far more robust during these lecture series compared to traditional didactics. While this study was only limited to critical care medicine, we postulate the same magnitude of response would be applied in other subspecialties utilizing the same teaching method.

DESIGN AND EVALUATION OF A MEDICAL STUDENT INPATIENT TELEHEALTH VIRTUAL ELECTIVE

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LEARNING OBJECTIVES 1: Describe the components of designing and implementing an inpatient telehealth elective for medical students

LEARNING OBJECTIVES 2: Evaluate inpatient telehealth elective effectiveness, including identifying skills gained and unique challenges posed by this curriculum

SETTING AND PARTICIPANTS: A 2-week novel medical student inpatient telehealth elective was created and implemented in March-April 2020 through the Yale School of Medicine Internal Medicine Department for 23 students who had completed core clinical clerkships.

DESCRIPTION: In the early stages of the COVID-19 pandemic, medical student subinternships and rotations were canceled, preventing learning about the clinical care of COVID-19 patients and student contribution to the inpatient medical team while resident workload increased. In response, medical students and internal medicine leadership at Yale developed a medical student inpatient telehealth elective. Students were trained in Palliative Care communication specific to COVID-19 and integrated into inpatient teams. They remotely followed patients, participated in rounds, conducted real-time literature review, completed tasks for patient care, attended educational conferences, and spoke with patients and families.

EVALUATION: A pre-survey and post-survey were distributed to the students in the elective. Questions assessed students' attitudes with a Likert Scale (1-7) about the remote aspect of the elective, comfort with clinical care of COVID-19 patients, and knowledge of COVID-19 and ICU care. Mean scores and standard deviations were calculated for each question and t-tests were used to determine significant pre- and post-survey changes. After the elective, students participated in focus groups to reflect on their experiences, which were transcribed, de-identified, coded, and analyzed. Students who had completed the elective felt significantly more comfortable in their ability to write progress notes for COVID-19 patients (5.22 vs 6.22, p=0.04), and reported a significant increase in their understanding of COVID-19 treatment algorithms (3.89 vs 5.89, p<0.01), knowledge of the clinical course of COVID-19 (4.0 vs 6.11, p<0.01), and knowledge of formulating an organ-based assessment and plan (4.11 vs 6.11, p=0.01).

DISCUSSION / REFLECTION / LESSONS LEARNED: Focus groups revealed these themes: 1) Team integration could be highly successful virtually but was highly dependent on resident willingness to participate 2) The greatest challenge was negotiating the exact role of the remote student and finding a balance between learning and helping the team with tasks and 3) Communicating with families and patients was the most rewarding aspect of the elective. A virtual elective was successfully designed and implemented to enhance medical student learning about clinical care of COVID-19 patients and assist inpatient teams during the height of the COVID-19 pandemic. As the pandemic continues, virtual inpatient rotations may be a feasible alternative for medical student education if in-person training is not possible.

ONLINE RESOURCE URL (OPTIONAL): <https://icollaborative.aamc.org/resource/5098/>

DEVELOPING A NOVEL TELEHEALTH CURRICULUM FOR MEDICAL STUDENTS

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LEARNING OBJECTIVES 1: Identifying the scope of an undergraduate medical telehealth curriculum.

LEARNING OBJECTIVES 2: Developing an easily applicable and modifiable telehealth curriculum for roll out during transition to clerkship.

SETTING AND PARTICIPANTS: During the COVID-19 pandemic, telehealth utilization in primary care markedly increased. Medical students and faculty from Albert Einstein College of Medicine initiated telephone and video visits at four primary care sites. It quickly became apparent that medical students would need to be trained in care delivery via telehealth. Thereafter, medical students under the guidance of a faculty supervisor, developed a formal telehealth curriculum to teach clinical skills in all spheres outlined by the AAMC telehealth competencies.

DESCRIPTION: The course design is virtual, asynchronous, and administered through Canvas, an online learning management system. It includes a variety of instructional modalities: presentations, readings, video interviews and interactive activities. Videos and readings consist of a mixture of original and borrowed content from publicly available, reputable sources. Original content is based on current literature and experiences of practicing physicians within our health system. Clerkship directors from internal medicine, family medicine, pediatrics and OB/GYN gave feedback to drive iterative curricular design. The local office of medical education has agreed to roll out the curriculum to students in a 'transition to clerkship' orientation week prior to the start of clinical education (before the start of third year).

EVALUATION: 1. Direct feedback from clerkship directors as curriculum develops.

2. Administration of student surveys before and after the course to gather quantitative and qualitative data on students' perception of their expertise with telemedicine: knowledge, skills and comfort.

3. Students will be assessed on telehealth competencies during their ambulatory clerkship based on AAMC competencies.

4. Non-director faculty surveys perspectives on the curriculum and suggestions for improvement.

DISCUSSION / REFLECTION / LESSONS LEARNED: Over the next 10 years the use of telehealth in healthcare delivery is predicted to increase greatly. This curriculum, therefore, was developed to meet a current and growing demand. Furthermore, since the curriculum design was led by medical students who had been tasked with providing telehealth with little to no formal training, we expect that the curriculum will address unmet student training needs. Additionally, the iterative curricular development with collaborative multi-disciplinary faculty input would make it applicable across many clinical rotations. This, however, might complicate roll out as different disciplines might apply the curriculum in different ways. We hope that our plan to improve

curriculum based on student and faculty feedback will address some of these complications.

DEVELOPMENT AND IMPLEMENTATION OF CODE BLUE CURRICULUM FOR INTERNAL MEDICINE RESIDENTS AT A NEW ACADEMIC MEDICAL CENTER

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LEARNING OBJECTIVES 1: Historically, Emergency Medicine (EM) physicians have managed codes at our Internal Medicine (IM) Residency Program's primary teaching hospital. This academic year, the IM Residency Program supported a transition of code management from EM to IM physicians, including the residents. A survey conducted in October 2020 indicated 91% of IM residents wanted to participate in code simulations. Therefore, we created a Code Blue Curriculum for IM residents with the following objectives: **LEARNING OBJECTIVES 2:** 1. Increase IM resident knowledge and skills in code management.

2. Improve IM resident confidence in leading a code.

3. Implement a framework for post-code operational and emotional debriefing.

SETTING AND PARTICIPANTS: The Code Blue Curriculum consists of two phases: 1. Small-group sessions in a simulation lab with residents only; and 2. Mock Code Blue sessions in the hospital with residents and other healthcare team members. For the first phase, we developed hands-on, case-based sessions conducted at a simulation lab equipped with a training mannequin and code cart and led by a Pulmonary and Critical Care Medicine faculty and either a Hospitalist Medicine faculty, an IM Chief resident, or a Palliative Care fellow. A mix of IM residents from all year-levels attended in five to six person cohorts, and 56% of IM residents have completed the Code Blue training sessions as of December 2020.

DESCRIPTION: The Code Blue training session is meant to supplement, rather than replace, the Basic Life Support and Advanced Care Life Support certifications the IM residents are required to maintain throughout their residency training. In a flipped classroom model, IM residents receive pre-simulation materials and resources. This is followed by a two-hour small-group session, which includes several interactive case simulations built to model scenarios residents are most likely to encounter. The simulations emphasized three sets of core skills: 1. leadership, communication, and room management; 2. proper resuscitative techniques including chest compressions, airway and ventilation, and defibrillator management; and 3. post-code debriefing.

EVALUATION: Participants completed pre- and post- training surveys to assess their knowledge, skills, and confidence in code management. Preliminary data indicates a positive response in all categories. For example, prior to the training session, only 32% of participants felt confident about running codes, compared to 83% post-training. Also, prior to the training session, only 74% of participants knew that quality control is a code leader role, compared to 100% post-training. Lastly, 100% of participants agreed that "the Code Blue Simulation Session was extremely useful." Based on this feedback, the IM Residency has asked our team to hold more training sessions in the upcoming months.

DISCUSSION / REFLECTION / LESSONS LEARNED: An intensive training workshop can improve IM resident knowledge, skills, and confidence in leading codes. Our model for a Code Blue Curriculum may be a valuable addition to any group hoping to increase involvement in codes.

DEVELOPMENT OF A NOVEL CURRICULUM IN MOTIVATIONAL INTERVIEWING FOR MEDICAL STUDENTS IN A LONGITUDINAL INTEGRATED CLERKSHIP (LIC)

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LEARNING OBJECTIVES 1: Describe the fundamentals of Motivational Interviewing (MI)

LEARNING OBJECTIVES 2: Recognize the various clinical applications of MI, specifically in addiction, disease prevention, and healthy lifestyle counseling.

Improve communication skills by using MI to identify patient's values, preferences and needs.

Practice using MI to develop effective information exchange with patients and their families.

SETTING AND PARTICIPANTS: The CUSOM's Denver Health-LIC is a year long program in which a cohort of third year medical students meet their core requirements in a longitudinal, integrated clerkship at a large urban safety-net health care system.

DESCRIPTION: Motivational Interviewing (MI) is a method proven to be effective in helping patients find their intrinsic motivation towards behavioral change¹. A Longitudinal Integrated Clerkship (LIC) is ideally suited to train students in MI as they have opportunities to counsel the same patients over time and observe their behavior changes. In a needs assessment of LIC students at the University of Colorado (CUSOM), 90.5% (n=21) of students reported that MI is either "very or extremely important" for their medical education, and 42.9% (n=21) of students reported that they were "neutral" or do not feel comfortable using MI in patient encounters. Based on these findings, a Motivational Interviewing Curriculum was developed with objectives to develop MI skills through practice and clinical application. The curriculum consists of a lecture on MI principles, MI-specific exercises, 1:1 coaching with expert facilitators, and two team-based learning (TBL) cases focused on chronic disease management and application of MI skills.

EVALUATION: A pre-curricular survey assessed each student's knowledge and ability to identify MI concepts, comfort using MI with patients, and attitudes around the importance of MI in medical education and health care. Results of this needs assessment demonstrated that students highly value learning and practicing MI in their medical education and in their anticipated specialty. There were mixed results related to comfort and experience using MI in patient encounters. Post curricular surveys will measure efficacy of the curriculum in reaching stated objectives, as well as student satisfaction with the curriculum, and will be available to present at the conference.

DISCUSSION / REFLECTION / LESSONS LEARNED: MI is recognized as a critical tool for physicians to help patients work towards positive health changes¹. An interactive, longitudinal, and multimodal curriculum has met a need in the CUSOM curriculum. We anticipate further dissemination of this curriculum to future CUSOM clerkship students and believe the structure and content is exportable.

DEVELOPMENT OF A TELEMEDICINE CURRICULUM INTRODUCING AAMC TELEHEALTH CORE COMPETENCIES

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LEARNING OBJECTIVES 1: 1. Describe the steps/resources needed to develop and implement a telemedicine curriculum

LEARNING OBJECTIVES 2: 2. Discuss how to teach telemedicine communication skills ("webside manner") using interactive lessons as well as simulations with standardized patients

SETTING AND PARTICIPANTS: Delivered virtually to the UCFCOM class of 2022 (114 medical students) during summer 2020.

DESCRIPTION: The Association of American Medical Colleges (AAMC) recently provided new telehealth core competencies across six domains. We describe a virtual telemedicine curriculum designed by UCFCOM as part of a Transition to Clerkship course to introduce the new AAMC core competency domains for telehealth while providing students with a simulated safe environment to apply knowledge and practice skills.

Content was tailored to address the urgent need for telemedicine skills, integrating synchronous and asynchronous multi-media activities to promote active learning, engagement, and self-regulation.

The course design centered on five primary educational activities that moved progressively from novice experiences to simulated telemedicine encounters over five weeks, including: 1) a virtual group interview-telemedicine simulation, 2) self-learning modules, 3) self-reflection and discussion, 4) two virtual standardized patient (SP) encounters and 5) faculty debriefs with SP and peer feedback. Essential aspects included the development of well-defined learning objectives, telemedicine-specific behaviors, standardized assessment tools for SP and peer feedback, virtual patient scenarios, debriefing sessions, self-reflection activities, and peer-feedback.

Activities focused primarily on AAMC Telehealth Domains that were appropriate for the level of learner and available resources: Patient Safety, Assessment, and Communication.

EVALUATION: Students evaluated the curriculum through the Transition course evaluation and anonymous surveys after virtual SP encounters. Responses were captured on a 5-point Likert Scale (1= strongly disagree to 5=strongly agree) as well as narrative comments. Greater than 95% of students agreed or strongly agreed the course was helpful to develop their clinical skills and prepare for clerkships.

DISCUSSION / REFLECTION / LESSONS LEARNED: With limited resources, we successfully developed and integrated an online Telemedicine course introducing the new AAMC telehealth core competencies. It also provided an opportunity for students to maintain their clinical skills during the period of limited access to the clinical setting caused by COVID-19. Students perceived virtual SP encounters to be as effective as traditional face-to-face simulated encounters. Engaging and training a group of SPs assured that students would receive timely and appropriate feedback to improve their "webside manner" and clinical skills.

To our knowledge, this is one of the first descriptions of a U.S. Medical school curriculum for an entire third-year cohort using AAMC Telehealth competencies simultaneously. These lessons can help other institutions fill telehealth curricular gaps.

ONLINE RESOURCE URL (OPTIONAL): www.shorturl.at/qAIVW

EARLY AUTHENTIC CLINICAL EXPERIENCE DURING COVID-19: AN INTEGRATED HOTSPOTTING MODEL FOR INTERPROFESSIONAL MEDICAL EDUCATION

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LEARNING OBJECTIVES 1: Students will address patients' social determinants of health (SDOH), including cultural values and system limitations, as part of a hybrid in-person and remote care delivery model.

LEARNING OBJECTIVES 2: Students will practice effective communication strategies of team building, task distribution, and conflict management with an interprofessional care team of graduate health students.

SETTING AND PARTICIPANTS: At an academic tertiary care medical center, 36 first-year medical students were separated into 9 teams with rotating 4 pharmacy students, 1 social work, and 9 graduate public policy students, each supervised by an internal medicine faculty attending physician to support one patient with complex medico-social needs, defined as 2 or more inpatient hospitalizations within 1 year or 3 or more emergency room visits in 1 year, in a patient centered medical home program. Students and faculty attend monthly 3-hour in-person or remote didactics and home visit sessions over an 8-month longitudinal curriculum.

DESCRIPTION: Large group didactics include sessions on interdisciplinary care plan development, housing and food insecurity, public health insurance, community-based social services, and polypharmacy led by attending faculty. Teams meet to formulate care plans for their patient and elicit feedback from a multidisciplinary panel of faculty through learner-driven discussion, focusing on addressing health disparities while adapting to telemedicine and COVID-19. Following didactics, teams conduct home visits or telemedicine

appointments to perform history taking, physical examinations, tailored social determinants of health and safety screenings, and post-visit debriefs with faculty.

EVALUATION: First year medical students are evaluated by 1) quantitative pre- and post-experience 5-point Likert scale surveys adapted from validated instruments assessing attitudes, knowledge, and skills regarding SDOH and interprofessional teamwork (IPT), 2) Direct observed assessment by assigned attending physicians on pertinent clinical examination, patient communication, and history taking skills, 3) Monthly qualitative reflections and one cumulative case review on the interdisciplinary teamwork and patient care experience. In our sample (n=18), mean pre-intervention scores regarding knowledge and skills were 3.78 ± 1.08 in IPT, and 2.82 ± 1.08 in SDOH.

DISCUSSION / REFLECTION / LESSONS LEARNED: US medical education has been slow to incorporate curricular changes to prepare students for interprofessional practice, its progress further impeded by the COVID-19 pandemic. As our pre-intervention analysis revealed low-average baseline scores in IPT and SDOH, we hope to show with our post-intervention comparison that our formalized curriculum offers early opportunities for first year medical students to improve in these abilities and impact patient outcomes through a collaborative interdisciplinary approach in caring for high-needs patients in a format adaptable to remote-learning methods.

ONLINE RESOURCE URL (OPTIONAL): <https://tinyurl.com/sgimhosp>

EFFECTIVE USE OF CLINICAL VOLUNTEERS IN A DISASTER: JUST-IN-TIME SKILLS DEVELOPMENT FOR STAFF SUPPORTING HIGH RISK CARE TRANSITIONS

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LEARNING OBJECTIVES 1: To develop, implement and evaluate a curriculum for reallocated staff providing post-discharge (PD) transitions follow up care

LEARNING OBJECTIVES 2: To identify high-risk patients discharged from acute care and connect them to primary care during NYC's initial COVID-19 surge

SETTING AND PARTICIPANTS: In March 2020, NYC Health+Hospitals/Kings County, a Central Brooklyn safety-net hospital, was overwhelmed by COVID-19. Stay-at-home mandates and staff redeployment impeded primary care access. Patients discharged from acute care experienced new barriers to PD care.

A team of medical students, residents and school nurses was assigned to provide PD follow-up. The challenge was to rapidly train them to a) support patients in self-management; b) help high risk patients stay connected to primary care and c) escalate to a PCP when clinically necessary. We designed, implemented and evaluated an efficient just-in-time curriculum to cross-train this new team. Ask Me 3 and Academy of Communication in Healthcare (ACH) tools were foundational elements of this patient-centered intervention.

DESCRIPTION: The curriculum consisted of a 2-hour workshop and daily video case conferences. In the workshop, participants discussed and practiced: 1) Ask Me 3 for eliciting patient understanding and concerns, 2) ACH Relationship-Centered Communication Skills for establishing rapport and managing emotions, and 3) ACH COVID-19 ART for responding to questions and anxiety around their illness. These tools were chosen because they a) are easy to train and standardize, b) support effective communication on self-management and emotion handling.

Daily case reviews allowed participants to discuss challenges and share tips such as community resources. The program was evaluated using participant surveys.

EVALUATION: Participants included 7 school nurses, 7 medical students and 2 residents (n=16). At 4 weeks, 100% "Agreed" or "Strongly Agreed" that they 1) were confident in their ability to elicit patients' barriers to following the PD plan, 2) gained a deeper understanding of barriers to self-management and 3) were confident in their ability to help a patient understand their illness and PD plan. 32% of patients reached had an immediate clinical need escalated to a PCP.

100% agreed this intervention should be standard of care. 4 of 7 RNs were so impacted by what they learned that they said they intended to explore alternative careers that incorporate these skills. Multiple students felt "shocked" by all the things that could go wrong in a patient's safe transition to home.

DISCUSSION / REFLECTION / LESSONS LEARNED: Disasters that require a sudden reallocation of primary care staff to acute care settings leaves short term threats to patient safety. Our curriculum yielded clinicians confident in their skills and aware of the impact this work plays in patient-centered primary care. Core elements of this just-in-time curriculum (standardized communication tools, skills workshops, daily case reviews) can be used to fill other care gaps that arise when disasters lead to rapid staff reallocation.

ENGAGING MEDICAL STUDENTS IN COMMUNICATION WITH PRIMARY CARE PATIENTS THROUGH THE PATIENT PORTAL: LESSONS DURING COVID-19

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LEARNING OBJECTIVES 1: Develop and pilot a program for medical students to participate in electronic communication with patients.

LEARNING OBJECTIVES 2: Assess the educational benefits of the program from student and faculty perspectives regarding patient care and communication skills.

SETTING AND PARTICIPANTS: Managing electronic communication with patients is an increasingly important part of a physician's duties, yet there are few studies about how to best prepare trainees for this aspect of practice. With the need for remote learning during the COVID pandemic, engaging medical students in electronic communication with patients presented an opportunity for training in this form of communication. Four students from Harvard Medical School who had completed at least half of their core rotations were selected to participate on a volunteer basis and paired with a faculty member at Healthcare Associates, the primary care practice based at BIDMC, a teaching hospital in Boston, Massachusetts. Patient messaging was through PatientSite, BIDMC's proprietary patient portal for communication between health professionals and patients.

DESCRIPTION: The pilot occurred between March and June 2020, during the first wave of the COVID pandemic. Three student-faculty pairs participated for 8 weeks; one pair participated for 4 weeks. Each faculty member's PatientSite messages were forwarded to their respective student. Students either forwarded messages to the appropriate clinical staff or drafted a response for messages requiring a clinician response, sending it to their preceptor for approval before sending it to the patient. Students created categories to track the types of messages they received, which were determined prior to initiation of the project and reassessed periodically.

EVALUATION: During the 8-week pilot, students responded to 381 unique interactions, with an average of 14 messages per work week. 52% of messages represented non-urgent clinical concerns, 10% were urgent concerns requiring same day follow-up, and 11% were related to COVID-19. 11% of messages regarded scheduling, and 4% involved prescriptions or prior authorizations. All students found the pilot to be an engaging educational experience, helping them build skills in clinical triage, care coordination, understanding social needs, and patient communication. Faculty felt the program allowed them to improve their ability to teach and assess communication skills, have more flexibility in teaching, and stay more connected to students during the pandemic.

DISCUSSION / REFLECTION / LESSONS LEARNED: This program demonstrated that involving medical students directly in electronic communication with patients is a promising method of helping them build patient care and communication skills. Just as students must develop a clinical "voice" for speaking with patients in person, they must also develop the ability to communicate effectively with patients online. While the pilot was small, it provides a model for broader implementation and preparing trainees for future practice.

ENHANCING PHYSICAL EXAM AND CLINICAL REASONING SKILLS IN MEDICAL STUDENTS THROUGH THE DEVELOPMENT OF A LONGITUDINAL HYPOTHESIS-DRIVEN PHYSICAL EXAM CURRICULUM

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LEARNING OBJECTIVES 1: Apply a hypothesis-driven approach to the physical exam allowing students to improve their ability to tailor their exam to a chief complaint.

LEARNING OBJECTIVES 2: Interpret physical exam (PE) findings and revise the post-test probabilities of competing diagnoses.

SETTING AND PARTICIPANTS: Ten 3rd year medical students at the University of Colorado School of Medicine enrolled in the Denver Health Longitudinal Integrated Clerkship (DHLIC) each attended six small group HDPE sessions.

DESCRIPTION: HDPE sessions are comprised of four components:

Anticipation- The facilitator presents a chief complaint and brief history. Students form a differential diagnosis and discuss PE maneuvers to perform. Assessment of the learner's pre-existing knowledge of PE maneuvers guides additional teaching.

Elicit findings- Perform selected exam maneuvers at the bedside. Provide feedback on student technique and findings.

Interpretation- Teach evidence-based physical diagnosis to help students utilize exam findings to justify a diagnosis.

Debriefing- Discuss case outcome and impact of PE on diagnostic and treatment interventions.

EVALUATION: Students were assessed before and after curriculum implementation using 1) An Anticipation Form on which students write anticipated physical exam findings associated with listed diseases in open-ended form, and 2) an Interpretation Form on which students are provided a clinical scenario and exam. Students select a final diagnosis and designate which exam findings had high diagnostic yield. DHLIC student results were compared with 3rd year medical students on the Internal Medicine clerkship who did not attend HDPE sessions.

The curriculum was also evaluated by student survey assessing the learning value, satisfaction, and if principles learned were applied in alternate clinical settings.

DISCUSSION / REFLECTION / LESSONS LEARNED: Prior literature cites the lack of longitudinal teaching and lack of hypothesis-based physical exam teaching as gaps in PE curriculum. Clinical clerkships provide opportunities for students to practice PE skills, but often without direct observation or dedicated teaching. Accurate physical diagnosis requires both a knowledge base and the procedural skill. We developed HDPE sessions to improve student knowledge of the diagnostic utility of the PE and to allow students to practice exam maneuvers.

Interim analysis found that medical students' ability to interpret provided exam findings to make a diagnosis exceeded their ability to independently describe a focused exam for a given chief complaint or detect abnormal findings. As the curriculum progressed, we observed that students focused more on contrasting exam findings and how to anticipate and elicit findings, rather than the evidence base of physical diagnosis. Facilitators observed improved skill in PE maneuvers and selection of a tailored PE approach as sessions progressed. HDPE sessions provided an opportunity to teach students how to tailor the PE to a differential diagnosis and incorporate the PE into developing illness scripts. Data analysis will be complete in March 2021.

EVIDENCE BASED MEDICINE REBOOT: THE IMPACT OF MENTORSHIP

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LEARNING OBJECTIVES 1: Incorporate EBM teaching into the outpatient setting

LEARNING OBJECTIVES 2: Implement a case-based EBM skills practice focused on faculty mentoring

SETTING AND PARTICIPANTS: The study was completed within an academic internal medicine residency program and received institutional IRB approval. Twenty-nine third-year residents were divided into two groups based on continuity clinic site. Fifteen residents received the experimental EBM Capstone curriculum, while 14 residents completed their evidence review using the online EBM Education Prescription (EP) learning tool.

DESCRIPTION: Our residency program has been using the online EBM EP tool from the University of Wisconsin (Feldstein, 2009) that guides residents through the four core EBM skills. In the process of re-evaluating our EBM curriculum and based on resident feedback, we built on the EP approach to create an EBM capstone project to emphasize asking relevant clinical questions and searching for the highest quality evidence.

All capstone residents were paired with a faculty mentor to guide their investigation and presentation. Residents were asked to identify a clinical question related to one of their continuity patients. Mentors were instructed to guide residents through question development and strategize an approach to literature review. Residents were then asked to prepare a 45-minute interactive presentation in which they facilitated a discussion based on the four EBM skills and their patient, which provided them an opportunity to teach instead of present their findings. All but one of the resident presentations utilized video-conferencing technology.

EVALUATION: On a post-course survey using Likert scales ranging from 1 to 5, third year residents doing the EBM Capstone compared to those who just used the EP tool indicated the faculty mentorship improved their ability to develop clinical questions (4.2 vs 3.5, Mann-Whitney U, p=0.04), apply results to their patients (4.4 vs 3.4, p=0.01), and teach EBM skills (4.6 vs 3.5, p=0.005). Ratings of confidence in EBM skills for first- and second-year residents participating in the presentations did not differ between groups and ranged from 3.0 to 3.8.

A post-course focus group among faculty mentors identified four key themes: 1) early interaction allowed for constructive formative feedback and guidance, 2) robust discussions during the presentation enhanced learning, 3) preference for formative over evaluative feedback and, 4) importance of emphasizing curiosity and self-directed learning.

DISCUSSION / REFLECTION / LESSONS LEARNED: While most residency programs have EBM curricula with didactic sessions and journal clubs to build confidence in appraising studies for risk of bias, trainees need practice applying this knowledge in the clinical setting. Our EBM Capstone course, based in faculty mentorship and self-directed learning, improved on an online learning tool in teaching core EBM skills in the ambulatory setting. A focus on initial question development and an approach to literature review may help learners integrate EBM into their daily clinical practice.

EXPANSION AND EVALUATION OF PC TEACH, A NOVEL PEER-TEACHING TEAM MODEL BASED IN THE OUTPATIENT SETTING

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LEARNING OBJECTIVES 1: To augment residents' confidence and skills as outpatient teachers and clinicians

LEARNING OBJECTIVES 2: To increase residents' satisfaction with and interest in primary care careers

SETTING AND PARTICIPANTS: 42 senior residents, 42 interns, and 10 attendings in an Internal Medicine residency program are participating in PC Teach at 4 primary care clinics.

DESCRIPTION: Whereas peer teaching is central to inpatient internal medicine education, residents rarely have the opportunity to teach and mentor each

other in the outpatient setting. To address this gap, we created PC Teach, an innovative outpatient peer-teaching program, in 2017. In the present study, we aim to evaluate an enhanced and expanded version of PC Teach.

In the expanded program, senior residents first participate in an interactive training session to learn a validated outpatient teaching model and feedback techniques. During each half-day PC Teach session, one resident is paired with one intern in the primary care clinic. The intern sees each patient independently and then presents to the resident, who serves as the main preceptor; the attending supervises this interaction. At the end of each session, all three participants are provided worksheets to facilitate self-assessment and feedback.

EVALUATION: Prior to the training session (December 2020), participating senior residents completed a baseline survey assessing their self-efficacy as teachers in the outpatient setting, their confidence in primary care practice, and their satisfaction with primary care training. All survey items used a 5-point Likert scale. A control group of senior residents not participating in PC Teach also completed the baseline survey. After 6 months of the intervention, both groups of residents will receive a followup survey to evaluate the program's impact on concepts measured in the baseline survey. We will compare the baseline and followup survey responses within and between the two groups to assess the impact of PC Teach on resident satisfaction with and perceived readiness for outpatient practice and teaching.

DISCUSSION / REFLECTION / LESSONS LEARNED: Successful implementation of our pilot program, completed in June 2020, demonstrated that PC Teach was feasible and well-received by primary care track trainees and faculty, thus leading to the current expansion to incorporate categorical trainees and additional clinic sites as part of the program.

Baseline survey data suggest that most residents, despite reporting low interest in primary care as a future career, are highly interested in careers involving outpatient practice and teaching; it also reveals room to improve residents' modest confidence in teaching in the outpatient setting.

In conclusion, PC Teach may be broadly beneficial, even for residents not planning careers in primary care. Analysis of followup data will offer additional insight into the impact of PC Teach. A successful program has the potential to improve resident satisfaction with outpatient education and to influence their interest in outpatient and/or primary care careers.

ONLINE RESOURCE URL (OPTIONAL): <http://bit.ly/PCTEACH>

EXPLORING HEALTH SYSTEMS SCIENCE THROUGH PROACTIVE OUTREACH: AN EXPERIENTIAL ELECTIVE CURRICULUM

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LEARNING OBJECTIVES 1: Learners will be able to define, appreciate, and apply Health Systems Science (HSS).

LEARNING OBJECTIVES 2: Learners will engage in direct patient care and reflect critically to identify ways the health system can better support communities.

SETTING AND PARTICIPANTS: Health professional students at Emory and Morehouse Schools of Medicine in Atlanta, GA, engaged in COVID-19 proactive outreach for Grady Health System. Students were offered the opportunity to participate in a formal HSS elective curriculum built around this experience.

DESCRIPTION: In the wake of the COVID-19 pandemic, health professional students joined faculty and hospital advisors to develop a proactive outreach initiative for high-risk patients. They developed a standardized telephone script to screen patients for COVID-19 symptoms, check on chronic medical conditions, determine need for medication refills, and evaluate for social assistance. Faculty advisors recognized the authentic application of HSS and opportunity to integrate curricular components. The advisors created a four-week elective curriculum involving group and independent learning components to supplement the completion of 30 outreach calls. Didactic sessions introduced the HSS framework while an interdisciplinary session engaged pharmacy and social

work to answer student questions from patient experiences. Students critically reviewed articles related to HSS in a journal club and completed the American Medical Association (AMA) HSS Learning Series. Students presented a final HSS project proposal based on their experiences. The elective is continuing and was implemented into medical student outpatient clerkships.

EVALUATION: Twenty-seven MD and PA students have completed the elective. Informal feedback indicated value in the authentic learning experience that directly applied HSS principles. Students deepened their understanding of healthcare barriers and gained skills in eliciting these obstacles from patients and connecting them with resources. Students encountered a wide breadth of medical, social, and health systems issues. Almost every HSS competency was incorporated into at least one if not more of the learning components. Next steps include measuring patient outcomes, collecting formal feedback from learners, and following implementation of students' HSS proposals.

DISCUSSION / REFLECTION / LESSONS LEARNED: The course utilized an experiential curriculum to teach HSS in an authentic, value-added way for learners and patients. The elective illustrated the value and opportunity in identifying preexisting student activities and integrating a formal curricula of reflection and discussion. Opportunities exist in pre-clinical modules like cardiology and endocrinology, which could incorporate the HSS competencies and apply them through supervised patient outreach efforts. Required clinical clerkships like primary care and internal medicine could supplement in-person patient encounters and provide follow-up. By incorporating patient care for experiential learning, this curriculum motivated students to learn from and participate in HSS.

FEASIBILITY TESTING OF AN INTERPROFESSIONAL ASSESSMENT OF MEDICAL STUDENTS' TEAMWORK SKILLS IN A LONGITUDINAL INTEGRATED CLERKSHIP

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LEARNING OBJECTIVES 1: Provide students with direct, formative feedback on their interprofessional (IP) skills

LEARNING OBJECTIVES 2: Test if the survey and collection method are sufficient to formally assess students' IP teamwork skills

SETTING AND PARTICIPANTS: Ten 3rd year medical students participating in a Longitudinal Integrated Clerkship (LIC) experience at the University of Colorado School of Medicine (CUSOM).

DESCRIPTION: The Clinical Integrations Interprofessional Professionalism Student Assessment (CI-IPSA) is a validated tool used to assess IP students at the University of Colorado. Prior research within CUSOM revealed that students wish feedback was provided by individuals who knew them better and occurred repeatedly to allow for continuous improvement.

To address these concerns and to prepare for a shift to criterion-based grading in the CUSOM including IP skills, we integrated the CI-IPSA into an LIC, where students work with the same faculty and IP staff throughout the year. We aimed to afford students feedback on IP teamwork skills from IP staff multiple times throughout the year.

We piloted a novel collection system for the CI-IPSA using posters with QR codes and email links encouraging IP staff to independently access the survey. We introduced the project at clinical staff meetings with periodic reminders. We outreached preceptors by email to encourage them to ask their IP staff to provide feedback via the survey.

Students were encouraged to request surveys from IP staff for a goal of 6 by the end of the LIC.

EVALUATION: Data collected for evaluation of the pilot includes: number of surveys completed; profession of the evaluators; who prompted the survey to be completed; the quality of comments; ratings of students IP skills; and changes in ratings over time.

We plan to do focus groups with students, faculty preceptors, and IP staff to assess the value of this project, barriers to implementation, and ideas for improvement.

Interim analysis demonstrated a range of 0 to 4 evaluations per student at mid-year from a wide range of IP staff. A total of 20 surveys have been collected. Comments were all positive in nature, with a minority describing specific behaviors related to IP skills. The majority of evaluations were prompted by students or faculty.

DISCUSSION / REFLECTION / LESSONS LEARNED: IP teamwork is critical for effective medical practice. Little has been published on validated tools for assessing medical students' development of these skills. We aimed to determine the feasibility of obtaining direct feedback from IP staff in a LIC and what methods are best to collect this. Interim analysis suggests training IP team members in providing feedback may be needed; full results and analysis including focus group data, will be available by March, 2021. Results will inform IP assessment for CUSOM students and are applicable to medical schools assessing students IP teamwork skills.

ONLINE RESOURCE URL (OPTIONAL): IPA Website: <http://www.IPprofessionalism.org> (basis of CI-IPSA)

FOCUSING THE LENS ON TRAINEE ASSESSMENT TO ENHANCE COMPETENCY-BASED MEDICAL EDUCATION OUTCOMES IN ACGME RESIDENCY PROGRAMS

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LEARNING OBJECTIVES 1: Describe an approach to tracking the rate of faculty completion of resident evaluations

LEARNING OBJECTIVES 2: Understand the potential of tracking and reporting evaluation completion rates to strengthen resident assessment

SETTING AND PARTICIPANTS: 36 residency programs, 2 academic medical centers (AMCs)

DESCRIPTION: The ACGME requires documentation of resident's competency prior to graduation. We examined concerns about resident assessment identified via ACGME program citations, internal program reviews, and/or annual resident surveys. Inadequate assessment could relate to quality and/or quantity of evaluations, as well as feedback. To explore the quantity of evaluations provided to residents, we sampled a 9-month interval in 6 programs and found a paucity of evaluations (an average of 50% of resident rotations had no faculty evaluations). We hypothesized that setting an explicit target, tracking completion of faculty evaluations, and reporting the data to key stakeholders would lead to improvement.

An initiative was launched in 36 residency programs at 2 AMCs to track and report the "evaluation completion rate" (ECR), defined as the proportion of resident rotations with at least one faculty evaluation submitted. A target rate of 80% was communicated to program directors. Evaluation data was extracted from New Innovations (NI), or collected from the program if NI was not utilized. The ECR was calculated for each program, and additional related metrics were compiled (the number of evaluations assigned, completed, or incomplete for each resident, on each rotation). Reports were distributed to program and institutional leaders and reviewed at education committee meetings. Programs <80% were asked to submit an improvement plan, and best practices utilized by programs >80% were shared with all. No specific steps related to enforcement for completing evaluations was undertaken during this period.

EVALUATION: Data for 1,300 trainees was analyzed every 6 months for 3 years, then annually for 2 years. Initially, 4 programs (4/36, 11%) were at or above the 80% target; with rates ranging from 8%-100%, mean 54% completion rate. After 8 report cycles, 20 programs (20/36, 56%) exceeded 80%. The mean completion rate among all programs improved from 54% to 73% over the 5-year period.

DISCUSSION / REFLECTION / LESSONS LEARNED: Faculty evaluation is an essential component of trainee assessment: while evaluation quality is clearly important, ensuring that evaluations are completed is even more fundamental. This study documents that the simple intervention of tracking and reporting evaluation completion rates was associated with a notable improvement, though causality is not established. Lower rates may be due to improper matching of faculty to trainees in NI, which would not be expected to respond to this intervention. Future efforts will broaden this approach to include other

evaluators, supporting ACGME's requirement of 360^o evaluation and the documentation of each resident's competency for practice.

FOOD JUSTICE AND MEDICINE: INCORPORATING FOOD JUSTICE WORK INTO UNDERGRADUATE MEDICAL EDUCATION

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LEARNING OBJECTIVES 1: Promote awareness among future physicians about the systemic barriers to healthful eating and its implications in patient care.

LEARNING OBJECTIVES 2: Develop innovative and sustainable solutions to address food insecurity in local communities.

SETTING AND PARTICIPANTS: Students at the Albert Einstein College of Medicine (AECOM) in the Bronx, NY during undergraduate medical education (UME). The Bronx community faces high rates of food insecurity, leading to disproportionate rates of diet-related diseases in its residents.

DESCRIPTION: At AECOM, the community-based service learning (CBSL) program was designed to serve and advocate for vulnerable groups in the Bronx. Within this platform, Food Justice and Medicine (FJAM) was formed to partner medical students with groups in the larger health system and community coordinating efforts to improve food access throughout the borough. Students will take part in established initiatives while collaborating to design and evaluate new ideas.

EVALUATION: The proposed evaluation will include tracking student-led research and advocacy initiatives, volunteer hours, and community-based partnerships. Demonstration of improved student knowledge of food insecurity and its effect on health will be measured through knowledge questionnaires, observed structured clinical exams, and integration of food insecurity screening into core UME sessions.

DISCUSSION / REFLECTION / LESSONS LEARNED: The COVID-19 pandemic has unmasked long-lasting systemic inequities in our society. Its disproportionate impact on marginalized communities, compounded by economic devastation, has forced many to seek emergency food assistance. Over the course of the pandemic, the Bronx has been an epicenter for both the virus and food insecurity.

As medical students training in the Bronx, we felt compelled to help our community access food during these difficult times. We developed a project to drop off groceries to homes of those medically unfit to venture out to stores and who could not afford grocery delivery service. From this experience, we have since thought about how we can continue engaging the AECOM community around food insecurity long term.

Food access is a core social determinant of health and food insecurity will not end with the pandemic. Our newly established CBSL group is positioned to foster collaborations between medical trainees, public health personnel, and community organizations to combat food insecurity. In order to end the epidemic of diet-related diseases, we must engage medical schools around the importance of access to nutritious food in our most vulnerable communities.

IMPACT: Medical schools have an obligation to train the next generation of physicians with competencies to promote the overall health of the communities they serve. By establishing a space within UME for students to take part in initiatives vital to their community, medical schools can augment student understanding of nutrition and its impact on health. With the creation of FJAM, students will take part in remedying an unjust food system that has plagued the Bronx for decades.

GETTING SOCIAL ABOUT HIV PRE-EXPOSURE PROPHYLAXIS (PREP) FOR BLACK HETEROSEXUAL WOMEN (BHW): A NOVEL EDUCATIONAL CAMPAIGN FOR POTENTIAL PREP USERS AND CLINICIANS

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LEARNING OBJECTIVES 1: Describe BHW's understanding of their HIV risk and their knowledge of and interest in PrEP

LEARNING OBJECTIVES 2: Prepare clinicians to engage BHW in non-judgmental conversations about sexual health and offer PrEP when indicated

SETTING AND PARTICIPANTS: The social media campaign engaged 8 Black women influencers and their 600,000+ online followers. The accredited digital publication targeted clinicians (internal and family medicine [IM/FM] physicians, OB/GYNs, NPs, PAs, nurses).

DESCRIPTION: Between April and August 2019, 8 social media influencers (SMI) with Black audiences shared information on multiple social media platforms and surveyed their network to gauge awareness of HIV risk and PrEP. One SMI hosted a Facebook Live webinar with an HIV expert for in-depth discussion and live Q&A.

An accredited digital publication for clinicians presented evidence on the benefits/limitations of PrEP for BHW, recommendations to successfully implement PrEP, and key points from the SMI survey. The publication launched in May 2019 and was available for 1 year.

The initiative was funded by an unrestricted educational grant from Gilead Sciences, Inc.

EVALUATION: The social media campaign reached 600,000+ followers and garnered 527 Facebook reactions, 203 comments, and 2,100 Instagram likes. The webinar had 13,000+ views (live and enduring versions).

692 Black women responded to the survey. 67% were not worried about being exposed to HIV in the next 6 months and 17% were moderately, very or extremely worried. 64% would be interested in taking a pill to prevent HIV; however, 33% were uncomfortable talking to their clinician about HIV prevention, most often due to not knowing what questions to ask, feeling embarrassed, and fearing they'd be seen as promiscuous.

The digital publication had 2,209 learners (85% MD/DO, NP, PA; 74% in target specialty), and matched pre/post-test data were available for 146. There were knowledge gains about the effects of BHW's behaviors and poverty on HIV risk (increase of 15% and 33%). Confidence in learners' ability to incorporate HIV prevention into routine care of BHW increased (34% moderately/very confident pre vs. 73% post), and more learners were very likely to recommend PrEP to BHW after the education (57% pre vs. 77% post). $P < .01$ for all comparisons.

DISCUSSION / REFLECTION / LESSONS LEARNED: We implemented a novel educational campaign to promote PrEP uptake among BHW and enhance clinicians' PrEP adoption. The campaign reached a large audience and identified potential gaps for clinicians to address in their discussions about PrEP with BHW. The digital publication was helpful in increasing clinicians' likelihood of recommending PrEP to BHW.

GLOBAL HEALTH ON THE FRONT LINES: A COVID-19 COURSE COMBINING EDUCATION AND SERVICE

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LEARNING OBJECTIVES 1: Explain the clinical and epidemiologic features of SARS-CoV-2 and COVID-19 disease, identify the key features of a pandemic response at global, national, and local levels, and analyze how global pandemics intersect with issues such as health equity, social justice, health system design, health care policy, political governance, culture, communications, research, education, and ethics.

LEARNING OBJECTIVES 2: Learn contact tracing in pandemic field placements and health education communication strategies

SETTING AND PARTICIPANTS: Faculty and medical students at Dell Medical School at the University of Texas at Austin

DESCRIPTION: In response to medical students being pulled from their clinical rotations due to the COVID-19 pandemic, we developed a timely and innovative medical student elective that included faculty-curated readings and discussion prompts, student-directed online learning, and service-learning at COVID-19 pandemic response field placements.

EVALUATION: We evaluated students' experience in the course and appraised curriculum content and format through discussion board posts, field placements, scholarly projects, and collecting aggregate enrollment data. Pre-/post-course questionnaires assessed pandemic knowledge/attitudes using 4-point Likert scales. We conducted a post-course focus group with a convenience sample of 6 participants. Institutional elective evaluation data was included in analysis. We analyzed questionnaire data with summary statistics and paired t-tests comparing knowledge/attitudes before and after the elective. We analyzed reflection pieces, discussion posts, and focus group data using phenomenological content analysis. Twenty-seven students enrolled. Each student posted an average of 2.4 discussion posts and 3.1 responses. Mean knowledge score increased from 43.8% to 60.8% ($p < 0.001$). Knowledge self-assessment (2.4 vs. 3.5 on Likert, $p < 0.0001$) and self-reported engagement in pandemic response (2.7 vs. 3.6, $p < 0.0001$) also increased. Students reported increased fluency discussing the pandemic and increased appreciation for public health. There was no difference in students' anxiety about the pandemic after course participation (3.0 vs. 3.1, $p = 0.53$). Twelve students (44.4%) completed the institutional evaluation. All rated the course "very good" or "excellent." Students favorably reviewed the field placements, readings, self-directed research, and learning from peers. They suggested more clearly defined expectations and improved balance between volunteer and educational hours.

DISCUSSION / REFLECTION / LESSONS LEARNED: The elective was well-received by students, achieved stated objectives, and garnered public attention. Course leadership should monitor students' time commitment closely in service-learning settings to ensure appropriate balance of service and education. Student engagement in a disaster response is insufficient to address anxiety related to the disaster; future course iterations should include a focus on self-care during times of crisis. This educational innovation could serve as a model for medical schools globally.

GOING THE DISTANCE: HOW SCHOOL AND SPECIALTY CHARACTERISTICS AFFECT RESIDENCY MATCH GEOGRAPHY

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LEARNING OBJECTIVES 1: Recognize how school and specialty choice impact geographic match trends

LEARNING OBJECTIVES 2: Highlight the effect of COVID-19 on applicants.

SETTING AND PARTICIPANTS: We compiled a list of accredited allopathic U.S. medical schools with publicly available match lists from official university websites. Schools were included that provided match results for the last 3 years (2018-2020) with specialty and residency program details for each student excluding preliminary year positions.

DESCRIPTION: The COVID-19 pandemic has profoundly disrupted the 2021 residency match. There exists potential for significant geographic impact as students are unable to attend away rotations or in-person interviews. Prior literature on match geography is mostly limited. Our study provides a means to quantify match distance and add insight into pre-pandemic match trends. 2020 NRMP match data was used to identify characteristics of residency programs and matched applicants for each specialty. Finally, state and census division of medical schools and residency programs were added to calculate the match distance itself. Distance was codified by whether an applicant matched at their: home institution, home state, adjacent state, same census division, adjacent census division, or skipped 1 or more census divisions. Bivariate analysis was

done using Chi-square for trend to analyze the impact of school and specialty characteristics on match distance.

EVALUATION: Residency match data of 27,040 U.S. allopathic medical students from 2018-2020 was analyzed representing 66 medical schools from 28 states. 59% of students were from public institutions, and 27% of schools ranked in the top 40 for research by USNWR. The mean percentage of in-state students by school was 60.3%. Students matched into 51 states (including District of Columbia) in 26 categorical specialties and 338 distinct residency programs. Public institutions correlated with a decreased match distance (P-value <0.001) with significantly more students matching at home institution or home state (39.3%) vs. private institutions (27.5%). Higher percentage of in-state students also correlated with decreased match distance (P-value <0.001). Medical school research ranking in the Top 40 of USNWR correlated with a modest increase in match distance (P-value 0.016).

DISCUSSION / REFLECTION / LESSONS LEARNED: Despite the well-described impact of geographic bias on the residency match process, little data exists on the geographic distribution of matched applicants. Our study shows a significant correlation between in-state match rates in public institutions with higher in-state percentages, reflecting a common mission for public institutions receiving state funding. Additionally, school reputation, for which we used research ranking as a surrogate, showed a small increase in match distance relative to those outside of the top 40 ranking. Our study adds insight into how geographic match patterns are influenced by school reputation and specialty factors, which will aid our subsequent effort to understand the impact of the pandemic on the 2021 Match.

IMPACTING IMPLICIT BIAS THROUGH THE ARTS AND HUMANITIES

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LEARNING OBJECTIVES 1: Identify sources of bias in medical diagnosis and treatment and demonstrate skills to reduce bias.

LEARNING OBJECTIVES 2: Apply skills learned from arts and humanities to medicine, including communication, critical thinking, and close observation.

SETTING AND PARTICIPANTS: Faculty in the School of Medicine and School of the Arts designed an elective for first year medical students at Virginia Commonwealth University in the Medicine, Arts, and Humanities. The pilot course was held in the Spring of 2019. Data regarding implicit bias was collected for the Spring 2020 course participants compared to 17 students in a control arm of our study. Sessions were held in local art museums, community centers, and eventually held virtually due to the pandemic.

DESCRIPTION: Students enrolled in the course participated in eight four-hour sessions in the Spring semester including dialogic observation of art in local museums, practice in improvisational theater and dance/movement, reflective writing, mindfulness, and experiences concerning the impact race and culture have on medicine.

Examples of exercises in the sessions include training in close observation and description with visual art, communication and empathy practice with theater and dance, and practice with cognitive bias with visual art and role-play.

At the completion of each session, students were asked to submit written reflections.

At the conclusion of the course, students submitted a creative capstone project reflecting on the arts and humanities impact on them as a person and as a physician.

EVALUATION: We enrolled 14 students in the intervention and 17 students in the control arm. All students reported that they would be very likely (75%) or somewhat likely (25%) to recommend this course to another student. Students rated their overall experiences in the course as 5 out of 5 (62.5%) or 4 out of 5 (37.5%).

In regards to implicit bias, students in the intervention group experienced a statistically significant decrease in implicit racial bias (preference for white people) from pre to post-intervention as compared to students in the control

group (Cohen's D = -2.06, 95% CI: [-4.08, -0.05], p=0.04) measured with the Implicit Association Test. Qualitative analysis of student reflection on topics including implicit bias is in process currently.

Of eight narrative responses collected, 87.5% of students reported the course impacted their implicit bias.

DISCUSSION / REFLECTION / LESSONS LEARNED: Students in the Medicine, Arts, and Humanities course had a positive experience and are likely to recommend the course to others. We found the course was also effective in reducing implicit bias.

In a time of reckoning for racism and bias, we in medicine must create ways to uncover and combat our own unconscious bias. The arts and humanities offer a unique opportunity to teach skills in reflection, close observation, and empathy which may impact implicit bias in medical students. Future study should examine the duration of this impact as well as replication of these effects on a larger scale.

IMPACT OF A MULTIDISCIPLINARY DIABETES CLINIC ON RESIDENT EDUCATION

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LEARNING OBJECTIVES 1: To analyze the impact of the Diabetes Clinic in the Yale Primary Care Internal Medicine Residency Program (YPC) on the educational experience of residents

LEARNING OBJECTIVES 2: To identify strengths and areas for improvement of the YPC Diabetes Clinic

SETTING AND PARTICIPANTS: We conducted an online survey of all residents in YPC in the 2019-2020 academic year, who completed at least one half-day session in the Diabetes Clinic, excluding the two co-investigators of the current study.

DESCRIPTION: Since 2004, YPC has employed a novel, targeted primary care-based approach to diabetes care. In the multidisciplinary referral-based Diabetes Clinic, residents have the opportunity to conduct longer patient visits with an exclusive focus on providing comprehensive diabetes care; partner in real-time with a pharmacist, dietitian, and social worker to enhance patient care; and receive mentorship from a general medicine faculty with expertise in comprehensive diabetes care. Diabetes mellitus is one of the most prevalent chronic medical conditions in the U.S., but graduating residents in internal medicine training programs often feel underprepared to manage such chronic conditions. We designed this study to examine the impact of YPC's unique Diabetes Clinic model on the educational experience of residents.

EVALUATION: Each participant was recruited via mass e-mail sent out to the residency program listserv and to the list of 2020 program graduates. The email contained a link to the survey. Participation was voluntary and anonymous. The survey included a combination of multiple-choice, Likert scale, and free-response questions that assessed resident perception of the impact of the Diabetes Clinic on their education.

Data included responses from 29 of 52 eligible participants. Greater than 85% of respondents indicated that participation in Diabetes Clinic "increased" or "slightly increased" their: comfort level with counseling patients on target glycemic range (92.9%) and using insulin in the outpatient setting (89.3%); awareness of the need to assess for ASCVD risk and to screen for complications of DM (92.9%); appreciation for psychosocial aspects of diabetes care (85.2%); understanding of roles of pharmacists, dietitians and social workers (88.9%); and likelihood of managing difficult-to-control DM as a future primary care physician instead of referring to a specialist (85.7%).

DISCUSSION / REFLECTION / LESSONS LEARNED: Our findings indicate the multidisciplinary referral-based Diabetes Clinic had a positive impact on the overall educational experience of internal medicine residents. Notably, residents indicated that the Diabetes Clinic experience could be strengthened by including more opportunities to apply practical medication counseling skills as well as to work with and learn from clinical pharmacists and dietitians. The YPC Diabetes Clinic should serve as a model for resident-faculty practices to bolster trainee preparedness in managing chronic conditions.

IMPACT OF SMALL GROUP DISCUSSION SESSIONS AS PART OF A WELLNESS CURRICULUM.

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LEARNING OBJECTIVES 1: Participate actively in small group discussions about imposter syndrome, resilience, cultivating compassion, and finding meaning and purpose in work.

LEARNING OBJECTIVES 2: Demonstrate comprehension and develop practical strategies to address imposter syndrome, resilience, compassion, and meaning/purpose, as assessed by a retrospective pre-post evaluation survey.

SETTING AND PARTICIPANTS: We created interactive, small group discussion sessions entitled reflection rounds that were attended by the 144 internal medicine residents at Washington University School of Medicine in St. Louis, Missouri. Initially, they were held in-person but transitioned to a virtual platform due to the COVID-19 pandemic.

DESCRIPTION: Interns had a 90-minute session to discuss resilience and imposter syndrome. Second and third-year residents had two 90-minute sessions: the first session was on cultivating compassion and the second on finding meaning and purpose. Anonymous retrospective pre-post survey questions were used to assess effectiveness.

EVALUATION: Twenty-eight percent of interns (13/47) knew strategies to prevent imposter syndrome from limiting their potential before the session compared to 91.5% (43/47) after the session. Similarly, the percentage of interns who could identify strategies to improve their personal resilience increased from 64.6% (31/48) to 89.6% (43/48) after the resilience reflection rounds. Before the cultivating compassion session, 58% (36/62) of residents could identify strategies to cultivate self-compassion compared with 85.5% (53/62) afterwards. Finally, after attending the finding meaning session, the percentage of residents that had thought about core values that motivate their current goals increased from 45% (30/50) to 88% (44/50). Most residents found the imposter syndrome and resilience useful (74% and 73% respectively); while about half of residents found the cultivating compassion and finding meaning and purpose sessions useful (49% and 46% respectively). The response rate varied from 90% to the lowest of 43% with lower response rates occurring during the virtual sessions.

DISCUSSION / REFLECTION / LESSONS LEARNED: Our small group discussion curricula aimed to provide our residents with strategies to cope with stress and enhance the meaning they find in being a physician. Incorporating activities to promote reflection into resident's educational curriculum can be limited by time and resources. However, our preliminary data show that residents gain valuable strategies from our reflection rounds making these sessions an important part of our educational curriculum. Given the wide range of usefulness scores for our sessions, we will use the feedback we obtained to strengthen the content of future sessions. Building upon on our current data, we plan to assess the residents several months after the sessions to determine the retention and application of strategies learned.

IMPLEMENTATION OF REAL-TIME ELECTRONIC PATIENT REVIEWS OF CLINIC VISITS AT A RESIDENT BASED PRACTICE

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LEARNING OBJECTIVES 1: Increasing Resident Activation and Engagement in Real-Time Patient Feedback

LEARNING OBJECTIVES 2: Improving the Patient Experience at a Resident Based Practice

SETTING AND PARTICIPANTS: We implemented Q-Reviews in the resident primary care clinic at Mount Sinai Beth Israel in November 2019. We chose to implement the survey design used in our Faculty Practice to best mimic post-graduate practice. Ten survey questions were chosen to capture data on the operations of the facility and provider performance. Patients were

surveyed across the following dimensions: access, staff, wait time, clinical care, facility, and likeliness to return. Text messages were set to contact patients within four hours of their visit, and again 24 hours after their visit for patients who did not respond initially. Patients with visits primarily for social work, pharmacy, or diabetes education were not surveyed. Only patients who opted in received the survey link. Both trainees and program directors received an email with a link to activate their provider dashboards.

DESCRIPTION: The ACGME's Program Requirements for Internal Medicine training state that residency programs should use multiple evaluators to gather feedback on residents' performance. Feedback from patients is often limited, yet it is an important metric of physicians used after training. We implemented a real-time, digital feedback system to measure patients' experience in our ambulatory care sites including our continuity teaching practice. To our knowledge, few residency practices have implemented real-time electronic patient satisfaction surveys.

EVALUATION: Since implementing Q-Reviews, a moderate number of residents have activated their provider dashboards. While Q-Reviews publishes data on whether or not a resident has activated their account, the data are limited and does not quantify the number of times a resident has logged in and has engaged in the data published on the dashboard. Thus, the engagement of these trainees with the data is unknown.

DISCUSSION / REFLECTION / LESSONS LEARNED: Our next step is to measure how the data is used. We will send an anonymous questionnaire to identify if the residents are reviewing their scores and comments, as well as its impact on informing resident behavior change and improving the patient experience at the clinic. We can then measure any changes over time both as an aggregate as well at the individual level.

IMPROVING CLINICAL REASONING IN DISCHARGE SUMMARY DOCUMENTATION VIA STRUCTURED PEER FEEDBACK

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LEARNING OBJECTIVES 1: Design a clinical-reasoning-based method for teaching and evaluating discharge summary documentation to improve interpersonal and communication skills

LEARNING OBJECTIVES 2: Analyze comfort and self-perception of quality of discharge summary among trainees before and after curriculum to promote practice-based learning

SETTING AND PARTICIPANTS: The pilot curricular intervention included interns and acting interns on general medicine inpatient wards rotations and categorical interns on outpatient ambulatory medicine blocks.

DESCRIPTION: Discharge summary documentation signifies an important opportunity to convey clinical reasoning and updates in patient care between inpatient and outpatient providers. Studies have linked improved quality of discharge summaries to reduced readmission rates among high-risk patient populations (Al-Damluji, et. al. 2015). Reviews suggest error rates as high as 36.4% (1.42 errors per document) (McMillen, et. al. 2006), with 6% of errors having potential to cause severe harm (AHRQ "Readmissions"). Formalized discharge summary curricula have been shown to improve satisfaction and quality of documentation among trainees, although most of studies rely on attending feedback for residents. Our team created a transitions-of-care curriculum to instruct first-year internal medicine residents and fourth-year acting interns on ways to improve discharge summaries, using peer feedback from categorical interns on ambulatory rotations.

EVALUATION: The curriculum employed two monthly arms to teach high-quality discharge summaries to writing interns on inpatient rotations and receiving interns on ambulatory blocks. The first arm targeted 81 inpatient interns who attended a didactic presentation outlining the core elements of a

discharge summary, including the “4 Ws – What, Why, What happened, What next.” Interns submitted two discharge summaries to be graded by attendings and peers. The evaluation also included open-ended questions for feedback and a checklist to determine inclusion of the “4 Ws.” The second arm of the curriculum involved ambulatory block interns attending a peer review workshop where they graded and discussed take-home points from the summaries. To evaluate resident comfort in writing discharge summaries, pre- and post-surveys were given to ambulatory and inpatient residents after each session.

DISCUSSION / REFLECTION / LESSONS LEARNED: Attending physician grades of resident discharge summaries and 4W scoring improved on average by 8.1% and 4.5%, respectively, throughout the year, while peer scoring decreased by 0.86% and 4.96% on average during the same period. Resident comfort scores on a Likert scale improved by 6.5% after attending the peer review workshop. 2019-2020 data showed a 10.7% increase in comfort level and 14.2% increase in overall quality on average. We feel that the novelty of this intervention is real-time trainee-to-trainee feedback as well as using ambulatory rotations to help boost clinical reasoning on inpatient rotations.

IMPROVING INTERNAL MEDICINE NOVICE INTERN CONFIDENCE AND COMMUNICATION IN TELEMEDICINE THROUGH A VIRTUAL SIMULATED PATIENT ENCOUNTER

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LEARNING OBJECTIVES 1: To improve confidence in gathering history, performing a focused physical exam, and counseling a patient during a video encounter (Patient Care)

LEARNING OBJECTIVES 2: To provide feedback on telemedicine communication skills (Interpersonal and Communication Skills)

SETTING AND PARTICIPANTS: The curriculum occurred during summer 2020. Internal Medicine interns at UPMC were participants.

DESCRIPTION: During the COVID-19 pandemic, telemedicine became an integral method of healthcare delivery. Telemedicine visits require different skills than face-to-face (F2F) visits, particularly in communication and physical exam adaptation. Novice interns have potential to benefit greatly from training, as they are still developing their communication styles. There are few published interventions for telemedicine skill development in medical professionals, and we did not expect the novice interns to have much, if any, experience with telemedicine.

We developed a simulated patient case to train novice internal medicine interns in telemedicine. The case was medically straightforward, allowing the focus to be on skills rather than medical knowledge. Interns conducted an interview and focused physical exam with a Standardized Patient (SP) on a recorded Zoom call. SPs then gave interns feedback on communication using a checklist developed from pre-publication AAMC Telehealth Competencies. One week later, interns reviewed the recording of their interaction and wrote a reflection on their perceived strengths and areas of improvement for communication.

EVALUATION: Pre- and post-surveys assessed interns' confidence with performing various clinical tasks, such as gathering a history and performing a focused physical exam, in both F2F and video encounters. Responses for F2F visits were used as a baseline to account for maturation effect.

48 of 52 interns participated in the curriculum. 41 (79%) completed the post-survey, and 38 (73%) completed the self-reflection. We used a Wilcoxon signed-rank test to compare pre- and post-survey data for the video and F2F responses.

Participants had statistically significant improvements in their reported comfort with taking a history, building rapport, and demonstrating empathy ($p < 0.01$), and in their overall comfort with video visits ($p < 0.001$). The curriculum and the SP feedback were well-received; 32/41 (78.1%) agreed the experience would benefit their future clinical practice. Narrative reflections were thoughtful and descriptive.

DISCUSSION / REFLECTION / LESSONS LEARNED: We demonstrated the feasibility and success of an SP-based curriculum for telemedicine skills development. To our knowledge, this is the first reported telemedicine curriculum targeting novice interns. Other published curricula utilized SPs in telemedicine for evaluation and not as a training technique. By developing a non-

complex SP case, interns focused on practicing telemedicine skills rather than medical decision making. This curricular approach could be easily adapted for other learner levels and is aligned with the pre-publication AAMC Telehealth Competencies.

IMPROVING RESIDENT RECOGNITION AND RESPONSE TO MICROAGGRESSIONS IN THE CLINICAL SETTING: A CASE-BASED WORKSHOP IN BYSTANDER TRAINING

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LEARNING OBJECTIVES 1: For medical trainees, microaggressions in the clinical setting are a common experience that have the potential to cause significant harm.

LEARNING OBJECTIVES 2: Here we demonstrate the effectiveness of a brief, case-based workshop in improving resident recognition and response to microaggressions in the clinical setting.

SETTING AND PARTICIPANTS: Microaggressions (MAs) are brief, commonplace, and often-unintentional indignities that communicate derogatory messages to a target person or group. For medical trainees, MAs in the clinical setting are a common experience that have the potential to cause significant harm. Despite this, few residency programs incorporate formal training to address MAs into curriculum. Among programs that do, few incorporate the principle of bystander intervention (whereby an individual who witnesses a potentially harmful encounter intervenes with the goal of interrupting injurious interactions). We invited all second- and third-year Internal Medicine residents at UCLA to participate in a workshop aimed at improving resident recognition and response to MAs with a specific emphasis on bystander intervention.

DESCRIPTION: We designed a two-part workshop totaling <2 hours. First, residents were asked to watch a pre-recorded lecture (<15 min) introducing the concept of MAs and their impact in the clinical setting. Next, residents attended an in-person, small-group workshop (~90 min) where we discussed several interactive cases exemplifying some of the most common types of MAs and reviewed several techniques for intervention, with a specific emphasis on bystander intervention. Residents were asked to complete electronic surveys both before and after attending the workshop.

EVALUATION: 85 residents participated in the workshop. 81 (95%) completed the pre-workshop survey, 50 (59%) completed the post-workshop survey, and 46 (54%) completed both. While 60 residents (71%) reported experiencing and/or witnessing MAs in the workplace, only 36 (42%) had previously received formal training in MAs. The 46 residents who completed both surveys rated their ability to identify MAs as 3.3 ± 0.89 (scale: 1-5) pre-workshop and 3.9 ± 0.64 post-workshop ($p < 0.001$), ability to respond to MAs as 2.54 ± 1.07 pre- and 3.4 ± 0.69 post-workshop ($p < 0.001$), comfort responding to MAs directed at themselves as 2.65 ± 0.9 pre- and 3.3 ± 0.97 post-workshop ($p < 0.001$), and comfort responding to MAs directed at others as 2.7 ± 0.99 pre- and 3.4 ± 0.96 post-workshop ($p < 0.001$).

DISCUSSION / REFLECTION / LESSONS LEARNED: Despite the common, shared experience of MAs among residents, few residency programs incorporate formal bystander training into curriculum. Here we illustrate the burden of MAs among a cohort of senior Internal Medicine residents at a large academic institution and demonstrate the effectiveness of a brief, case-based workshop in improving resident recognition and response to MAs in the clinical setting. Our outcomes reveal both the critical importance and feasibility of incorporating bystander training into the professionalism curriculum of all residency programs.

INCORPORATING IMPLICIT BIAS EDUCATION AND MITIGATION INTO CULTURAL COMPETENCE CURRICULUM FOR FIRST-YEAR MEDICAL STUDENTS

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LEARNING OBJECTIVES 1: Patient Care: Define cultural competence and enumerate at least four aspects of culture.

LEARNING OBJECTIVES 2: Professionalism: Identify a personal bias that may potentially impact the way one cares for patients and create a mitigation plan for the identified bias.

SETTING AND PARTICIPANTS: This innovation was implemented for 1st year medical students at the University of Colorado School of Medicine. Due to the COVID-19 pandemic, the session was held virtually during Winter 2020 in a large group format with breakout rooms for small group activities. The session was required, and an optional survey was completed by students with consent.

DESCRIPTION: The Institute of Medicine report “Unequal Treatment” highlights the importance of cross-cultural medical education as a means of eliminating healthcare disparities. The LCME and ACGME agree that education in cultural competence (CC) is essential at all levels of medical education. Recently, there has been increased attention to the role that implicit bias plays in patient care and how mitigation of such bias is critical to ensuring equitable healthcare. Despite this attention, most of the focus on implicit bias has been on understanding its impact without actionable steps toward managing such bias. The aim of this innovation was to integrate CC training and implicit bias education and mitigation. The session began with didactic education about CC and implicit bias in a large group format. Following this, students were given time to reflect on a personal implicit bias, create a mitigation plan, and were provided tools to reevaluate their bias management plan in the future. Students were then placed in small groups to role play a patient-provider interaction that employed cultural aspects of shared decision making and asked students to reflect on possible biases in the case. This was followed by a large group debrief and an optional survey.

EVALUATION: 70% of the 153 students completed the retrospective pre-post survey with Likert scale ratings (1 –strongly disagree, 3- neutral, 5- strongly agree). Using a paired t-test there was a significant improvement in mean difference between students pre- and post-ratings in defining cultural competence (3.7 to 4.2, $p < 0.005$), enumerating at least four aspects of culture (3.7 to 4.3 $p < 0.005$), and recognizing a bias within oneself that may impact patient care (3.8 to 4.2, $p < 0.005$).

DISCUSSION / REFLECTION / LESSONS LEARNED: These results indicate that CC and implicit bias education can be effectively incorporated together in undergraduate medical education. Further, this intervention ensures that students can act on their knowledge to enhance patient care. Limitations include a single Institution study with no exploration of long-term retention of knowledge or performance in clinical settings. Using self-reflection and case-based examples where cultural needs and biases interact, programs can be developed that help students grow in mitigation of personal bias and to recognize situations where biases may occur.

INTEGRATING TRANSITIONS OF CARE EDUCATION THROUGHOUT THE UNDERGRADUATE MEDICAL EDUCATION CONTINUUM

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LEARNING OBJECTIVES 1: 1) Help learners identify key features, complexities, challenges and safety concerns involved in transitions of care (TOC).

LEARNING OBJECTIVES 2: 2) Evaluate strategies for enhancing effective TOC and reducing readmissions.

SETTING AND PARTICIPANTS: At Dell Medical School, health systems sciences (HSS) concepts are introduced in didactic format in the pre-clinical first year, followed by practical implementation in the clinical setting across years 2-4. We sought to develop innovative means to introduce key TOC concepts across Medicine (IM) UME courses.

DESCRIPTION: 1. The IM Clerkship introduces the key features of TOC. Students follow up with a hospitalized patient’s primary care physician for 2-way communication during hospitalization, and also contact the patient after

discharge. They subsequently write a reflection on the TOC challenges they encountered, and potential solutions.

2. These concepts are reinforced during the Acting Internship. Fourth year students participate in a similar TOC exercise, building on what they learned previously and taking greater responsibility for the discharge planning along with their attending physician.

3. We also developed a TOC Elective during the COVID-19 pandemic. Students were remotely embedded in teams caring for COVID-positive patients, serving as the “glue” that connected patient care needs across the inpatient-outpatient continuum using tele-health.

4. The longitudinal Primary Care, Family and Community Medicine Clerkship includes activities such as the Home Visit Project which highlight patients’ experiences between the inpatient-outpatient settings.

EVALUATION: Qualitative data in the form of student reflections include 2 narrative groupings: 1) reflections on challenges with TOC and 2) students’ proposals for improving TOC- at the individual provider, institutional and national systems levels.

DISCUSSION / REFLECTION / LESSONS LEARNED: Developing systems-ready physicians who understand HSS issues, such as TOC, needs to start early.

We learned that by intentionally creating opportunities for active participation in patient care across the care continuum, students gain an enhanced understanding of the challenges and pitfalls in TOC and are able to envision solutions to this complex issue.

Additionally, there is a value-added component to this work. For example, one faculty member noted that students were “incredibly helpful ..they played a pivotal role in communication with the family members of acutely sick patients, interprofessional collaborations, as well as discharge planning and follow-up.”

INTERNAL MEDICINE RESIDENT COLLEAGUE / FACULTY COLLABORATIVE: DESIGN AND IMPLEMENTATION CLINICIAN EDUCATOR TRACK AT UNIVERSITY OF FLORIDA

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LEARNING OBJECTIVES 1: Discuss an innovative resident peer designed Clinician Educator Track

LEARNING OBJECTIVES 2: Provide knowledge of professionalism enhancement through medical education community of practice.

SETTING AND PARTICIPANTS: Academic center internal medicine residency, PGY 1-3

DESCRIPTION: The University of Florida (UF) Internal Medicine Residency Clinician Educator Track was created to bring together a collaborative group of like-minded residents and faculty who are passionate about medical education. The goal of the program is to provide the foundation and expertise in medical education and scholarship, and to train the next generation of leaders as Clinician Educator Scholars. This track provides a longitudinal curriculum and experiential opportunity to acquire proficiency in adult learning theory, clinical teaching, curriculum design and assessment, leadership, and scholarship with the goal of collaborating within the community of educators as both mentees and mentors. The Clinician Educator track was created using a three-prong approach of didactics, active teaching experience, and a scholarly capstone project. The didactics are comprised of a longitudinal curriculum to develop residents as educators. Resident peer and faculty mentors further engage in collaborative education in medical education scholarship design and implementation. Active teaching experiences include small group teaching of both medical students and residents, lecture-based teaching, and precepting. Finally, the scholarly capstone project gives residents experience designing and implementing a scholarly medical education project. Examples of capstone projects include an interactive research curriculum, a leadership curriculum, and a new anesthesia elective for IM residents.

EVALUATION: The Clinician Educator Track was awarded the 2020 UF Graduate Medical Education Innovation of the year award. The first two

cohorts have had an above average number of publications with 19 PubMed indexed original research articles, 3 published case reports, 18 accepted abstracts and posters, and 7 ongoing quality improved projects. This track saw two out of the four inaugural residents elected as chief residents. Further evaluation of the Clinician Educator Track will be through future focus group assessment. Longitudinally, we plan to evaluate how many residents completing this track go on to have careers as clinician educators.

DISCUSSION / REFLECTION / LESSONS LEARNED: The UF internal medicine Clinician Educator track has succeeded in improving the culture of medical education within our residency program. The resident peer participation in the design and the on-going peer mentoring is an innovative component of this track. It is producing physicians who feel prepared for careers in medical education and have developed expertise in medical education-based research and curriculum design. It has successfully created an environment that fosters peer-to-peer teaching and mentoring, increased scholarly performance and opportunities in curriculum development, and development of future leaders in medical education.

LATE NIGHT LEARNING: STUDENT AND FACULTY PERCEPTIONS ON AN OVERNIGHT ROTATION DURING A RESTRUCTURED INPATIENT MEDICINE CLERKSHIP IN THE AGE OF COVID-19

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LEARNING OBJECTIVES 1: To assess student and faculty perceptions on the educational value of an overnight clinical rotation.

LEARNING OBJECTIVES 2: To assess the impact on student wellness of an overnight clinical rotation.

SETTING AND PARTICIPANTS: We implemented a one-week night float (NF) at the Icahn School of Medicine at Mount Sinai as a component of the inpatient medicine (IM) clerkship, followed by a survey distributed to inpatient medicine clerkship students, house staff and faculty.

DESCRIPTION: A large proportion of patients on general medical wards are admitted overnight, limiting opportunities for medical student involvement. The COVID-19 pandemic has introduced new challenges in undergraduate medical education such as cancelled or shortened clerkships and limited availability of faculty and clinical sites to accommodate students. To address these dual challenges, students were assigned to perform history and physicals (H&Ps) and participate in cross-coverage events as observers during a one-week (NF) rotation starting in July 2020.

EVALUATION: In this ongoing survey study, we examined perceptions regarding the educational value of the rotation, the quality of teaching and feedback delivered overnight, and the impact on student wellness. Using a 5-point Likert scale (1=strongly disagree to 5=strongly agree), we assessed perceptions of the educational value of the components of the NF rotation and student wellness.

Using a 5-point comparative scale (1=much better on days to 5=much better on nights), we assessed the quality of teaching, supervision, and feedback on days compared to nights.

At interim analysis, 48/78 (61.5%) students and 8/17 (47.1%) faculty responded to our survey. Students rated all educational components of the NF rotation as greater than 3.0, with particular value placed on performing H&Ps (4.4) and advancing oral presentation skills (4.3). Students perceived that supervision of history taking, physical exam, and oral and written presentations was equally good at night compared to days. Students perceived their wellness to be better on days than nights (3.9), and received less feedback (2.5) and teaching on medicine topics (2.3) from their intern overnight. Students perceived the overall benefits of NF to outweigh its disadvantages (3.5) and recommended NF be continued in future academic years (3.7). Faculty rated all components of the NF rotation as greater than 4.0 and did not perceive difficulties in assessing student performance or managing time during morning rounds with the introduction of NF.

DISCUSSION / REFLECTION / LESSONS LEARNED: Students and faculty reflected positively on the quality of education and supervision on NF. Opportunities for improving this novel curriculum include addressing student wellness overnight. Additional data collection from the entire cohort along

with house staff attitudes will be needed to support the conclusion that a 1-week NF rotation can provide educational value while addressing the current curricular challenges in undergraduate clinical education.

LEARNING TO PARTNER: MEDICAL FACILITATION AS AN EDUCATIONAL TOOL

Hira Qureshi, Oliver Schirokauer

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LEARNING OBJECTIVES 1: Participants will describe ways to support the development of communication skills, self-awareness, and professional identity in students.

LEARNING OBJECTIVES 2: Participants will consider how best to promote partnerships between patients and students.

SETTING AND PARTICIPANTS: The medical facilitation elective is an 8-week course designed for a cohort of medical, nursing, and physician assistant students who are in the early stages of their programs.

DESCRIPTION: Medical facilitation is a service that provides support related to communication, information processing, and decision making to patients who are adjusting to serious illness. Enrollees in our elective will train as student facilitators. In this capacity, they will accompany patients to their medical appointments, see and hear what it is like to be ill or to care for someone who is ill, and explore how to provide meaningful support. In addition, they will attend a weekly two-hour class. Half of each meeting will be devoted to activities related to communication, contexts of illness, self-awareness, partnering, and/or professional identity. The other half will be dedicated to discussion of the patient cases.

EVALUATION: Students will submit weekly reflections that will serve as data for a qualitative study of the course's impact on how participants approach interactions with patients and how they understand their professional role. Secondary themes of interest include students' perspectives on interprofessional identity, systems-based practice, and self-care. Additionally, after each running, the course will be evaluated in 8 domains: organization, logistics, clinical experiences, class sessions, assignments, workload, coordination with affiliated programs, and missed opportunities.

DISCUSSION / REFLECTION / LESSONS LEARNED: Because our elective comes early in training and gives students the opportunity to experience medical practice and the impact of disease from the patient's perspective, we expect that it will confer a foundational and lasting awareness of what it means to be on the other side of the medical encounter. As such, it will promote the development of effective communication skills, a sensitivity to the contexts in which illness occurs, and an affinity and capacity to partner with patients.

The non-clinical activities in the course include readings, videos, writing assignments (see URL), in-class exercises, and case discussions, and are essential to the growth that we envision. The curriculum is designed to enable students to learn from experts, each other, and themselves, and reflects our commitment to the role that personal experience and self-awareness play in learning and practice.

ONLINE RESOURCE URL (OPTIONAL): <https://drive.google.com/file/d/1cTxOWqX5rh1iFxFxK0XbjpqDbEOxGKEhCa/view?usp=sharing>

MAKING AN IMPACT WITH E.M.P.A.C.T.

Tracey Henry

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LEARNING OBJECTIVES 1: Review the need for the programs like E.M.P.A.C.T. via its purpose and framework.

LEARNING OBJECTIVES 2: Discuss the key findings from our pilot program: Engage, Empower, Mentor, Prepare, Advocate for, Cultivate, and Teach (E.M.P.A.C.T.) URiM medical students in a supportive and inclusive learning environment.

SETTING AND PARTICIPANTS: EMPACTgroup sizes range from 4-5 members with representation from each medical school class M1-M4 with two overarching faculty mentors. We recruited medical students, one from each year, to operate as peer mentors. Uniquely, there will be a trickle-down effect of

mentoring as the more senior medical student mentee M3 or M4 also mentors his/her junior, adding a layer of leadership and accountability for each mentee all with ultimate oversight by a faculty mentor.

DESCRIPTION: The EMPACT Pilot Program was conducted between October 2019 and May 2020. A total of 19 EMPACT mentorship groups were created from the October Speed Mentoring Mixer, consisting of two resident/fellow/faculty mentors and three-four medical students. There were a total of 68 medical students and 38 mentors. The mentoring groups met separately an average of 3 times during the program. Additionally, four workshops were held for EMPACT students and mentors between March 2020 and May 2020: Microaggressions and Bystander Workshop, Wellness during COVID-19 Workshop, Overcoming the Imposter Syndrome Workshop, and a CV building Workshop. A final EMPACT Wrap-up and Awards event was held in May 2020 in which outstanding mentors and students were recognized.

EVALUATION: There was a significant increase for mentors or students in feeling that there is a good social support system at Emory SOM when comparing before and after the EMPACT program.

There was a significant decrease in the amount of medical students that feel they need an advocate at the Emory SOM when comparing before and after the EMPACT program.

The majority of students were satisfied or very satisfied with the EMPACT educational experience (79%) and the program overall (85%).

94% students would recommend the EMPACT program to other students.

93% of mentors would recommend the EMPACT program to other mentors

DISCUSSION / REFLECTION / LESSONS LEARNED: -Overall a successful program -We met our program goals to foster a sense of community -Strengthen social support with structured mentoring relationships for URiM students

-Fostered personal and professional growth

Limitations to the Program

-COVID-19 served as a major limitation to the program being executed as intended. This may have impacted the amount of meetings mentor groups had, feelings of connectedness, and satisfaction with the program.

-The pre and post surveys may have been completed by different respondents, so comparison data from pre and post surveys may have been affected.

-Survey did not ask respondents whether they attended the workshops, which may have provided more insight into tracking pre and post outcomes for those who attended the workshops.

ONLINE RESOURCE URL (OPTIONAL): <https://med.emory.edu/education/multicultural-med-student-affairs/empact/index.html>

MAPPING CLINICAL DATA TO CHARACTERIZE RESIDENTS' DIVERSE EDUCATIONAL EXPERIENCES

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LEARNING OBJECTIVES 1: Characterize internal medicine resident's inpatient clinical exposure across public, private, federal and community hospital settings.

LEARNING OBJECTIVES 2: Identify disparities in resident's clinical exposure across sites to guide curriculum development and rational rotation scheduling.

SETTING AND PARTICIPANTS: Experiential learning through patient care is the primary means by which Internal Medicine (IM) residents mature. Despite this, there is an unmet need to characterize how residents' diverse patient care activities inform their educational experience. This is especially true at NYU's IM Residency, which comprises over 200 residents across four distinct hospital systems, exposing residents to diverse, and often variable clinical content. We have previously described a 'crosswalk tool' which maps ICD10 diagnosis codes to one of 16 American Board of Internal Medicine (ABIM) medical content areas and one of 178 specific condition categories, to better characterize clinical exposure. Here, we translate resident-attributed principal ICD-10 discharge diagnosis codes from each of our Program's four training hospitals in Quarter 1 of AY 2020 to profile the educational experience of residents at each site.

DESCRIPTION: From July 1-Sept 30 2020, we mined principal ICD10 discharge diagnosis codes from resident teams at Bellevue Hospital (BH), a

large public hospital; NYU Langone Hospital – Brooklyn (NYU-BK), an academic community hospital; NYU Langone Hospitals – Manhattan (NYU-MN), a large quaternary hospital; and VA NY Harbor Healthcare – Manhattan (VA), a Veteran's Affairs Hospital. We then applied diagnosis codes to the crosswalk tool to translate ICD10 codes into broad ABIM content areas and specific condition categories, yielding site-specific clinical content maps.

EVALUATION: At each site there was notable enrichment in two specific content areas – Infectious Disease (ID) and Cardiovascular Diseases (CVD). However, there were striking differences in the frequency of these content areas across sites. Roughly 28% of all diagnoses fell under ID at NYU-BK and NYU-MN, with half that frequency at BH and VA. CVD diagnoses represented 40% of diagnoses at VA, while only 20% at NYU-BK, 25% at NYU-MN, and 30% at BH. For reference, CVD represents 14% and ID 9% of content on the ABIM Certification Exam. There were uniformly low frequencies (<1%) of several less typical ABIM content areas, namely Ophtho, Derm, Allergy/Immuno, OB/GYN, and ENT/Dental Med. The frequency of Psychiatry diagnoses, which houses substance use, was markedly higher at BH and NYU-BK than the other sites. There were several substantial differences in condition categories across sites, most notably within 'bacteremia and sepsis syndromes' and 'ischemic heart disease.'

DISCUSSION / REFLECTION / LESSONS LEARNED: In this pilot we translate discharge data from four distinct hospital systems into an educational framework to characterize our resident's educational experience and in doing so unmask disparities in exposure that could drive rational changes in rotation schedules and didactic content selection.

MAXIMIZING THE POTENTIAL OF THE REMOTE CASE CONFERENCE. LEVERAGING THE RIGHT TECHNOLOGY FOR THE RIGHT CASE

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Internal Medicine Residency Program, Mid-Atlantic Permanente Medical Group, Washington, DC. (Control ID #3540139)

LEARNING OBJECTIVES 1: Describe how specific technological tools can enhance synthesis of information to define a patient's clinical problem, prioritize differential diagnoses, and improve diagnostic skills (PC1, MK2).

LEARNING OBJECTIVES 2: Identify how integration of a remote librarian into case-based conferences (CBC, i.e., morning reports) can facilitate development of evidenced-based management (EBM) and interprofessional communication (PC2, ICS, SBP1).

SETTING AND PARTICIPANTS: CBC are a long-standing fixture of most Internal Medicine residency programs. Due to Covid-19, programs have transitioned to online platforms, where maintaining learner interest and participation is a challenge. Our objective is to describe a remote CBC structure which maximizes learner engagement and retention.

DESCRIPTION: We created a standardized format and checklists for both resident presenter and facilitator (e.g., chief resident). The resident checklist includes clarifying the focus for each case (diagnosis, workup, or management), identifying salient teaching points, and holding a pre-report huddle with chief, presenter, and expert. The facilitator checklist includes recruiting an expert, assigning a scribe, eliciting differential diagnoses, guiding clinical reasoning, and managing time.

For all CBC, we use a co-edited virtual whiteboard and audience response systems to improve participation and implement separate technological toolsets for each category of focus. For cases focused on diagnosis, online mobile differential diagnosis apps encourage teamwork and participation. Workup cases are enhanced with real-time annotation of radiology images. Management cases benefit from using EBM approaches like real-time literature searches facilitated by a remote medical librarian.

EVALUATION: We developed our checklists via comprehensive needs assessment and refined them based on stakeholder feedback. We conducted 1:1 interviews with the entire core faculty, resident class, and chief resident. After implementation, we modified the lists through educator-driven group assessment. We are evaluating CBC structure by anonymous questionnaire on impact, benefits and suggested modifications.

DISCUSSION / REFLECTION / LESSONS LEARNED: Implementation of a teaching-focused, formal checklist helped resident presenters identify specific learning points and improved consistency of CBC quality. The facilitator checklist improved control of session, participant engagement, and expert involvement.

In the virtual classroom, interactive co-editing annotation functionality on a templated virtual whiteboard, real-time annotations of images, chat participation and anonymous polling were effective for learner engagement. Moreover, including a clinical librarian enabled real-time literature searches, reinforcing teaching points and management plans.

Although the venue for CBC has changed and new tools are available, the goal of teaching problem-solving strategies and developing illness scripts remains the same. Strategic checklists and specific technological toolsets can enhance these virtual sessions.

MORNING REPORT FOR ALL: A MIXED-METHODS EVALUATION OF THE CLINICAL PROBLEM SOLVERS PODCAST

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LEARNING OBJECTIVES 1: Medical Knowledge - Discuss how the popularity of The Clinical Problem Solvers' (CPSolvers) schemas emphasizes the need to teach ways to organize knowledge in addition to the knowledge itself.

LEARNING OBJECTIVES 2: Medical Knowledge - Describe how CPSolvers' culture of compassion and diversity can be applied to create safe and productive learning environments for all learners.

SETTING AND PARTICIPANTS: CPSolvers is a podcast launched in December 2018 with 25,000 listeners in 147 countries. Qualitative data are from 3 developers and 8 podcast listeners.

DESCRIPTION: CPSolvers is a podcast (150 episodes, 1-2/week) that teaches and models diagnostic reasoning (DR) in a morning report/case conference format. Cases are presented to trainees and expert diagnosticians in aliquots of clinical information, providing natural stopping points for discussion. Listeners are encouraged to think along. CPSolvers emphasizes teaching diagnostic schemas, structured approaches to specific clinical problems.

EVALUATION: This study examines podcasting as a novel way to disseminate DR education by evaluating alignment of the developers' goals for the podcast, with listeners' actual usage habits, features they valued, and perceptions of the podcast. Qualitative data was collected and analyzed to inform the creation of a quantitative survey.

Qualitative:

We conducted the semi-structured interviews from April-May 2020, followed by thematic analysis, resulting in three major developer goals with sub-goals:

1. To teach diagnostic reasoning in a case-based format by (1a) teaching schemas, (1b) modeling expert diagnostic reasoning, (1c) teaching clinical knowledge, and (1d) teaching diagnostic reasoning terminology.
2. To change the culture of medicine by (2a) promoting diversity, (2b) modeling humility, (2c) eliminating shame, and (2d) creating a fun way to learn.
3. To technologically advance and democratize the teaching of diagnostic reasoning.

Listeners' usage habits, valued features, and perceptions overall aligned with all these aspects, except for clinical knowledge (1c), and diagnostic reasoning terminology (1d). Listeners identified schemas (1a), and elimination of shame (2c) as the most valuable features of the podcast.

Quantitative:

We will disseminate an online survey to all listeners to explore this data in March 2021. Survey items will ask about listener demographics, frequency of use, active vs passive listening, and valued features of the podcast.

DISCUSSION / REFLECTION / LESSONS LEARNED: The listeners' most valued features emphasize: (1) the need to teach ways to organize knowledge (e.g. schemas) in addition to transmitting the knowledge itself;

(2) the need for compassionate, entertaining, and diverse learning environments in medical education generally. The gap in sub-goals (1c) and (1d) highlights the importance of evaluation in medical education to test goals. Overall, CPSolvers meets the goals of its developers and is an effective way to disseminate DR education — democratizing morning report for listeners around the world.

ONLINE RESOURCE URL (OPTIONAL): <https://clinicalproblemsolving.com/>

MORNING REPORT ON REPEAT – IMPROVING RESIDENT EDUCATIONAL ENGAGEMENT USING FIXED INTERVAL, SPACED REPETITION-BASED REVIEW

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(Control ID #3544907)

LEARNING OBJECTIVES 1: Improve resident access and engagement in virtual morning report

LEARNING OBJECTIVES 2: Improve resident retention of information presented at virtual morning report

SETTING AND PARTICIPANTS: The COVID-19 pandemic has disrupted medical education across specialties, including internal medicine. Given the need to social distance, the Yale Traditional Internal Medicine Residency Program (YTIMRP) canceled in-person teaching conferences and transitioned to a virtual morning report (VMR). Cancellation of in-person teaching conferences raised multiple concerns including the level of resident engagement, participation and information retention. To address these concerns, we created a weekly VMR summary email as a means to improve resident access to educational conferences, increase engagement and assist with information retention.

The YTIMRP has 143 trainees across three post-graduate years (1-3). On weekdays, there is a daily, case-based VMR. Teaching points span a large range of topics, including disease pathophysiology, management, differential diagnosis, as well as clinical reasoning, navigating challenging patient interactions, and addressing social determinants of health.

DESCRIPTION: To increase access to morning report, improve resident engagement, and assist with information retention, we created a fixed-interval weekly email summary of the VMR cases. Coined “Morning Report on Repeat,” this email summarized key teaching points from each VMR case and finished with an open-ended review question based on previous weeks' VMRs utilizing spaced repetition.

EVALUATION: Before the implementation of VMR, an average of 28.4 residents on inpatient general medicine services attended morning report (19.9%). Based on Mailchimp “free plan” data (Atlanta, GA, USA), the VMR summary email was opened an average of 484.8 times per week with 217.8 clicks on links to additional figures, references, and pictures within each email. Combining the total opens and total clicks, the engagement rate was 44.9%. (total clicks/total opens). 6.3 residents per week (4.0%) responded via email to the open-ended review question.

DISCUSSION / REFLECTION / LESSONS LEARNED: Although we do not have directly comparable pre-and-post VMR data, our click data yields compelling evidence that the implementation of a weekly VMR summary email has increased resident access and engagement in educational teaching conferences. Our experience supports a low maintenance and achievable model for fixed-interval, spaced repetition, which can act as a vehicle to improve resident engagement in daily teaching conferences. Although this was created because of the unique challenges of the COVID-19, we anticipate fixed interval review will continue to improve access and engagement in teaching beyond the pandemic. MROR's effect on information retention was not assessed in our initial evaluation, however, future work should investigate the impact of fixed-interval, spaced repetition on retention of information presented at VMRs.

OBSERVATION AND FEEDBACK IN THE TELEHEALTH AGE: A NEEDS ASSESSMENT OF INTERNAL MEDICINE RESIDENTS AND PRECEPTORS IN CONTINUITY CLINIC

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LEARNING OBJECTIVES 1: Assess the current state of and need for direct observation and feedback on telehealth continuity clinic skills for resident development (Patient Care)

LEARNING OBJECTIVES 2: Identify opportunities to enhance preceptor provision of direct observation and feedback on resident clinical skills in telehealth continuity clinic encounters (Systems Based Practice)

SETTING AND PARTICIPANTS: 181 internal medicine residents and 148 clinical faculty preceptors at 7 continuity clinic training sites (3 university-based clinics, 3 VA clinics and 1 public hospital based safety-net clinic were invited to complete an online needs assessment. These sites serve patients in an urban setting and have a large regional catchment area given their connection to a quaternary care center.

DESCRIPTION: The Covid-19 pandemic resulted in all resident continuity clinics expanding telehealth from an optional experience to a core operation in residency practices. While this transition to telehealth was operationally successful, little is known about the educational impact of telehealth in the development of important continuity clinic skills for residents.

We developed a needs assessment to identify opportunities to enhance direct observation and feedback of residents' clinical skills in telehealth encounters. The literature supports the benefits of direct observation and tailored feedback for residents in internal medicine continuity clinics, therefore we expect that observation in the telehealth context will present additional opportunities for residents to progress in training.

EVALUATION: The needs assessment includes both quantitative and qualitative components in three sections: 1) perceptions of the current state of direct observation and feedback in continuity clinic telehealth encounters; 2) attitudes toward the importance of observation and feedback with regard to specific clinical skills; and 3) perceptions of optimal setting, duration and frequency of direct observation and feedback.

These surveys were reviewed by focus groups of residents and preceptors to ensure clarity. A final review was conducted by the investigators prior to administration. All data will be reviewed by the investigators including iterative consolidation of themes from qualitative responses.

DISCUSSION / REFLECTION / LESSONS LEARNED: Initial review of preliminary quantitative data indicates that residents across sites would appreciate more direct observation and feedback targeted to clinical skills during telehealth encounters based on learner-identified goals.

At the time of this submission, the survey is not yet closed. If accepted, we anticipate being able to share the entirety of the quantitative and qualitative responses from both residents and preceptors at the time of the SGIM meeting. We hope such data will help guide education leaders as they develop tools to facilitate direct observation and feedback and promote resident growth in telehealth continuity clinic skills.

PATIENT PERCEPTIONS OF A NOVEL VIRTUAL MEDICAL STUDENT AMBULATORY INTERNAL MEDICINE CLERKSHIP

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LEARNING OBJECTIVES 1: To design a virtual outpatient medical student clerkship to meet the learning objectives of a typical outpatient internal medicine student rotation.

LEARNING OBJECTIVES 2: To assess patient comfort and satisfaction with a virtual medical student rotation

SETTING AND PARTICIPANTS: The setting was a virtual longitudinal outpatient internal medicine clerkship during the COVID-19 pandemic in the Spring of 2020. An IRB- approved survey was distributed to patients seen during virtual clinics by nine preceptor and third-year medical student pairs.

DESCRIPTION: We created a novel virtual clerkship curriculum to meet the learning objectives of a traditional outpatient internal medicine rotation. We developed a 14-item instrument to assess patients' perspectives on telehealth visits and medical student involvement. Survey items probed past, current and future patient perspectives towards telehealth and medical student education. A mixed methods model was used to analyze survey results.

EVALUATION: 33 of the 66 patients surveyed in this study responded regarding their telemedicine experience from May 14, 2020 to August 5, 2020. 58% of respondents reported this being their first virtual visit. 88% of respondents had previous in-person experience with medical students.

With regard to virtual visits, 85% of patients reported visits as "very convenient," with 6% expressing "somewhat inconvenient" or very "inconvenient." 67% expressed interest in future virtual visits.

With regard to student involvement, 73% of respondents felt they assisted students in their education. 56% of patients reported that student involvement did not make a difference in virtual visits and 39% of patients felt student involvement actually improved the visit. 85% felt "very comfortable" with virtual medical student involvement.

70% were interested in having students take part in future virtual encounters. Review of patient written comments indicated that they liked having a student as part of the virtual visit, felt that it helped the student in their learning, and felt that the student being there was helpful for the physician.

DISCUSSION / REFLECTION / LESSONS LEARNED: Our results indicate overall positive patient perception regarding participation in virtual medical student education. Next steps will include assessing student and preceptor feedback to further improve the educational quality of the virtual curriculum and expanding the population of patients surveyed. Given that utilization of telehealth is likely to continue post-pandemic, it will be important to dedicate resources to faculty development and student education in these clinical methods and to continue to elicit feedback regarding patient satisfaction.

ONLINE RESOURCE URL (OPTIONAL): <https://github.com/Shreya-L/Piloting-Ambulatory-Virtual-Visits-MedEd/blob/master/README.md>

PILOTING A TRAINING FOR MEDICAL STUDENTS TO DEBRIEF PEERS AFTER AN ADVERSE PATIENT OUTCOME

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LEARNING OBJECTIVES 1: Describe the need for debriefing sessions and how student-led sessions are effective.

LEARNING OBJECTIVES 2: Learn the skills necessary to facilitate a discussion following adverse clinical events.

SETTING AND PARTICIPANTS: The Peer-to-Peer Debrief Training was piloted at a large public medical school during the 2020 fall semester. Fifty-four medical school students volunteered to receive the one-hour training.

DESCRIPTION: Medical students commonly experience adverse events such as patient death during their schooling, contributing to higher rates of burnout. Debriefing after these events helps students effectively work through these experiences. In addition to students routinely requesting this type of training, studies show that peers are an acceptable substitute when professors are unavailable to lead debriefs. We created an innovative Peer-to-Peer Debrief Training addressing adverse patient outcomes, adapted from a training for senior residents at our institution. The training describes the importance of debriefing and introduces a framework for walking a fellow student through the inciting event, grief responses, and coping strategies.

EVALUATION:

Students completed a pre- and post-training survey to assess knowledge of debriefs, attitudes towards debriefs, and comfort level performing debriefs, all on a 5-point Likert scale. The survey was developed and administered through REDCap. Data was analyzed with descriptive statistics and t- tests.

Of the 54 students surveyed, 20 (37%) reported experiences with adverse patient outcomes and only 3 (15%) reported receiving a debrief afterwards.

Participants indicated a statistically significant increase in knowledge for how to seek out a debrief after an event (2.52 → 4.36, $p < 0.001$). Students also reported higher confidence in their ability to debrief peers (2.02 → 4.41, $p < 0.001$). Students thought the training was important to their professional development (avg 4.70). There was no significant difference between pre- and post-test attitudes towards the importance of debriefing after an adverse clinical experience (avg 4.61 and 4.78, respectively).

DISCUSSION / REFLECTION / LESSONS LEARNED: A majority of students reported not receiving debriefs after an adverse clinical event, revealing the potential for this training to create a healthier emotional environment for medical students dealing with serious or traumatic patient outcomes. The low pre-test scores on knowing who to reach out to and how to give a debrief strengthens our theory that there is a need for more formal education regarding debriefs. Our data indicates students showed significant improvements in both aforementioned categories after participating in the training and found the training to be valuable to their professional development. This project serves as a first step in shifting the culture of medicine to embrace difficult conversations. Next steps include incorporating this training into the medical school curriculum and administering delayed post-tests to evaluate whether medical students are actively utilizing this training to debrief peers.

PREDICTORS OF CHIEF MEDICAL RESIDENT SELECTION

Richard Cartabuke

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LEARNING OBJECTIVES 1: We aim to review the ACGME competency data, demographic information and ITE scores utilized in the selection of Chief Internal Medicine residents at a large academic program to determine if there is an association of one or more components with CR selection.

LEARNING OBJECTIVES 2: We aim to develop a predictive model that utilizes ACGME competency data for the selection of Chief Internal Medicine residents at the end of their post-graduate year (PGY) 1 and PGY-2 years.

SETTING AND PARTICIPANTS: This study was approved by the Institutional Review Board (IRB) at Cleveland Clinic. Data were collected from academic records of internal medicine residents (PGY-1 to PGY3) at the Cleveland Clinic between 2013 – 2019.

DESCRIPTION: Data was collected on 527 internal medicine residents at Cleveland Clinic between 2013-2019 regarding their performance during their training. After appropriate exclusion due to academic start year, the study consists of 383 residents for whom at least second year data is available and thus were eligible for selection as a chief resident. ITE data was available for 372 residents.

EVALUATION: Based on demographic data, the largest single predictor of CR is medical school – those that attended allopathic medical schools were more likely to be selected for chief resident.

After review of ITE scoring data, there is no evidence to claim that in-service year 1 or 2 percentile is associated with chief residency selection ($P = .68$; $P = .89$).

The competencies significantly associated with chief residency selection are PC5, SBP1, SBP3, PBL13, PROF2, PROF4, ICS1 & ICS2. Interestingly, when running a regression model and allowing both year 1 & year 2 data to be a candidate variable, the single strongest predictor is ICS2: Communicates effectively in interprofessional teams.

DISCUSSION / REFLECTION / LESSONS LEARNED: While a variety of research has been published regarding predictors for success in residency utilizing information obtained from the Electronic Residency Application Service (ERAS), there has only been one abstract to date examining the association between ERAS data and CR selection. Furthermore, these studies have not examined the association between Accreditation Council for Graduate Medical Education (ACGME) competency data (compiled while residents were in training) and selection as CRs to determine which, if any, of these variables are associated with CR selection.

The data presented suggests a correlation with sub-competencies at the PGY-2 level with regard to selection of CR. Not surprisingly, the areas with the strongest predictive value are those related to inter-professional communication, working within teams and professionalism. It remains unclear how our single institution rates medical knowledge, research acumen and teaching/

coaching skills in the context of selection of CR, but this study did not take into account the interview process which highlights these more formally and likely would provide more contextual support for how this information is utilized.

PRELIMINARY REPORT OF A SPANISH-LANGUAGE CARDIOLOGY PODCAST TO ADDRESS GAPS IN MEDICAL EDUCATION THROUGH PODCASTING IN LOW- AND MIDDLE-INCOME COUNTRIES (LMIC)

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LEARNING OBJECTIVES 1: Understand that despite the potentially global reach of medical podcasting and other forms of organic digital education, considerable barriers exist including the lack of native-language content and poor localization for different health care systems.

LEARNING OBJECTIVES 2: Learn practical tips from a novel podcasting intervention that resulted in high penetration in Spanish-speaking countries and LMIC.

SETTING AND PARTICIPANTS: Medical students, residents, fellows, and attendings worldwide who speak Spanish.

DESCRIPTION: Mio-Cardio podcast is a Spanish-language cardiology podcast aimed at Spanish-speaking healthcare providers and providers-in-training that incorporates evidence-based, case-driven discussions with expert cardiology discussants from Iberoamerican and Spanish-speaking countries. In this report, we present preliminary data of our intervention.

EVALUATION: We chose to evaluate our intervention by measuring penetration of our podcast in LMIC targeting Iberoamerican and Spanish-speaking audiences as well as measuring other data such as chart position on the Apple Podcasts charts.

DISCUSSION / REFLECTION / LESSONS LEARNED: Despite market research data showing good penetration of podcasting overall in Iberoamerican and Spanish-speaking countries, medical podcasting has lagged considerably, especially compared to other forms of organic digital education like YouTube and blogs.¹⁻⁴ Previous research has identified a “global digital medical education divide,” with both the lack of native language content as well as limited relevancy to Iberoamerican settings as possible reasons for the substantial gap in utilization.² We hypothesized that a Spanish-language cardiology podcast with a focus on Iberoamerican and Spanish-speaking audiences would have greater penetration in both Iberoamerican countries and LMIC. Over a four-month period, eight episodes were released, with a total of 1,571 downloads. In total, 66.2% of downloads came from Spanish-speaking countries. Only 37.0% of downloads came from high-income countries; 62.1% of the total downloads were from upper-middle-income countries, and 0.9% were from lower-middle income countries. Medicine genre podcasting charts similarly showed that Mio-Cardio Podcast charted #1 in Colombia, Guatemala, Honduras, and Venezuela, top 3 in Mexico and Peru, top 20 in Argentina and Spain, and top 200 in the United States. Our preliminary data suggests that focusing language and content on Iberoamerican and Spanish-speaking audiences does increase podcast penetration. While we continue to collect data, this intervention has considerable implications for medical podcasting. There does not appear to be any intrinsic reason that learners in LMIC are less likely to use medical podcasts. Our intervention raises hope that medical podcasting can be an impactful tool to increase access to digital education in Iberoamerica and LMIC, just as it is in high-income countries.

ONLINE RESOURCE URL (OPTIONAL): <https://linktr.ee/MioCardioPodcast>

PREPARING INTERNAL MEDICINE (IM) RESIDENTS TO CARE FOR TRANSGENDER AND GENDER DIVERSE (TGD) PATIENTS

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LEARNING OBJECTIVES 1: Design and implement a curriculum for residents on gender-affirming care for TGD patients, including: hormone management, non-surgical body modification, and gender affirming surgeries. **LEARNING OBJECTIVES 2:** Increase residents' knowledge and level of comfort for caring for TGD patients.

SETTING AND PARTICIPANTS: Curricular content on health of TGD patients is not widely incorporated into Graduate Medical Education. TGD patients face numerous health and healthcare disparities, and 50% report they must teach their health care provider about transgender care.

Prior to this initiative, there was no required curriculum for University of California San Francisco (UCSF) IM residents on TGD health. In a survey of UCSF IM Residents (n=57), 88% reported that there was insufficient training on this topic. In light of this curricular gap, we implemented a curriculum on care of TGD patients for 2nd and 3rd year UCSF IM residents in the San Francisco Primary Care Track or Health Equity Track. To date, this curriculum was implemented for half of this cohort and will be offered to the remainder in the future.

DESCRIPTION: Learning objectives were developed based on competencies appropriate for primary care providers. These informed 10 sessions (12hr) during an ambulatory month, including terminology and disparities, trauma-informed care, adolescent gender care, gender affirming (GA) hormones, voice therapy, GA surgeries, prosthetics and compression devices, identity document changes, and mental health. Lecturers were recruited from content experts within and outside the UCSF community. Residents were given a survey before and after the course.

EVALUATION: Of the 13 residents participants who participated, 8 completed the before and after survey and attended a minimum of 2 sessions. Prior to this curriculum, residents received an average of 3.5hr on TGD health during medical school and 2.5hr during residency. They reported caring for an average of 5 TGD patients during residency and felt that they had not received adequate training. Baseline transphobia scores were low based on a 9-item validated transphobia scale and remained low after attending an average of 6.25 sessions (10.50 vs 10.38, range 9-45).

Prior to the curriculum, residents on average expressed feeling 'not at all' to 'not very' confident on counseling patients about GA hormones, surgeries, vocal therapy or binding and tucking, as well as initiating hormones, writing a letter for GA surgery, and knowing where to access resources about TGD health. They had a neutral level of confidence obtaining a gender history and felt 'somewhat confident' establishing a patient's name and pronouns. Confidence increased in every category on average by 1 point on the 5-point likert scale after the curriculum.

DISCUSSION / REFLECTION / LESSONS LEARNED: Many resident physicians do not receive adequate training on caring for TGD patients. A dedicated curriculum can improve resident confidence in caring for this population. Provider education is one means to address health inequities experienced by the transgender community.

PREPARING MEDICAL STUDENTS FOR THEIR FIRST EXPERIENCE OF PATIENT DEATH

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LEARNING OBJECTIVES 1: Medical Knowledge

LEARNING OBJECTIVES 2: Interpersonal and Communication Skills

SETTING AND PARTICIPANTS: Medical students rarely have explicit preparation for their first experiences of patient death during clinical rotations, an event that is often accompanied by anxiety, stress, and highly individualized emotional reactions. It is common for trainees to struggle alone with coping

after their first patient death, as tools to address this issue are often missing from the formal medical school curriculum. The University of Illinois College of Medicine created a simulation experience in which a patient acutely decompensated and died. All rising third-year medical students participated in the scenario and its subsequent debriefing session. In interviews with students about patient deaths on clinical rotations, we investigated how well the simulation prepared students for their first actual patient death in comparison to fourth-year students who had not engaged in the simulation.

DESCRIPTION: We recruited third- and fourth-year students to discuss their first patient death experience. A semi-structured interview guide included questions about the death experience, students' reactions, the support they received, and the role of prior educational experiences in preparing for the death. Interviews were conducted by a third- and fourth-year medical student, lasted around thirty minutes, were transcribed by the research team, and analyzed in Nvivo using constructivism theory.

EVALUATION: Fifteen students were interviewed between Jan-May 2020. Nine had participated in the simulation and six had not. Students felt the most valuable aspects of the simulation were the debrief and introduction to resources to assist in coping with a patient death. The debrief gave students a framework in which to process their reactions to patient deaths and was especially beneficial for students who subsequently did not have an opportunity to debrief after their first real patient death. Fourth-year students who had not had the simulation were less likely to describe an explicit instance in the curriculum that prepared them for their first patient death and were more likely to report a lack of discourse preceding the event. Limitations in the simulation included students' lack of an emotional connection to or relationship with the simulated patient and ways in which actual patient deaths they experienced differed from the scenario presented in the simulation.

DISCUSSION / REFLECTION / LESSONS LEARNED: This is the first study, to our knowledge, that examines the salutary effect of a simulation and debrief on preparing for and coping with clinical students' first actual patient death. Our study demonstrates the benefit of simulating a patient death and recommends improvements for future iterations of the simulation including interactions with family members to maximize the emotional and contextual fidelity.

PREPARING RESIDENTS FOR FUTURE CAREERS IN MEDICAL EDUCATION WITH A LEARNER-CENTERED, MULTIMODAL, LONGITUDINAL TRAINING PATHWAY

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LEARNING OBJECTIVES 1: Residents participating in the pathway will identify best practices in clinical teaching and apply them to real-world educational experiences.

LEARNING OBJECTIVES 2: Residents participating in the pathway will demonstrate scholarship and leadership in the design, administration, and evaluation of educational activities and research.

SETTING AND PARTICIPANTS: UCLA Internal Medicine Training Program Residents.

DESCRIPTION: The UCLA Medical Education Pathway (MEP) is a two-year longitudinal experience designed to fill a current gap in training and practice opportunities for residents interested in future careers in medical education as clinician-educators. Residents in the pathway participate in a multimodal curriculum that includes: (a) a didactic series addressing best practices in clinical teaching, curriculum development, educational scholarship, and leadership; (b) teaching opportunities in medical student courses; (c) design, administration, and evaluation of an educational scholarship project; and (d) mentorship with faculty.

EVALUATION: Since 2016, 13 residents completed a one-year pilot of the pathway and 42 residents completed the full two-year curriculum. Pathway residents have contributed over 2,000 teaching hours and completed 37 educational scholarship projects. Surveys completed at the end of the pathway (n=52) reveal that 83% of residents were satisfied or very satisfied with their

experience. Participation in teaching opportunities within the medical school is the most highly rated component of the curriculum. Over 75% of residents agreed or strongly agreed that the pathway increased their confidence in: teaching in the clinical environment (77%); assessing learners and providing feedback (75%); designing, implementing, and evaluating teaching/learning activities (88%); and designing and conducting educational research (87%). Over 90% of residents agreed or strongly agreed that they learned something valuable through participation in the pathway. Qualitative survey data indicates residents feel the pathway had a positive influence on their teaching skills, career planning, and ability to conduct educational research.

DISCUSSION / REFLECTION / LESSONS LEARNED: The MEP sets itself apart from existing residents-as-teachers curricula in scope, providing enhanced training and practice opportunities in the areas of clinical teaching, curriculum development, and medical education scholarship for residents interested in future careers as clinician-educators. The curriculum also promotes career development and participation in the pathway has offered residents perspective on what a future career as a clinician-educator entails. In addition, the local medical education system has benefited from resident participation in the pathway through contributions to teaching in medical student courses as well as identifying and filling gaps in medical education curricula. Further innovation of the curriculum will focus on enhancing direct observation and feedback for residents on their teaching skills.

ONLINE RESOURCE URL (OPTIONAL): <https://tinyurl.com/uclamepgim>

RACE, BIAS, AND ADVOCACY IN MEDICINE: A PATHWAY FOR IN-DEPTH ENGAGEMENT IN ANTI-RACISM FOR INTERNAL MEDICINE RESIDENTS

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LEARNING OBJECTIVES 1: To increase opportunities for Internal Medicine residents to engage in high quality education on anti-racism in healthcare and medical education

LEARNING OBJECTIVES 2: To foster the development of Internal Medicine residents as educators and advocates of anti-racism and health equity

SETTING AND PARTICIPANTS: In the Yale Internal Medicine residency programs, distinction pathways serve as concentration “minors” for residents to obtain in-depth knowledge on a content area. Distinction pathways are voluntary, and residents join a distinction pathway in their PGY-2 year. Participation is longitudinal, culminating in a capstone project at the end of residency. For those not formally enrolled in a distinction pathway, residents are welcome to attend meetings and access distinction pathway content. During the 2019-2020 academic year, existing distinction pathways were in medical education, research, quality improvement, and global health. Prior to this academic year, there were no pathways focused primarily on anti-racism and advocacy work.

DESCRIPTION: We created the Race, Bias, and Advocacy in Medicine Distinction Pathway (RBAM) to address the urgent need for in-depth education in anti-racism and diversity, equity, and inclusion for Internal Medicine residents. The distinction pathway has three core pillars. The first pillar is “introspection.” This pillar will encompass a series of didactics, small group sessions, workshops, speaker series, and experiential learning to foster residents’ understanding of the legacy and state of racism and bias in healthcare. The second pillar is “citizenship,” which involves developing residents as communicators and ambassadors of anti-racism. As part of the citizenship pillar, resident participants will design and present educational content for mandatory resident education sessions and propose feasible interventions to address racism and bias in healthcare and/or medical education. The third pillar is the “capstone project,” the culmination of the two-year experience. A capstone project can manifest in many ways – community-based participatory research, quality improvement, narrative medicine, clinical research, clinical practice interventions, and/or physician advocacy.

EVALUATION: The primary outcomes of the distinction pathway are to develop participants’ knowledge, skills, and attitudes on anti-racism within healthcare and medical education. These will be measured through pre- and post-participation assessments regarding level of engagement and acquired knowledge, skills, and attitudes in anti-racism work after completion of the pathway. A long-term outcome could be retention of participants in continuation of work in diversity, equity, and inclusion.

DISCUSSION / REFLECTION / LESSONS LEARNED: Internal Medicine residents deserve high quality education on anti-racism in healthcare and medical education. Future goals of RBAM include the development of a robust resident-driven curriculum on topics of racism and bias and the fostering of residents who will become future leaders in diversity, equity, and inclusion.

RAPID CREATION OF A REMOTE MEDICAL STUDENT ELECTIVE AT THE HEIGHT OF THE PANDEMIC: “TELEHEALTH IN THE AGE OF COVID-19”

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LEARNING OBJECTIVES 1: To describe how clinical and service-based medical education can continue in new learning environments despite constraints on clinical education and care systems

LEARNING OBJECTIVES 2: To highlight how medical students can be integrated into multidisciplinary teams, use telehealth collaboratively to help patients access the healthcare system and community-based resources

SETTING AND PARTICIPANTS: This elective took place in a large NYC academic institution during the initial COVID-19 pandemic. All activities were conducted remotely, allowing students to be involved in clinical care in a safe learning environment. All enrolled MS2 students were early in their clinical clerkship year.

DESCRIPTION: “Telehealth in the Age of COVID-19” was a 4-week elective rapidly implemented for Weill Cornell Medicine (WCM) clerkship students during the ‘academic pause’ at the start of the COVID-19 pandemic in NYC.

Students rotated through 2 of the 3 offered virtual clinical sites: 1) Primary Care (PC), 2) Emergency Medicine (EM), and 3) the “Center on Aging”(COA) outpatient Geriatrics practice. At PC and EM sites, students worked on multidisciplinary teams to provide follow-up care of patients with confirmed or suspected COVID-19 after discharge home. In the COA site, students collaborated with social workers in a “telephone reassurance” program to address mental health needs amongst the practice’s most vulnerable homebound geriatric patients. Students followed panels of patients for the length of the elective. Students participated in didactic sessions on COVID-19 management, introduction to telemedicine communication and virtual physical examination, and role-played simulated telephone follow calls to prepare them for each virtual clinical site.

EVALUATION: The telehealth elective was evaluated qualitatively by feedback from participating students. Feedback was overall positive. Students completed the elective with increased comfort in conducting focused interviews and physical assessments, patient education/counseling, and providing mental health support via telehealth. They received a sense of purpose and ability to meaningfully contribute to the fight against COVID. Students conveyed that they valued the continuity and therapeutic relationships formed with patients/family members they followed.

DISCUSSION / REFLECTION / LESSONS LEARNED: The extent to which the healthcare system was overwhelmed at the beginning of the COVID-19 pandemic cannot be overstated. The course directors were given a 1-week timeline to carefully develop a novel remote telehealth elective that would meet the needs of the encumbered healthcare system and medical students eager to help.

We were fortunate to have tremendous support and collaboration across multiple departments and discipline to trust us and our medical students with a level of autonomy and responsibility beyond precedence.

This telehealth elective set the groundwork for seamlessly integrating telemedicine into revised core clinical clerkships. It also introduced new multidisciplinary team learning objectives into core clinical clerkship.

READY FOR SUB-IS – AN EPA-BASED GATEWAY TRAINING TO ENTRUST LEARNERS FOR SUB-INTERNSHIP ELECTIVES.

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LEARNING OBJECTIVES 1: Create a curriculum focused on advanced clinical skills related to Entrustable Professional Activities (EPAs) to prepare students for better sub-internship (SubI) performance. (ACGME Patient Care)
LEARNING OBJECTIVES 2: Revamp the USMLE Step 2 CS examination preparatory curriculum to formatively hone communication, history, and examination skills in preparation for the new examination. (ACGME Interpersonal and Communication Skills and Medical Knowledge)

SETTING AND PARTICIPANTS: The COVID-19 pandemic created limitations in clinical training and an additional need for student preparation at the critical juncture between the core clerkship year and SubIs. Suspension of the USMLE Step 2 CS examination allowed us to realign our existing curriculum to provide advanced skill training to students transitioning to the senior phase of the curriculum. To minimize student stress, this year the course will be offered on an ungraded, elective basis to all students in the class of 2022 (~150 students) in January, March, and April of 2021.

DESCRIPTION: This three-day, remote pilot is a hybrid (synchronous and asynchronous) course designed to promote advanced clinical reasoning. There is a different case each day. The morning begins with a remote Objective Structured Clinical Examination (OSCE), which flows into an interactive online module where the case continues. Key course content was developed by reviewing relevant educational literature and surveying needs/perspectives of SubI directors as well as third- and fourth-year students.

EVALUATION: To examine the impact of the course and students' growth in clinical skills, we will conduct pre-/post- medical knowledge tests, evaluate clinical skills with OSCEs, and assess SubI performance through workplace-based assessments and final evaluations compared to historical/contemporary controls. Student and SubI director surveys will further help us gain insights into course efficacy and satisfaction.

DISCUSSION / REFLECTION / LESSONS LEARNED: Though core EPAs for entering residency have been defined by the American Association of Medical Colleges, SubI-specific EPAs are not clearly defined in the literature. This course is an initial attempt to address this question and to teach advanced EPAs remotely. In addition, extra enrichment opportunities will be offered as needed based on performance in this course, rendering it a gateway point in our curriculum.

Strengths include a condensed yet formative approach to honing clinical skills, focus on advanced EPA skills (4, 6, 8, 10) for SubI experiences, flexibility for students, and concurrent preparation for the USMLE Sstep 2 CS exam. Challenges include finding time within the curriculum for this coursework and optimizing learning clinical skills in the remote, digital setting. Additional information and lessons learned will be shared based on our experience running the course.

For medical schools that already use OSCEs and a flexible Learning Management System, adaptation to align with preparation for SubIs is possible.

REINVIGORATING GRAND ROUNDS: RAPID DISSEMINATION OF COVID EDUCATION USING MULTI-MODAL PRESENTATION METHODS AND PRINCIPLES OF CLINICAL REASONING TO ENGAGE AND ENHANCE INTERPROFESSIONAL ADULT LEARNERS

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LEARNING OBJECTIVES 1: Describe the development and rapid implementation of a General Internal Medicine (GIM) Grand Rounds (GR) COVID case series utilizing an interactive multi-modal presentation format to engage adult interprofessional learners at the Dreyfus proficient, expert, and mastery levels of learning

LEARNING OBJECTIVES 2: Recognize that applying the principles of clinical reasoning during COVID care has the translational benefit of providing a framework to structure case-based learning through the lens of clinical reasoning

SETTING AND PARTICIPANTS: Participants: Respiratory Illness COVID Clinic (RIC) faculty, Office of Continuing Professional Development (CPD), GIM division leadership, GR attendees

Setting: GIM Virtual GR

DESCRIPTION: The RIC was created in Spring 2020 to centralize care for patients with COVID- related symptoms at an academic medical center (AMC). The trajectory of patients with COVID impacting multiorgan systems was documented including timelines, clinical data, specialty consultation, and outcomes.

These "Cases from the RIC" were developed into an inter-disciplinary teaching series and incorporated into the pre-existing GIM virtual GR series. The need for rapid dissemination of emerging knowledge and expertise about the novel coronavirus offered an opportunity to re-imagine and expand the traditional GR didactic format. A virtual platform that flexibly accommodated an interactive format was identified. Case presentations are anchored in the principles of clinical reasoning including inductive and deductive reasoning, emphasizing biases that can impact clinical judgement. Cases focus on COVID's multi-system impact and guidelines for testing, diagnosis, and treatment.

The Office of CPD and GIM leadership approved the rapid implementation of this educational initiative. 4 GR RIC cases have been presented; 7 more cases are scheduled for AY21. GR average 90 interdisciplinary attendees and presentations target the Dreyfus levels of proficient, expert, and master learner.

EVALUATION: CPD distributes evaluations after GR; CME and ABIM MOC credits are awarded. 134 evaluations have been completed and qualitative responses grouped into themes: Enhanced multi- disciplinary team learning; awareness of COVID's multi-system impact, illness scripts, diagnostic work- up, and risk stratification; art of clinical decision making.

DISCUSSION / REFLECTION / LESSONS LEARNED: The "Cases from the RIC" GR provides an opportunity to reimagine faculty development, emphasize principles of critical clinical reasoning, and better understand COVID's multi-system impact. Active learning paired with a virtual platform flexibly accommodates many inter-disciplinary learners simultaneously, promotes discussion, and rapidly disseminates knowledge to enhance real-time crisis care. GR is typically aimed at faculty learners; this new virtual series promotes interprofessional team learning. Enhancing faculty and nurse development using a clinical reasoning framework and multi-modal presentation format is feasible, generalizable, and can be easily implemented by other GIM divisions.

RESPONDING TO MICROAGGRESSIONS FROM PATIENTS: A "JUST-IN-TIME" TRAINING FOR FACULTY

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LEARNING OBJECTIVES 1: Describe a three-phase approach to responding to microaggressions from patients directed toward trainees.

LEARNING OBJECTIVES 2: Identify one new phrase to use when discussing microaggressions with your inpatient medicine team.

SETTING AND PARTICIPANTS: Training sessions occurred at the San Francisco VA (SFVA) Medical Center, a tertiary-care, Veterans' Affairs hospital affiliated with the University of California, San Francisco (UCSF). Participants were SFVA/UCSF faculty members who taught medical students and residents on the inpatient medicine wards.

DESCRIPTION: We created a "just-in-time" faculty development program that provided supervising physicians on an inpatient medicine teaching service with an approach to responding to microaggressions from patients toward trainees. Drawing upon a published framework (Wheeler et al. 2019) we designed a fifteen-minute training session held twice each month, timed to coincide with attendings starting on service, and facilitated by internal medicine faculty with experience discussing microaggressions. Sessions highlighted the harm of remaining silent in the face of microaggressions and introduced participants to a three-phase approach for responding to microaggressions.

EVALUATION: Each month, after faculty and trainees had concluded their time on service, we surveyed all faculty and trainees about their perceptions and experiences before and after the rotation. Between January – June 2019, 31 of 37 invited faculty members attended the session at least once; 156 trainees (108 residents, 48 medical students) rotated on the inpatient teaching service. We performed descriptive statistics using a 5-point scale (1=strongly disagree, 5=strongly agree).

Faculty responses (n=32) showed that faculty had developed specific language to establish a supportive learning climate for responding to microaggressions from patients (reported as mean±SD; pre: 3.02±1.14; post: 4.29±0.58; p<0.01); increased comfort in debriefing microaggressions (pre: 3.24±0.95; post: 4.18±0.52; p<0.01); and increased comfort responding to microaggressions in the moment (pre: 2.52±1.13; post: 3.56±0.86; p<0.01). Responses from trainees (n=43) showed increased comfort in talking to a faculty supervisor about a patient-initiated microaggression (pre: 3.71±1.11; post: 4.64±0.62; p<0.01).

DISCUSSION / REFLECTION / LESSONS LEARNED: We found that a single, brief "just-in-time" training session can increase faculty self-confidence in responding to microaggressions from patients toward trainees, as well as trainee comfort discussing microaggressions with a supervising physician. High participation of our faculty, presumably due to interest in the topic, and low survey participation by learners, may limit the generalizability of these results elsewhere. Additionally, the persistence of the effects of the intervention without skill reinforcement remains unclear. Nevertheless, this reproducible training appears to build faculty comfort addressing microaggressions and exert meaningful impact on trainee experience in the clinical learning environment.

RE-THINKING RESIDENT M&M – FOSTERING A CULTURE OF SELF-REFLECTION AND DIAGNOSTIC IMPROVEMENT

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LEARNING OBJECTIVES 1: To share an innovative model for re-thinking the standard resident M and M conference (practice-based learning)

LEARNING OBJECTIVES 2: To describe a method for teaching cognitive biases and diagnostic self-reflection to residents (patient care, practice-based learning)

SETTING AND PARTICIPANTS: All presenters are chief residents or faculty at the University of Virginia, a large university teaching hospital in Charlottesville, VA. This innovative teaching conference was held at least once monthly at a convenient time for residents to attend (noon conference). One chief resident and one resident present the case to residents and faculty discussants.

DESCRIPTION: Presenters will share a new model for resident M&M designed and implemented at their own institution. This model includes strict ground rules promoting a safe and tolerant environment, an explicit framework for discussion of a case appropriate for M&M, and guided discussion of potential cognitive biases. At the start of each academic year, residents are taught about these biases to have a shared foundation prior to the year's conference and the structured diagnostic error analysis.

EVALUATION: Residents were surveyed on the impact and effectiveness of the seminar in spring 2020. 90% of surveyed residents felt the new structure was a less judgmental way to approach errors, and 93% of residents felt they had a framework for how to reflect on mistakes and cognitive errors.

DISCUSSION / REFLECTION / LESSONS LEARNED: Presenters have found that the new M&M conference structure has been hugely successful at regenerating resident interest in presenting M&M cases due to a culture shift in approaching these cases. With a strictly nonjudgmental set of ground rules and a structured focus on cognitive bias, we have seen a culture shift of residents embracing a common language of cognitive biases and a lower threshold to debriefing and reflecting on critical cases and events. This conference format would be easily taught and translated to other institutions who have a faculty champion to spearhead basic teaching on diagnostic error.

RURAL RESIDENCY PROGRAM DEVELOPMENT

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LEARNING OBJECTIVES 1: Understand the importance of expanding rural residency training to rural health workforce capacity in underserved communities.

LEARNING OBJECTIVES 2: Describe progress across 37 rural training locations, with barriers and opportunities to develop rural internal medicine programs

SETTING AND PARTICIPANTS: 37 Nascent US rural primary care residencies in three specialties: 3 Internal Medicine, 5 Psychiatry, and 29 Family Medicine.

DESCRIPTION: Rural America has proportionately far fewer physicians than urban areas, and poorer rural health outcomes. Rural training increases rural physician workforce. In 2019, the Health Resources and Services Administration (HRSA) awarded approximately \$20 million in Rural Residency Planning and Development (RRPD) grants to 26 entities in 21 states to start residency training programs in family medicine, internal medicine, and psychiatry. In 2020, an additional \$8 million was awarded to 11 more institutions. With widening US mortality disparities involving rural dwellers and rural minorities, the RRPD program reflects a federal effort to transform the values of health equity and justice into action.

EVALUATION: The Technical Assistance Center tracked grantees with a novel assessment tool, prompting individualized action plans and interactive discussion among attendees. Data and discussions provided rich insights into the trajectories and key objectives for rural program development during the first year of this three-year grant project, yielding common barriers, and proposed solutions at each stage of development.

DISCUSSION / REFLECTION / LESSONS LEARNED: The majority of programs are starting urban non-profit hospital-linked Rural Training Tracks (RTTs) in affiliation with a school of medicine. Rural sites include sole community hospitals, critical access hospitals, health-system affiliated primary care clinics, and federally qualified health centers. At baseline, 52% had conducted a community needs assessment; 89% had achieved sponsoring institution accreditation; 59% had appointed a program director; 22% had completed, and 26% had submitted an ACGME application. The average rural-urban commuting area (RUCA) code was 5.2 ranging from 2 to 10. Residents will spend an average of 72% of the time training in rural settings. Findings in first year: Program readiness scores, a measurement of developmental progress, increased from 21% to 59% Progress across programs varied, with more improvement in program planning and accreditation Of 26 programs in cohort 1, 9 achieved ACGME accreditation and 6 have matched residents. Greatest barriers were financing and recruiting faculty

ONLINE RESOURCE URL (OPTIONAL): <https://www.ruralgme.org/>

STANDARDIZING RESEARCH TRAINING AND ASSESSMENT IN DEPARTMENT OF MEDICINE FELLOWSHIP PROGRAMS

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LEARNING OBJECTIVES 1: Understand the need for a more standardized educational framework for research training and accompanying evaluation tools.

LEARNING OBJECTIVES 2: Learn about a novel approach to developing shared learning outcomes and a resulting formative evaluation tool, a research training portfolio, to support medical research training.

SETTING AND PARTICIPANTS: A pilot program was initiated through work with an educational consultant within the University of Wisconsin (UW) Hematology/Oncology (H/O) Fellowship Program.

DESCRIPTION: We developed a professional learning community (PLC) composed of core research faculty and fellowship leadership dedicated to the development of research skills among trainees that created: (1) intentional learning competencies for research training in fellowship, (2) an expected timeline for fellows to achieve these goals, (3) didactics to support development of these goals, and (4) a research training portfolio and accompanying assessment rubric for formative evaluation.

EVALUATION: Pre-intervention surveys identified large variations in the perceived level of proficiency in core research topics, variable confidence in the quality of current research teaching strategies and ability of fellows to successfully obtain funding and conduct independent research post-fellowship, and a lack of clearly defined metrics of research productivity.

Comparison of H/O fellow pre-intervention and interim analysis surveys completed 6 months into a planned 3-year research portfolio experience (n=7 each) showed improved trainee confidence in the quality of teaching strategies used during fellowship training regarding research. Comparison of the highest Likert scale obtained in either survey showed that at interim analysis, 86% (6/7) of fellows were somewhat confident as compared with only 43% (3/7) somewhat confident pre-intervention. Fellows also noted increased preparedness regarding clinical trial design, assembly of grant components, contract negotiation, and manuscript preparation at interim analysis.

DISCUSSION / REFLECTION / LESSONS LEARNED: Our current model of research training during graduate medical education (GME) lacks a standardized educational framework, intentional learning competencies, and formative evaluation tools. The use of research training portfolios during GME has many benefits including serving as: (1) a method to evaluate both trainee and mentor academic success, (2) a tool for more holistic view of applicants, (3) a discrete representation of success to support marketability of trainees and assist with bargaining for protected research time as they pursue post-training career plans.

We aim to create a new paradigm for research training that can be disseminated across departments, institutions, and multiple training levels. Additional post-intervention data will guide our efforts in adapting our research training approach to best meet the needs of our trainees and further research is needed to help develop best practices for GME training programs that can be easily adapted into the current educational framework.

STUDENT TELE-SUPPORT TO REDUCE ISOLATION AND VULNERABILITY (STRIVE)

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LEARNING OBJECTIVES 1: A primary objective for STRIVE was to address patient needs worsened by COVID-19 care disruption and social distancing related to (1) social isolation and loneliness, and (2) increased health-related social needs.

LEARNING OBJECTIVES 2: The secondary objective was to enable medical student education during the pandemic by creating a program where medical students could serve patient needs virtually in conjunction with the primary care physician and team. As COVID-19 halted traditional medical student learning, this approach allowed students to learn by serving patients and receive credit through a novel COVID curriculum.

SETTING AND PARTICIPANTS: A group of 65 patients at higher risk of social isolation and adversely affected by unmet social needs were identified by their primary care physicians in the UNC Internal Medicine Clinic. Six medical students from UNC School of Medicine worked with 12 physicians and 2 social workers to serve this pre-determined list of patients.

DESCRIPTION: After orientation keyed to addressing isolation and social contributors to health resources, medical students in the STRIVE program reached out to patients via phone or video calls and offered companionship, which, with assent, was continued weekly. During the virtual visits, medical students also inquired about unmet social needs and provided education on COVID-19. Students reported to preceptors weekly to discuss patient progress and interventions to address patient concerns and social needs. Students communicated social and emotional concerns of patients to providers and provided supports accordingly with assistance from our social work team. At the project's end, students reflected on how the STRIVE experience impacted their empathy, understanding of social determinants of health, and self-efficacy.

EVALUATION: Fifty-three out of 65 patients were successfully reached and established care with a medical student. Of the patients reached, 43 (81%) were identified to have at least one adverse social determinant of health. One medical student wrote: "This has been my most formative experience in medical school. I've gained extensive knowledge on state resources available to our patients, improved my motivational interviewing, and became a more attentive listener."

DISCUSSION / REFLECTION / LESSONS LEARNED: There is a need for outreach amidst this pandemic to mitigate unmet social needs that challenge citizens of NC. STRIVE has shown that patients can benefit from virtual longitudinal contact with a student providing emotional support that also uncovers and addresses unmet needs, and serve as a continuous link to their providers. The next step will be to evolve into a permanent elective within the curriculum at UNC School of Medicine, where 4th year medical students follow patients over a 2 month period, providing weekly calls and updates to their providers. This could provide unmatched care and attention to the most vulnerable patients in our state, while educating future physicians on the importance of empathy and social support as integral aspects to the delivery of quality care.

SUGAR-COATED SCIENCE: A RANDOMIZED CONTROL TRIAL OF ANTHROPOMORPHIC CHARACTER ANIMATIONS VERSUS DIGITAL CHALK-TALK MODULES IN RESIDENT DIABETES EDUCATION

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LEARNING OBJECTIVES 1: Learners will be able to choose appropriate T2DM agents based on host and drug factors: comorbidities, side effect profiles, patient goals and preferences, and potential added benefits. (Knowledge)

LEARNING OBJECTIVES 2: Learners will feel more comfortable and confident using SGLT2 inhibitors, DPP4 inhibitors, and GLP1 receptor agonists in their practice. (Attitude)

SETTING AND PARTICIPANTS: This diabetes curriculum was administered to 92 internal medicine residents as a part of their mandatory ambulatory didactics.

DESCRIPTION: Learners received a 3-hour curriculum covering three key drug classes. All sessions were multi-modality, included a pretest, and a combination of video modules, live lecture, interactive polling, and small group discussions. Two sessions used 2D vector animation that represented drugs as comical, anthropomorphic characters and conveyed content through the lens of mnemonics and metaphorical story. The other two groups received a digital chalk-talk (DCT), a video lecturer covering the same material while annotating powerpoint/PowerPoint slides. A delayed posttest was administered 5 months after the intervention.

EVALUATION: Pretest knowledge scores were low for both groups, 36.2 \pm 19.5%, n=45, and 40.1.0 \pm 21.2%, n= 47, for DCT and animation groups, respectively, p=0.40. Immediate posttests showed significantly higher scores for animation for a DPP4i and GLP1 knowledge composite, but overall scores were not significantly different. Delayed posttest response rate was limited by pandemic, but showed both arms learned significantly compared to baseline, without a significant difference in the amount of learning. Three items (Cronbach's alpha= 0.87) addressed whether videos induced social presence, and showed a significantly higher rating in the animation group compared to DCTs, Median_{anim} = 3.5, IQR_{anim} 2.8-4.0, N_{anim}= 30 Median_{DCT} = 3.0, IQR_{DCT} 2.0-3.0, N_{DCT} = 66, p=0.016. Video acceptability showed a higher score for animation over DCT (p=0.03), mostly driven by a higher entertainment rating (p=0.015). Open ended feedback showed that learners from both groups valued the multi-modality and deliberate nature of the curricular design.

DISCUSSION / REFLECTION / LESSONS LEARNED: Sugar-Coated Science uses characters as advance organizers, plot to achieve social presence, entertainment to enhance engagement, and anthropomorphic emotional design for positive affective response. Its development employed a novel integration of curriculum development with workflows adapted from the animation industry, and was carried out by clinician-educators without formal training in art, film, or animation. The combination of asynchronous video interaction, live polling, synchronous lectures, and group work was positively received and increased knowledge. Well-designed, multimodality curricula and media elements like character animation should be incorporated to enhance learners' subjective experience and sense of immersion.

ONLINE RESOURCE URL (OPTIONAL): Sugar-Coated Science: DPP4i sample:

<https://youtu.be/jUQfDBLPoOs> DCT: GLP1ra sample: <https://www.youtube.com/watch?v=sVP48wfuQc0&feature=youtu.be>

TAKING TWO STEPS BACK: AN INNOVATIVE ONLINE CURRICULUM IN CLINICAL REASONING

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LEARNING OBJECTIVES 1: Describe the core concepts in clinical reasoning.

LEARNING OBJECTIVES 2: Apply clinical reasoning concepts to identify possible errors in clinical reasoning. Utilize a reflective reasoning checklist to help prevent diagnostic errors.

SETTING AND PARTICIPANTS: We developed an interactive online curriculum for University of Pittsburgh medical students and internal medicine residents. Students completed the curriculum during their 3rd-year internal medicine clerkship (n=173) or during a 4th-year clinical reasoning elective (n=21). First year residents (n=77) completed the curriculum during the first half of the academic year.

DESCRIPTION: The curriculum is presented as 11 online modules hosted using Pitt's Canvas Learning Management System. The modules use a

combination of short text and video didactics to deliver content, multiple choice and short answer questions to stimulate retention, and interactive case tutorials with branching logic to teach learners to apply the material. Modules 1-6 focus on the cognitive theory of clinical reasoning and cover System 1 versus System 2 thinking, key clinical findings, problem representation, illness scripts, and cognitive biases. Modules 7-11 incorporate these concepts into a reflective reasoning checklist and teach learners to apply the checklist to clinical vignettes. Key questions within the checklist include "Is there discordant information?", "Does my diagnosis fit the physiology I am observing?", and "Is there a 'must-not-miss' diagnosis that I need to consider?", among others. The modules take 4.5 hours on average to complete.

EVALUATION: Curriculum completion rates were high: 90% (19/21) among 4th-year students taking the clinical reasoning elective and 94% (72/77) among internal medicine residents. Third-year students were required to complete the curriculum during their clerkship: by January 4, 2021, 86/173 students had completed the modules. Participants were also asked to complete a 4-question course evaluation. On a 5-point Likert scale, 93% (165/177) agreed or strongly agreed that the curriculum enhanced their knowledge and understanding of medical decision making. Similarly, 93% (164/177) agreed or strongly agreed that the curriculum provided them with knowledge and tools that will improve bedside medical decision making. Free text responses were similarly positive. Multiple interns who took the course as 3rd- and 4th-year students reported still finding the course helpful. Suggestions for improvement included finding ways to condense the curriculum and adding additional instruction on clinical reasoning throughout the year.

DISCUSSION / REFLECTION / LESSONS LEARNED: An online, interactive curriculum was an effective means for delivering clinical reasoning instruction to learners. The curriculum was well-received by learners who thought it achieved its stated learning objectives. Future iterations must balance learner desire for a more condensed curriculum with the time-on-task necessary to deliver all intended content to participants.

TEACHING TELEHEALTH DURING A PANDEMIC: AN INTERN'S SURVIVAL GUIDE FOR VIRTUAL MEDICINE

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LEARNING OBJECTIVES 1: Identify barriers to resident uptake of virtual care (Patient Care/Interpersonal and Communication Skills).

LEARNING OBJECTIVES 2: Develop case-based curricula in telemedicine for resident trainees (Systems-Based Practice/Patient Care).

SETTING AND PARTICIPANTS: Sixteen internal medicine interns providing primary care at a VA clinic participated in our curriculum.

DESCRIPTION: The COVID-19 pandemic has dramatically changed care delivery in the outpatient setting. Restrictions on in-person visits have required primary care clinics to rapidly transition to telemedicine. While the implementation of telehealth was previously limited by issues of reimbursement, changes in insurance coverage have allowed physicians to rethink the way we provide care both during the pandemic and in the future. As virtual care is likely to remain a mainstay of outpatient medicine, it is imperative that telemedicine training be incorporated into graduate medical education.

Based on our experiences in transitioning to remote care in the spring of 2020, we developed a three-hour curriculum for incoming interns to prepare them for virtual primary care visits. Our curriculum began with a didactic session focused on the appropriate use of telehealth technology, virtual care etiquette, and strategies for billing and coding. Interns then practiced these skills in a safe space through simulation sessions focused on troubleshooting technical issues, performing physical exams, coordinating team-based care, and tackling emergencies.

EVALUATION: Participants' comfort with telemedicine was assessed by survey prior to the training, then reassessed at 1 week and 3 months after completing the curriculum. Participants reported little previous experience with telemedicine. After completing the training, resident confidence in conducting

video visits increased from a mean of 4 on the pre-survey to 7 at one week and 8 at three months (on a scale of 1-10 with 1 indicating “not confident at all” and 10 indicating “extremely confident”). Residents were more likely to agree that video visits would allow them to bond with their patients, effectively communicate with their patients, and effectively treat patients’ needs at 1 week and 3 months after completing the training.

DISCUSSION / REFLECTION / LESSONS LEARNED: Virtual care has been implemented widely during the COVID-19 pandemic and is likely to remain integral to the future of primary and specialty care. This shift in the way we provide care demands further research into effective strategies for teaching telemedicine to trainees. Our curriculum provides a novel strategy for integrating the fundamentals of telemedicine into an internal medicine primary care curriculum utilizing case-based simulation. Additional research is needed to further evaluate telemedicine training on a larger scale and to investigate the impact of telemedicine training on clinical outcomes.

TELEMEDICINE CLINICAL SKILLS: RAPID RESPONSE BUT ONGOING NEED

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LEARNING OBJECTIVES 1: Medical Knowledge: Primary care providers (PCPs) will gain knowledge and experience in telemedicine (TM) clinical skills as a result of completing this curriculum.

LEARNING OBJECTIVES 2: Practice-based learning: PCP attitudes, knowledge, and experiences in TM will be evaluated and used to enhance the curriculum.

SETTING AND PARTICIPANTS: Academic primary care group practice with 245 providers.

DESCRIPTION: A Telemedicine Education Consortium (TEC) was formed in March 2020 during the COVID19 pandemic to study and promote clinical standards in TM and to create a “virtual library” of clinical skills. Our initial goals were to (1) develop a TM clinical skills curriculum targeting PCPs; (2) disseminate this rapidly given needs at onset of the public health emergency (PHE); (3) study and refine the curriculum as TM practice evolved. The TEC was an interdisciplinary, multispecialty team including nurses, PCPs, medical specialists, educators, and instructional technologists. This effort was unbudgeted, so most resources were donated. The TEC has developed a curriculum plan, and produced seven focused videos. We completed one cycle of evaluation to refine the scope of our program.

At the onset of the PHE, the TEC performed a rapid needs assessment, and identified 9 priority topics, including TM fundamentals and system-specific examinations. The TEC rapidly developed a curriculum, style guide, demonstration modules, and evaluation plan. A patient orientation module was produced, translated into 5 languages, and disseminated in April 2020 via YouTube and our institution’s intranet. Five additional modules have been produced and disseminated to date. We surveyed generalist learners in November 2020 to identify learning needs after their initial acclimation to TM.

EVALUATION: At baseline, providers had little education in TM clinical skills, and few learning resources were available. Our survey was sent to 245 PCPs, each averaging more than 1000 TM visits since the start of the PHE; 106 (42.4%) completed the survey. Of these, 96.2% were confident or highly confident in their history taking skills, compared to 68.3% for “system specific” and 34.6% for “overall” examination skills. Only 31.3% “disagreed/strongly disagreed” that education in communication and relationship building was needed, and only 20.1% felt TM clinical skills education was unnecessary. Comments expressed concerns that TM evaluation in primary care “has not been adequately studied”, and few accessed the online resource.

DISCUSSION / REFLECTION / LESSONS LEARNED: Telemedicine (TM) use was rapidly upscaled during the PHE caused by the COVID pandemic, but few providers had specific training in TM clinical skills, and few learning resources were available. To address this need, we developed a team,

video curriculum, and resource platform, though few have accessed it to date. Education needs in TM clinical skills continue to exist, and work is needed to understand, evaluate, and address these needs.

ONLINE RESOURCE URL (OPTIONAL): <https://www.hopkinsmedicine.org/office-of-johns-hopkins-physicians/education-training/telemedicine.html>

THE AMAZING RACE: LIFE OF AN INTERN

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LEARNING OBJECTIVES 1: To promote learners’ engagement, group cohesion and interpersonal communication skills by using a game-based interactive series of orientation activities.

LEARNING OBJECTIVES 2: To provide practical “survival skills” for immediate incorporation into clinical duties, such as pre-rounding, formulating an assessment and plan, delivering an oral presentation, paging a consult service, and completing a discharge summary and orders.

SETTING AND PARTICIPANTS: Most incoming PGY-1 residents to the MetroHealth Internal Medicine Residency Program in June 2020 were included; several PGY-1 residents on J-1 and H-1B visas were not.

DESCRIPTION: There are two parts to the orientation program:

Part 1) Participating residents were given a PowerPoint presentation on “Life as an intern” outlining the daily workflow and expectations of an intern.

Part 2) Participants were then divided into teams; each was given a laptop and presented with the history and physical for the same case. Each team worked through five “roadblocks” presented in chronological order entailing content that they were previously exposed to in Part 1. The “roadblocks” were designed to emulate an intern’s daily tasks.

Roadblock 1: Work as a group to gather pertinent information from the Electronic Medical Records followed by a formal presentation.

Roadblock 2: Correctly place admission orders and call the appropriate consult service. Roadblock 3: Complete a discharge summary.

Roadblock 4: Perform correct medication reconciliation for discharge with appropriate follow up orders.

Roadblock 5: Give a sign-out to the facilitator.

To encourage equal participation, a different member of the team lead each new “roadblock”. The goal for each team was to navigate all “roadblocks” as quickly as possible. A prize was given to the winning team.

EVALUATION: Participants involved (n=27) reported that this method of learning was well suited for their individual style of learning (92.6%). They felt engaged (92.6%), confident in the amount of material they were able to retain (100%) and experienced positive interaction between facilitators and learners (100%). Comments include “Increased my confidence,” “Great hands-on preparation,” and “Loved the interaction.”

DISCUSSION / REFLECTION / LESSONS LEARNED: Residency programs routinely provide dedicated orientation to incoming residents, but little is known about the best delivery method. The Amazing Race: Life of an Intern uses a team-based and game-based learning strategy to promote engagement, interaction between residents, and familiarity with the daily workflow of an intern. This not only adds a hands-on experience to learning daily tasks, but additionally provides an active learning component that fosters teamwork among the groups. Additionally, given the unprecedented challenge of the past year, there has been an urgent need for innovative solutions optimizing the use of virtual educational endeavors. Although we were able to provide this initiative in person (albeit masked), this curriculum can also be delivered using the “break-out rooms” function of a virtual platform.

THE ASYNCHRONOUS CONFERENCE TRACKER: AN OPEN-SOURCE SOLUTION TO ASSESSING RESIDENT UTILIZATION OF ASYNCHRONOUS LEARNING ACTIVITIES

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LEARNING OBJECTIVES 1: Identify how and when residents prefer to engage with asynchronous learning activities(ALAs)

LEARNING OBJECTIVES 2: Review the benefits and limitations of an online tracker for measuring resident utilization of ALAs

SETTING AND PARTICIPANTS: Responding to disruptions to the resident learning environment during the COVID-19 pandemic (Redinger 2020), IM residency programs have expanded the use of asynchronous learning activities (ALAs). While providing residents with flexibility in how and when they review content, resident ALA preferences and utilization remains understudied. At our institution, the Asynchronous Conference Tracker (ACT) was developed to measure several components of resident utilization of ALAs. The ACT was introduced to 76 PG1-PGY3 IM residents in July 2020 and collected entries over a 6-month period.

DESCRIPTION: The ACT was developed by the authors using open-source Google Forms/Sheets software. The ACT was accessed by residents after completing an ALA, either via the program website or QR code posters. Three types of ALAs were counted towards semester conference targets—recorded core content lectures, interactive cases, and podcasts—with a list of pre-vetted activities posted on the program website. Residents' progress towards their conference targets was presented in real-time on the program website in an anonymized table.

EVALUATION: ALA utilization was assessed via entries in the ACT. Means and ranges were calculated for total utilization of recorded lectures, interactive cases, and podcasts, as well as utilization by class. Mean time between the posting of recorded core lectures and resident submission to the tracker was also evaluated.

DISCUSSION / REFLECTION / LESSONS LEARNED: Utilization of ALAs was high across all PGY classes, with nearly 12 activities completed per resident over a 6 month period. Residents engaged with recorded core lectures most frequently, completing a mean 7.4 lectures over the evaluation period (range 0–33). Podcasts (mean 3.8 activities, range 0–20) and interactive cases (mean 0.3 activities, range 0–2) were less utilized. PGY2s were most likely to complete ALAs. The mean time between the content being posted and completion by residents was 18.6 days.

These findings reflect a shift in resident learning preferences that was present prior to the COVID-19 pandemic (Cardall 2008), but has accelerated this academic year: When offered the opportunity, residents will engage with ALAs—often on busy rotations and both before and after their clinical duties, as evidenced by time stamps from the ACT. The range of utilization captured by the ACT points to a need for creative interventions to meet the needs of residents who do not place as much educational value on ALAs. While other tools are needed to better assess engagement with the content and knowledge retention following ALAs, the ACT represents an easily-deployable solution for capturing resident asynchronous learning preferences.

ONLINE RESOURCE URL (OPTIONAL): <https://forms.gle/17BCCre4oG4PkFV88> <https://docs.google.com/spreadsheets/d/1AATfNoGuR-zMIDbg3FgN72ZifZr0Q8bLF0wEBqHodc/edit#gid=0>

THE CARDIONERDS ACADEMY: A NOVEL DIGITAL MEDIA AND MEDICAL EDUCATION FELLOWSHIP

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LEARNING OBJECTIVES 1: Fellows in the CardioNerds Academy will learn to create high-quality asynchronous medical education content, including producing the CardioNerds podcast and creating virtual journal clubs, tweeterials, infographics, videos, and blog posts.

LEARNING OBJECTIVES 2: Fellows will collaborate with leaders within cardiology to develop their professional network and complete a capstone project.

SETTING AND PARTICIPANTS: 13 Fellows (comprised of IM residents, cardiology fellows, and hospitalists) divided into 4 houses have been selected

for the inaugural class of the CardioNerds Academy. Video conferencing is used for most activities.

DESCRIPTION: The CardioNerds Academy is a medical education fellowship, whose primary focus is educating physicians in the use of digital media for cardiology education. The fellowship is free and not directly affiliated with any singular medical institution. IM residents and cardiology fellows who have completed at least 1 year of post-graduate training are eligible to apply. The Fellows are mentored by a group of Chiefs, who are IM residents with experience in digital content creation. The Academy is led by creators of the CardioNerds podcast.

The fellowship lasts 12 months, during which fellows will complete 3-month rotations in “Videos and Blog Posts”, “Tweeterials”, “Virtual Journal Clubs”, and “Infographics”. During each rotation, Chiefs mentor Fellows in creating their own digital education content within the rotation domain, that will be disseminated by the CardioNerds platform. Chiefs organize didactic sessions to discuss best-practices at the beginning of the rotation.

In addition to the core rotations, each Fellow is tasked with completing a digital cardiovascular education capstone project. To assist in this goal, Fellows are connected with the larger CardioNerds network, which includes cardiovascular fellows and faculty throughout the country.

EVALUATION: Each Fellow will complete a pre-fellowship survey at the beginning of the program (see “Online Resources”). This survey will assess: (1) attitudes and beliefs regarding digital media and medical education; (2) reported comfort with the digital media modalities and with ACGME’s listed “Competencies for Medical Educators”; and (3) a formal Needs Assessment, asking Fellows to identify content creation skills and medical education core competencies most important to improve their teaching. At the end of the fellowship, each Fellow will complete the same survey to assess for changes.

DISCUSSION / REFLECTION / LESSONS LEARNED: As more learners turn to the internet to augment the traditional medical education experience, there is a need to provide physicians with the tools necessary to create and effectively leverage digital content for medical education. Digital media provides the opportunity to connect individuals despite geographical distance and decrease educational hierarchies. The CardioNerds Academy is the first digital media medical education fellowship to focus on the field of cardiology.

ONLINE RESOURCE URL (OPTIONAL):

<https://docs.google.com/forms/d/1qxRw1Gg9bwGypfgFjvpo0ia-Vf9V70baTvT6riswKE8/prefill>

THE EVOLUTION OF OPHTHALMOSCOPY: USING A SMARTPHONE FOR TEACHING THE FUNDOSCOPIC EXAM

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LEARNING OBJECTIVES 1: To evaluate student preference and confidence in identifying anatomic landmarks using two smartphone imaging devices.

LEARNING OBJECTIVES 2: To determine if there is room for improvement in the direct ophthalmoscopic exam using smartphone imaging devices.

SETTING AND PARTICIPANTS: Ninety-seven second year medical students were asked to complete an IRB approved anonymous survey pre- and post-training comparing their perceived confidence, proficiency, and ease of use of a traditional direct ophthalmoscope versus a novel smartphone enabled imaging device. Ninety-three students completed the survey in its entirety and were included in the study while incomplete surveys were excluded. Both the direct ophthalmoscope and smartphone training sessions were performed on Kyoto head models that had one eye displaying pathology and one control eye displaying a normal retina. No human patients were used in this study.

DESCRIPTION: Direct ophthalmoscopy is a basic and essential physical examination skill taught in all medical schools. Multiple studies have shown that medical students, residents, and even physicians have limited confidence and skill proficiency in performing an ocular fundus exam using an ophthalmoscope. We used two smartphone retinal imaging devices, the Ophthalmic oDocs Fundus and the oDocs Nun, to effectively image the retina. The oDocs

Fundus is a 3D printable adapter that converts any smartphone and 20 diopter lens into a retinal fundus camera. The oDocs Nun is a wide field ophthalmoscope that can be utilized with or without a smartphone. We hypothesized that the smartphone retinal imaging devices would be preferred by trainees as they enable instructors to provide real-time feedback for our students, which is not possible currently with the direct ophthalmoscope alone.

EVALUATION: Paired sample t-test showed there was a significant difference $t(92)=-32.3$ ($P < .001$) in pre- and post-test scores for confidence following training overall. The direct ophthalmoscope was only preferred by 18% of students when compared to other smartphone imaging devices. The other 82% of students preferred the smartphone imaging devices due to ease of use and view of the retina.

DISCUSSION / REFLECTION / LESSONS LEARNED: 70% of the students preferred the oDocs Nun, to the direct ophthalmoscope. Device preference is primarily determined by ease of use as selected by 82.8% of respondents and view of the image by 81.7% of respondents. Ease of use and view were more important than the ability to capture the image or educate the patient. This device is a novel, effective education tool, with a potential for retinal imaging and telemedicine consults. This study demonstrated that simulation training is an effective method to increase medical students' confidence in performing a fundus examination. It also shows that innovation in traditional instruments and teaching can improve learner confidence in performing a vital exam. With the rapid development of technology, we must adapt our instruments and teaching styles to best improve medical education and patient care.

THE IMPACT OF THE CORONAVIRUS PANDEMIC ON LEARNING AND USING POINT-OF-CARE ULTRASOUND BY INTERNAL MEDICINE RESIDENTS

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(Control ID #3546047)

LEARNING OBJECTIVES 1: Describe a longitudinal curriculum to train internal medicine (IM) residents in point-of-care ultrasound (POCUS).

LEARNING OBJECTIVES 2: Recognize the impact of decreased patient contact on residents' retention of POCUS skills.

SETTING AND PARTICIPANTS: Despite the well-documented benefits of POCUS, internal medicine residents receive little formal training. We implemented a curriculum in the 2019 academic year to train 55 PGY-2 IM residents in POCUS across four urban teaching hospitals and a method to evaluate its efficacy. As the COVID pandemic hit, we additionally sought to understand the impact of COVID on the efficacy of our curriculum and to ascertain from IM residents their barriers to using POCUS during the COVID pandemic.

DESCRIPTION: The curriculum was composed of three workshops, consisting of lectures and hands-on practice covering lung, cardiac, abdominal, and lower extremity vascular views. Following the workshops, we sought to consolidate learners' knowledge with a subsequent year-long skill building phase. The skill-building phase was truncated due to the pandemic. A hands-on assessment was performed prior to the course and not repeated at course conclusion due to social distancing concerns. An online knowledge test was administered before the course, immediately following the course, and at one year. A survey assessing attitudes and barriers to POCUS was administered before the course and at one year.

EVALUATION: No resident passed the pre-course hands-on assessment. Prior to the course, the average resident score was 54% on the online knowledge quiz; directly after the workshop series, the average rose to 78%. At one year, the average score on the online knowledge quiz was 74%, a statistically significant decrease ($p=0.04$). Ninety-one percent of residents reported performing POCUS at least once/month prior to the pandemic. During the pandemic, scanning activity decreased; 67% residents reported they scanned rarely or never.

DISCUSSION / REFLECTION / LESSONS LEARNED: Our course led to significant improvement of knowledge regarding ultrasound technology and image interpretation, however this decayed at one year, likely due to lack of skill reinforcement. Though POCUS was widely used prior to the pandemic, usage dropped at the pandemic's peak, despite its utility as both a diagnostic

and therapeutic tool. The most commonly cited reason for lack of use was concern regarding contamination and infectious exposure. While the COVID pandemic disrupted our curriculum, it also highlighted opportunities to incorporate POCUS into clinical practice and reinforced the importance of continued longitudinal practice to retain learned skills.

THE PRE-MEDICAL HEALTH COACHING (PHC) PROGRAM: PRE-MEDICAL STUDENTS AS VOLUNTEER HEALTH COACHES AT A SAFETY-NET HOSPITAL IN CALIFORNIA, 2016-2020

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LEARNING OBJECTIVES 1: Explore how to engage pre-medical students as health coaches to contribute to a more diverse primary care workforce.

LEARNING OBJECTIVES 2: Discuss the benefits of racially- and culturally-concordant health coaching on patient outcomes.

SETTING AND PARTICIPANTS: The setting for this program is the Adult Medicine Clinic at Highland Hospital, within Alameda Health System (AHS) in Oakland, California. Highland is a public safety net hospital serving a culturally diverse and predominantly low-income Medicaid and uninsured patient population. Although this project began in 2008, the current review encompasses the years 2016-2020, during which 22 pre-medical students participated. These data represent an update to an oral presentation at the 2017 SGIM national meeting.

DESCRIPTION: Pre-medical students who self-identified as belonging to groups historically underrepresented in medicine (URM) served as volunteer pre-medical health coaches (PHCs) in outpatient primary care. This study assessed the impact of the PHC program on PHC outcomes and patient level outcomes. PHCs were recruited from local pre-medical post-baccalaureate and undergraduate programs. Selected PHCs were trained in motivational interviewing and evidence-based chronic disease self-management support. PHCs spent 5 hours weekly, for 1-3 academic years, working alongside primary care residents and faculty in a public safety-net adult medicine outpatient clinic. During each clinic session, they: 1) observed the doctor-patient interview, 2) provided on-site health coaching to patients, and 3) provided telephone follow-up after the visit.

EVALUATION: The 21 PHCs were diverse - 36% were from URM groups and 9% were first generation individuals. Preliminary results show that the PHC experience had a positive impact on career trajectory: 91% stayed in science, 50% applied to medical school, and 20% have entered medical training. Qualitative impacts on coaches included significant clinical exposure, meaningful connection with patients, overcoming career barriers, and having a more holistic view on health. Patient level impacts varied: hemoglobin A1c level decreased by 1 percentage point in patients with diabetes-focused action plans; 89% of smoking-focused action plans led to smoking decrease or cessation. In contrast, action plans focused on weight loss did not yield a significant change in BMI over time.

DISCUSSION / REFLECTION / LESSONS LEARNED: The Pre-medical Health Coach (PHC) program is an innovative model with potential benefit for both PHCs and patients. PHCs were often from URM backgrounds, providing culturally-concordant chronic disease self-management support to patients in a safety-net health care system. This program could be readily adapted in health care systems across the country to increase racially and ethnically diverse entrants to the healthcare workforce, tackle chronic disease inequities, and reduce primary care provider workloads. Future directions include evaluating the impact the PHC program on career paths over time, as well as long-term effects on patient outcomes and patient satisfaction.

THE PRICE IS RIGHT: USING CLINICAL REASONING TO TEACH HIGH VALUE CARE

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LEARNING OBJECTIVES 1: Improve clinical and diagnostic reasoning capacity among internal medicine residents.

LEARNING OBJECTIVES 2: Emphasize the importance of clinical reasoning as a key component of high-value care and educate trainees about the financial and temporal costs of excessive diagnostic testing.

SETTING AND PARTICIPANTS: The estimated cost of waste in the US health care system is up to \$935 billion, which represents approximately 25% of total healthcare spending. Because of the degree of waste in the US health care system, residencies are now emphasizing the delivery of high-value care. Trainees need curricula that emphasize clinical reasoning as a means to reduce financial and temporal losses associated with excessive diagnostic testing and understand the importance of clinical reasoning in circumventing these losses. We hypothesize that implementing such curricula will highlight the importance of trainees' reasoning and diagnostic skills and ultimately decrease waste in healthcare.

DESCRIPTION: Participants included 67 PGY1, PGY2, and PGY3 residents at a large academic institution and utilized a virtual platform during protected educational time. Our educational innovation simulated two outpatient clinical scenarios to convey the importance of sound clinical reasoning. Trainees were divided into small groups who worked together to evaluate each patient while facilitators provided "real-time" lab, imaging, and pathology results. Each diagnostic test, procedure, and consult was assigned a predetermined financial cost and assigned wait time to achieve results or to schedule follow up appointments. The facilitator recorded the group's total cost and time needed to reach a reasonable working diagnosis.

EVALUATION: Eight small groups participated in this exercise. Both time to diagnosis and cost to final diagnosis varied drastically between groups. No two groups had the same workup, price, or time to diagnosis for either case. Costs varied from 2,000-12,000 between the groups and time to diagnosis ranged from 1 day to 3 months for each case. Post-simulation discussion revealed that residents were surprised about the discrepancies between differences in approach to care, total cost, use of consultants, and time to diagnosis.

DISCUSSION / REFLECTION / LESSONS LEARNED: High-value care is an important topic that is gaining momentum within medical education. This innovation integrates both critical thinking and a cost-conscious approach to patient care and has been instrumental in highlighting the importance of clinical reasoning in reducing healthcare waste. Utilizing an interactive approach in a collaborative conference setting has proven to be an effective method in past initiatives and has been effective for delivering this curriculum as well. By providing a safe space to discuss high-value care and allow residents to practice techniques in a practical setting, we are training physicians to use clinical reasoning as a primary approach to tackling diagnostic uncertainty.

THE ROLE OF AN INTERNAL MEDICINE (IM) RESIDENCY PREPARATORY COURSE IN TRANSITIONING MEDICAL STUDENTS (MS) TO CONFIDENT INTERNS

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LEARNING OBJECTIVES 1: To build skills and knowledge of 4th year MS to facilitate transition to intern through advanced experiences in managing acute conditions and performing common procedures

LEARNING OBJECTIVES 2: To build confidence of 4th year MS to start an IM internship through learning core intern skills including communicating skills, balancing responsibilities, and wellness as interns

SETTING AND PARTICIPANTS: A two week elective was offered to MS pursuing IM residency in spring semester of past 3 academic years. Total 30 participants were enrolled over 3 years. MS participated in procedural/simulation sessions and didactic sessions at Boston Medical Center (BMC) Simulation Center.

DESCRIPTION: Curriculum was designed based on a needs assessment survey offered to 4th year MS (N=47) pursuing IM residency and categorical interns (N=40) at BMC IM Program. Survey was based on managing 27 clinical scenarios, skills, and procedures with open ended questions about most relevant topics for interns. The survey was voluntary and anonymous and was found exempt by Boston University IRB. Based on results of survey,

curriculum was developed to have a heavy component of hands-on practice-based simulation exercises including acute medical scenarios using SimMan, procedure training, classroom based sessions, and advanced communication skills training using an OSCE.

EVALUATION: Students were evaluated by faculty based on their ability to meet learning objectives by direct observation. Areas of evaluation were successful participation in problem-based learning; in clinical and procedural skills in simulation using 3 D debrief model (diffusing, discovering, deepening); student-led presentations; mock paging assessment profile using University of Michigan Mock Paging Curriculum. We performed a pre-post-remote post evaluation of curriculum electronically using RedCap. Domains of survey included participants' self-reported confidence in managing acute medical scenarios, teaching medical students, advanced communication skills, time management, and handoffs. Immediate post-survey and remote-post survey (3 months after start of intern year) included open ended qualitative questions about effectiveness of elective and areas needed improvement.

DISCUSSION / REFLECTION / LESSONS LEARNED: When comparing pre-post surveys of students' confidence level before and after bootcamp, there was a great increase in confidence in all domains. Data analysis of both quantitative and qualitative surveys is currently ongoing. Few qualitative comments are:

"It was by far the most practical and useful elective I have done, giving us hands-on, real life skills, that will carry us with confidence into our intern year."

"This elective identified gaps in our knowledge as practitioners, and efficiently and methodically corrected those gaps with highly thought-out sessions."

Our preparatory course is distinct from other courses as our curriculum is learner based, IM-focused, and proves to be both manageable from a resource perspective for faculty and effective for MS as an intensive 2 week model, that is hands-on, simulation based.

TIME TO END ROUNDS! (TOPICS IN INTERNAL MEDICINE)

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LEARNING OBJECTIVES 1: Provide a positive "nudge" to standardize rounding times across the inpatient teams

LEARNING OBJECTIVES 2: Develop an additional high-yield educational session for residents focusing on deliberate practice of core skills

SETTING AND PARTICIPANTS: The length of morning teaching rounds was identified as a significant issue on our resident covered General Internal Medicine (GIM) inpatient teams. Longer rounds encroached on noon conference attendance, delayed placement of discharge orders, and were a stressor among house staff. A new morning didactic conference was developed to facilitate a set time to end rounds, as well as provide an opportunity to regularly practice core skills required of an internist. The setting was the GIM service at Saint Louis University Hospital. Participants were residents and attendings on the GIM teaching teams.

DESCRIPTION: The TIME (Topics in Internal MedicineE) conference established a set time for residents to be excused from rounds while providing a short but high impact educational experience. The conference takes place daily from 10:45am to 11:00am and attendance is mandatory for inpatient teams. Residents are then excused to continue patient care prior to noon conference.

Attendings are aware that residents are no longer expected to join rounds after the TIME conference. Topics rotate daily but remain consistent each week. On Mondays, we review a high yield ECG. Imaging Tuesdays are used for honing the skill of chest X-ray interpretation. Wednesdays feature a senior resident giving a 'mini-report,' with a focus on developing diagnostic reasoning skills. Mini- Journal Club Thursday is dedicated to the review of a landmark or recent publication. For each session, a standardized approach for analysis helped

participants develop a systematic approach to each skill which was reinforced by session feedback.

EVALUATION: Evaluation was based on voluntary surveys of attendees to each conference. When asked if their teams planned to continue rounding after 11:00AM, 74% of respondents answered probably or definitely not. 86% of respondents found the conference extremely or very useful. In the future, we plan to study improvements in the competency of skills such as EKG or chest X-ray readings that can be attributed to this conference.

DISCUSSION / REFLECTION / LESSONS LEARNED: We developed the TIME conference with the goal of providing standardized rounding times across the inpatient teams in order to improve patient throughput within the hospital and provide an additional high-yield educational session for residents. The conference presents an opportunity to regularly practice routine skills of medical practice including EKG and radiograph interpretation, diagnostic reasoning and critical appraisal. It also had the benefit of forcing teaching rounds to end at the desired time to allow residents time to follow up on patient tasks prior to noon conference. Overall, the TIME conference has been well-received and well-executed with an intention to encourage behavior based on positive experience rather than negative reinforcement.

TRAINING INTERNAL MEDICINE RESIDENTS TO PERFORM TELEMEDICINE VIDEO VISITS: A NOVEL SKILL-BASED CURRICULUM

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LEARNING OBJECTIVES 1: Improve internal medicine residents' self-perceived competence with telemedicine skills in continuity clinic (ICS, SBP, PC)

LEARNING OBJECTIVES 2: Provide direct observation and feedback to internal medicine residents on telemedicine skills in continuity clinic (ICS, SBP, PC)

SETTING AND PARTICIPANTS: Early in 2020, telemedicine provided a rapid response to the COVID-19 pandemic, allowing safe continuation of outpatient care. In continuity clinic, internal medicine (IM) residents at a large academic center transitioned from performing no telemedicine visits to completing more than 50% of visits over video by April and did so without formal training. After 2 months of hands-on experience, 119 PGY1-3 IM residents participated in a skills-based telemedicine video curriculum from May-July 2020.

DESCRIPTION: In May, faculty preceptors completed a needs assessment survey identifying gaps in residents' telemedicine knowledge and skills. Based on responses, we developed a 2-part curriculum. Residents first participated in a 45-minute interactive case-based didactic focused on patient triage to appropriate visit type, telemedicine communication skills, and physical exam adaptation.

Subsequently, faculty completed direct observation of one telemedicine visit per resident, using a structured checklist to provide feedback.

EVALUATION: Curriculum participants completed pre- and post-test surveys. Residents rated efficiency with telemedicine visits, agreement with attitudes about telemedicine, and competence with telemedicine skills on a 5-point scale (1=not competent, 5=extremely competent). For a subset of residents, we determined the number of video visits conducted.

Fifty-one percent of residents completed both the pre- and post-tests. No improvements in self-perceived efficiency or attitudes about telemedicine were observed. Self-perceived competence significantly increased for 14 of 15 surveyed skills with largest gains in patient triage to appropriate visit type (+0.5, $p < 0.001$), addressing preventative needs over telemedicine (+0.5, $p < 0.001$), and arranging follow up after telemedicine visits (+0.5, $p < 0.001$). Improved self-perception of competence was independent of level of training and volume of video visits. Sixty-one percent of residents received direct observation and rated feedback as useful for telemedicine practice.

DISCUSSION / REFLECTION / LESSONS LEARNED: This curriculum met residents at their learning edge and was rapidly implemented to develop

telemedicine skills in as many IM residents as possible. We satisfied our objectives to improve self-perceived competence in telemedicine skills and provide direct observation with feedback. Our curriculum aligns with three of the six AAMC pre-print Telehealth Competencies: 1) Patient Safety and Appropriate Use of Telehealth, 2) Data Collection and Assessment Via Telehealth, and 3) Communication via Telehealth, suggesting the curriculum has broad applicability to telemedicine education. Residency programs could easily adapt our curricular approach to provide residents with a framework for outpatient telemedicine skills.

USING A "CHALK TALK BANK" TO TURN RESIDENTS INTO TEACHERS

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LEARNING OBJECTIVES 1: Create an open resource to allow residents to create and share chalk talks

LEARNING OBJECTIVES 2: Investigate the creation of a chalk talk bank to increase resident teaching

SETTING AND PARTICIPANTS: This study included 2nd and 3rd year Internal Medicine residents at an academic institution.

DESCRIPTION: Resident teaching during clinical rotations is an essential component of medical student education. A frequently utilized method of instruction is the chalk talk. There are several barriers, however, preventing residents from providing quality teaching to medical students. The aim was to identify and mitigate barriers to clinical teaching among residents. We hypothesized that the creation of an easily accessible pool of chalk talks, the "chalk talk bank," would alleviate the time pressure required to create chalk talks and facilitate the development of "teaching scripts" among novice educators.

We first surveyed residents to identify the challenges of educating learners during a medicine inpatient month. Time and lack of confidence were identified as the two largest barriers to teaching. Next, we created a "chalk talk bank" that would allow residents to share and easily access chalk talks, using the internal medicine program's online database as a platform. We integrated the development of the chalk talk bank into the existing medical education elective to give residents protected time to create their own chalk talks. Residents rotating through the elective would upload advanced organizers, outlines for chalk talks, videos of chalk talks, or original visual aids.

EVALUATION: Of the 37 residents surveyed, 31 (83%) believed that the creation of a chalk talk bank would help them teach more during inpatient rotations. A post-survey was distributed 6 months after the creation of the chalk talk bank. One-quarter of the 28 residents reported utilizing the chalk talk bank. Residents also reported using the bank for self-learning. Residents who utilized the chalk talk bank did not report teaching more frequently than residents who did not utilize the chalk talk bank. However, 85% of the residents who utilized the chalk talk bank reported feeling either "fairly confident" or "completely confident" in their ability to deliver a chalk talk compared with only 42% of residents who did not utilize the chalk talk bank.

DISCUSSION / REFLECTION / LESSONS LEARNED: This study was completed during the COVID-19 pandemic which impacted the number of residents on the medical education elective and the low numbers of medical students rotating through clinical sites. These factors likely lead to a lower number of residents who contributed to or utilized the chalk talk bank. Although the frequency of teaching did not increase, residents who did access the chalk talk bank felt more confident in their teaching skills. The chalk talk bank should be studied over a longer period of time to better assess its impact on resident teaching. A Plan-Do-Study-Act model may be used in an iterative process for continuing to develop the chalk talk bank for use within the residency program.

VICE: A VIRTUAL DIAGNOSTIC REASONING CONFERENCE FOR THE COVID ERA

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LEARNING OBJECTIVES 1: Engage in real-time deliberate practice of diagnostic reasoning through stepwise interpretation of a challenging case

LEARNING OBJECTIVES 2: Practice a cognitive autopsy in real time
SETTING AND PARTICIPANTS: We implemented VICE with internal medicine residents at all PGY levels. Inpatient VICE conferences replaced weekly autopsy conference and the outpatient conference replaced pre-clinic conferences.

DESCRIPTION: COVID-19 has disrupted in-person educational conferences. We developed a virtual interactive case-based educational conference format (VICE) for internal medicine residents, intended to develop diagnostic reasoning skills, and used this format to replace both inpatient and outpatient conferences. Rather than simply transitioning an existing conference to the virtual setting, VICE leverages virtual learning to build an environment of psychological safety.

VICE is modelled after the NEJM “Clinical Problem Solving” series and the medical podcast Clinical Problem Solvers. It utilizes an online conferencing platform with screen-sharing. Residents are asked to volunteer for the role of designated discussant. Using a novel PowerPoint™ template, a facilitator then presents a case in brief “aliquots” of information to the discussant. After each aliquot is presented, the discussant comments on their problem representation and differential diagnosis while the facilitator records and represents this visually for the group.

Following the case presentation, the facilitator guides the discussant through a “cognitive autopsy”. The facilitator then presents a brief didactic relevant to either the final diagnosis or to the clinical problem.

EVALUATION: Attendees completed an online survey; we collected 37 responses. 97% of respondents agreed that VICE added something that was otherwise missing from their curriculum. In qualitative comments, residents praised the conference’s focus on diagnostic reasoning, single-discussant format, and learning environment. Although some discussants (n=10) endorsed feelings of stress about being wrong or making mistakes (60%), none reported feeling judged by peers. However, majorities of discussants felt that holding the conference in person would worsen their fear of being judged by peers (60%) as well as their level of stress about making mistakes (70%).

DISCUSSION / REFLECTION / LESSONS LEARNED: VICE has been well-received and has proven to be an effective format to practice diagnostic reasoning and cognitive autopsy skills relevant to both inpatient and outpatient practice. This conference format fills a curricular gap within our residency program. We expected that serving as the designated discussant might be a stressful experience for learners. Our data suggests that VICE successfully builds an environment of psychological safety, thereby mitigating this stress and yielding a positive educational experience. Although VICE was developed as a virtual conference in response to the exigencies of the COVID-19 pandemic, we believe that the virtual format is crucial for generating this safe learning environment.

ONLINE RESOURCE URL (OPTIONAL): <http://tinyurl.com/vicetoolkit>

VIRTUAL INPATIENT ROUNDS FOR MEDICAL STUDENTS DURING COVID-19

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LEARNING OBJECTIVES 1: Analyze the value of contingency virtual clinical experience

LEARNING OBJECTIVES 2: Identify requirements for and barriers to virtual inpatient rounds

SETTING AND PARTICIPANTS: Clinical rotations for students were suspended in March 2020, so the inpatient medical teams at GW began virtual rounds. On each team was a mix of 3rd & 4th year medical students and PA students. For clinical rounds, in the team room and on the wards, hospitalists would connect to a Webex meeting with students. We could not bring devices to the patient bedside during the pandemic.

DESCRIPTION: Students were invited to join rounds via Webex, follow and present patients. Rounds format varied; teams also had varied AV capabilities.

EVALUATION: At the conclusion, each participant received an email invitation to an anonymous online survey via SurveyMonkey. Participants identified their role on the team, then answered: What did you like, dislike, and what can be improved? Anonymous responses were collected by the clerkship director and filtered into subgroups by the respondent’s role. Individual comments were tabulated according to themes, and subgroups were independently analyzed for similarities and differences by all members of the research team. 20 of 37 participants (54%) completed the survey (5 faculty, 6 residents, 9 students). We identified 3 themes across all respondents.

DISCUSSION / REFLECTION / LESSONS LEARNED: Engagement: All appreciated the opportunity to continue having students involved. Students specifically felt the format was more engaging than patient simulations, which were also part of the curriculum at that time. One faculty highlighted the persistence of the students. Both the attendings and the residents reported feeling positive about the students’ safety, although the students themselves didn’t mention it.

Logistical challenges: Intertwined with engagement. The number of students inhibited participation. Residents felt the virtual format impaired their ability to get to know the students. Some students felt forgotten and sensed that they were almost interfering with rounds. Others reported inefficient use of time and length of rounds.

Technical issues: Unanimous major barrier. Lack of remote electronic medical record (EMR) access for students was a constant complaint. To compensate, a team member would hold a mobile device to the computer screen to show the students the EMR, which was cumbersome. There were hardware nuances and difficulties with the video conference software. All participants felt that simultaneous AV communication was critical; audio connection alone was not worthwhile. When using a smartphone for the conference, there were incoming calls and texts, which disrupted AV connections. Weak signals on the hospital wireless network also led to some distorted connections or lags, and not all hospital laptops had cameras.

In sum, virtual rounds had value but require high quality wifi & AV platform, remote EMR access, clear structure. Technical, security and HIPPA issues should proactively be addressed and warrant investment for future.

ONLINE RESOURCE URL (OPTIONAL): <https://ufile.io/f4t4bx1r>

VISIBILITY & SUPPORT FOR FIRST GENERATION COLLEGE GRADUATES IN MEDICINE

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LEARNING OBJECTIVES 1: Define the term First Generation student in the medical education context

LEARNING OBJECTIVES 2: Describe practices at UCLA DGSOM to promote academic equity for First Gen learners in medical school

SETTING AND PARTICIPANTS: The experience of First Generation (First Gen) students, those who are the first in their families to attend college, has been more heavily examined. We describe our innovation in medical education, developing a First Gen program at our medical school. We discuss the conception, design and execution of our program to help First Gen medical students thrive in their training, as a call to action for other medical schools to do so as well.

DESCRIPTION: The First Gen program at the David Geffen School of Medicine at UCLA consists of four core focus areas: community building, mentorship, transitions/home identity, academic support. Our community building component consist of initiatives that help First Gen students feel a sense of belonging, visibility and recognition. Examples include: First Gen lapel pins, large/whole group First Gen community dinners. Our mentorship

component emphasizes intersectional and intergenerational mentorship. An example includes our First Gen Families, where medical students are part of a First Gen mentorship group. This First Gen family consists of a small number of First Gen medical students, residents/fellows in training, faculty and staff. Our home identity component focuses on engaging with medical student's family members. An example includes our family welcome session during our school's white coat ceremony. The goal of these activities is to increase family engagement and understanding from parents and family members of First Gen students and to provide them with tangible ways they can support their First Gen family member. Our academic support focuses on normalizing the use of academic tutoring and providing support at key points of transition. Examples include students requesting First Gen students as tutors, increasing visibility of the medical school's Academic Support staff at all First Gen meetings and events, promoting of Academic Support resources on the First Gen medical student email list-serve.

EVALUATION: We have begun to examine our program's progress via First Gen Needs Assessments (quantitative and qualitative). Some of the ideas already stemming from these assessments include but are not limited to: educating non First Gen faculty and staff about the First Gen narrative/experience, allocating funds for First Gen programming, and expanding academic, financial, and mental health support services for First Gen individuals. **DISCUSSION / REFLECTION / LESSONS LEARNED:** As we move forward in our programming to support the First Gen community, we increasingly focus on harnessing the resilience that First Gen individuals carry within them. Our role as medical leaders and educators—is to maximize the full potential of the First Gen medical population. This population is poised to already understand and eliminate the structural injustices in medicine that lend themselves to innumerable health disparities.

WE ALL NEED SOMEBODY: DESIGNING A NEAR-PEER MENTORING PROGRAM TO IMPROVE INTERNAL MEDICINE RESIDENTS' SOCIAL CONNECTEDNESS

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LEARNING OBJECTIVES 1: Provide interns with near-peer mentors to help navigate the transition to IM residency program. (PBL)

LEARNING OBJECTIVES 2: Enhance the role of peer mentorship to improve resident social connectedness. (PBL)

SETTING AND PARTICIPANTS: We implemented a near-peer mentorship program in the internal medicine residency program at Emory University during the 2020 academic year.

DESCRIPTION: This resident-led near-peer mentorship program paired incoming interns with a PGY2/3 resident with the goals of supporting intern transition to residency and enhancing resident social connectedness. This program was implemented during the COVID-19 pandemic, when usual social events were limited.

All interns and residents were invited to participate and were surveyed about their career interests and hobbies. Pairs were matched based on interests, and mentors were asked to contact mentees prior to orientation. During orientation, mentoring pairs were able to meet at small outdoor events. Mentors were provided recommendations regarding contact intervals, topics of discussion, and support resources. The program was designed to promote flexibility and organic interactions.

EVALUATION: Participants included 88/88 PGY1 (100%) and 60/119 PGY2/3 (50%) residents. We evaluated participants' attitudes towards and engagement with the program using a cross-sectional survey.

Preliminary data from 49/148 participants (34%) found that 88% (43/49) had connected with their mentor/mentee at least once. Texting was the most common contact method (32/43, 74%) although 47% (20/43) connected in-person. Most participants had "a few contacts" (28/43, 65%) with the rest having "one contact" (10/43, 23%) or "ongoing regular contact" (5/43, 12%). Five point Likert scales measured social connectedness and mentees' sense of support (1, strongly disagree; 5, strongly agree). Mentees agreed that the

program enhanced their sense of belonging (3.6/5) and provided tips for succeeding as an intern (3.6/5) more than it helped them navigate hospital systems (3.2/5). All participants agreed (4.4/5) that the program should be continued. The majority (37/43, 86%) did not want more formalized guidelines regarding the number or content of meetings.

DISCUSSION / REFLECTION / LESSONS LEARNED: Social connectiveness is critically important for resident wellness. COVID-19 physical distancing requirements created new barriers to building community and welcoming interns. This initiative was a response to these challenges. Approximately 15 hours of time were required to develop the survey, match intern and resident pairs, and conduct follow-up. Next steps include qualitative research to further evaluate mentee engagement which will be used to modify future cycles of the program. In conclusion, this near-peer mentorship program is a simple initiative to enhance resident social connection and support interns' navigation to residency.

WELLNESS BY COMMITTEE

Justin Guthier, Joseph Scuzo, Brian Costello

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LEARNING OBJECTIVES 1: Provide a Framework for Enhancing Resident Engagement

LEARNING OBJECTIVES 2: Provide a Review on Current Trends, Initiatives in IM Resident Wellness

SETTING AND PARTICIPANTS: Virtual Presentation delivered by APD, Chief Medicine Resident, can be poster vs oral, No Preference

DESCRIPTION: Over the past 5 years, our program has had a dramatic improvement in resident engagement through the implementation of IM Resident driven subcommittees. These sub-committees are: Leadership, Community Service, Wellness, Research, Education/Curriculum. Each subcommittee consists of 3 residents (combination of interns, seniors) and one faculty adviser. Participants are chosen by the program leadership and nominated by the active resident participants. Our residency is moderate sized in comparison to other programs on a national scale (64 residents). Historically the program had performed well in multiple areas. However 5 years ago with the creation of subcommittees, the production of scholarly activity, leadership initiatives and dramatic increase in resident engagement was notable amongst program leadership. Purpose of our poster/oral presentation will be to highlight for programs the ability to create a framework and structure to increase accountability, productivity, satisfaction and achievement within the residency.

EVALUATION: We can highlight resident engagement through ACGME satisfaction surveys Wellness surveys

Highlight the difference in number of projects/initiatives of residency program before and after implementation of committees

Demonstrate how resident wellness, engagement and productivity ultimately leads to higher levels of achievement during residency (consistent fellowship placement >70% of residents in past 3 years).

DISCUSSION / REFLECTION / LESSONS LEARNED: By distributing and delegating the activities of the residency there was a significant increase in the productivity of the residency program on multiple levels. Through increased engagement, this led to improvement in resident wellness. Nomination to a subcommittee is viewed as a leadership achievement within the residency. Accountability within the committee is reviewed monthly at our residency leadership committee meetings. The contents of our presentation either oral/poster will be to demonstrate to other residency programs the advantages in restructuring the leadership of their respective program.

WHAT DID YOU SAY?: ASSESSING A VIRTUAL GOSCE TO TRAIN RAS WHO RECRUIT OLDER ADULTS TO CLINICAL TRIALS

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LEARNING OBJECTIVES 1: Interpersonal/Communication Skill: 1) Identify communication skills needed to recruit older adults

LEARNING OBJECTIVES 2: 2) Assess feasibility of GOSCEs to enhance recruitment skills in RAs.

SETTING AND PARTICIPANTS: Convenience sample of 18 (5 male, 13 female) Research Assistants (RAs) at an urban hospital who recruit older adults for clinical trials.

DESCRIPTION: Increasing older adults' participation in clinical trials is urgently needed. We developed a remote, three station simulation (Group Objective Structured Clinical Exam - GOSCE) to teach RAs communication skills.

This 2-hour course included a discussion of challenges in recruiting older adults; skills practice with Standardized Participants (SPs); and a debrief to review experiences, highlight best practices. After discussion, RAs rotated (3 per group) through the stations, each with SP and faculty observer who provided immediate feedback. Thus, learners had opportunities for active and observational learning. Scenarios were: 1) an older white woman with hearing impairment; 2) an older white woman and family member together; and 3) an older Black man mistrustful due to history of racism in medical research.

SPs completed behaviorally anchored checklists (11 communication skills across all cases, and 5-7 case-specific questions). Learners completed a 36-item survey of self-assessed change in skill after the workshop; insights on recruitment practice; and educational value.

EVALUATION: The communication checklist across all cases included: relationship development (5 items, mean of 58% well done (range: 50-75%), patient education (3 items, 44% (42-58%)), patient satisfaction (2 items, 54% (50-58%)), and information gathering (1 item, 92%).

Seventeen RAs completed the survey, 100% felt the workshop provided valuable feedback and taught relevant material, 88% would participate again and 52% reported that the workshop improved their recruitment skills. All RAs reported encountering situations similar to hearing impairment and family member cases, and the majority rated the cases as high in educational value. Just 45% reported experiencing a case similar to the Black male case, and 100% rate it as high in educational value.

Key points identified by RAs included the value of building a trusting relationship with potential subjects, recognizing possible barriers to communication early on and addressing these directly in a supportive and respectful style.

DISCUSSION / REFLECTION / LESSONS LEARNED: Remote GOSCEs are a feasible mechanism for training RAs in subject recruitment focused on the unique needs of older adults. Responses to the RA survey suggest that GOSCEs are feasible for training RAs in simulated clinical scenarios with which participants are familiar and unfamiliar. SP assessment of RAs identified areas for further reinforcement to improve recruitment skills. This innovation is a feasible, high yield strategy for training research staff. It is highly adaptable to the specific recruitment needs and skills of a clinical trials and will add to the literature on educating RAs.

WHAT MATTERS MOST? A CURRICULUM TO ADVANCE MOTIVATION AND CONFIDENCE IN SERIOUS ILLNESS CONVERSATIONS

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LEARNING OBJECTIVES 1: To design and implement a primary palliative care communication workshop and practicum using mentored skill-based feedback

LEARNING OBJECTIVES 2: To improve resident motivation and confidence in patient/proxy/caregiver-centered advanced care planning (ACP) and serious illness conversations

SETTING AND PARTICIPANTS: Internal Medicine residents at our Central Brooklyn safety-net hospital participated in a primary palliative care

workshop. Faculty directly observed resident clinical communication skills in the resident primary care practice.

DESCRIPTION: During the height of the COVID-19 pandemic, the threat of critical illness underscored the importance of timely, meaningful ACP conversations. Most residents have not received formal training or feedback on this skill.

Primary care faculty trained in palliative medicine administered a 2 hour workshop focused on: 1) barriers to communication around life-altering news 2) SPIKES framework (setting, perception, invitation, knowledge sharing, empathic listening, strategy/summary) for breaking bad news 3) serious illness conversation guide 4) role play using standardized clinical scenarios.

After the workshop, residents committed to practicing ACP communication skills with one primary care patient. Faculty observed this encounter and provided feedback on communication, reflective listening, and use of the SPIKES model using a structured feedback tool.

EVALUATION: Residents completed a survey before and after the workshop/observed clinical encounter to compare motivation and confidence in engaging patients in ACP.

Before the intervention, the rate of residents stating they "agreed" or "strongly agreed" that they were confident in ACP discussions was 33% for outpatient settings and 66% for inpatient settings (n=30).

After the intervention, 90% (n=21) and 86% (n=21) residents "agreed" or "strongly agreed" that they were confident in having outpatient or inpatient ACP discussions respectively.

21 resident physicians (88%) completed the workshop, observed clinical encounter, pre- and post- intervention surveys. Responses were anonymous and not paired. A Wilcoxon signed rank test indicated that motivation to have ACP discussions, confidence in discussing ACP in inpatient settings, and confidence in discussing ACP in outpatient settings increased (p=0.000, 0.012 and 0.000 respectively) post-intervention.

DISCUSSION / REFLECTION / LESSONS LEARNED: Residents report more experience and confidence in having ACP discussions with acutely ill patients. Direct observation revealed a one-size fits all approach focused on code status instead of patient values and preferences. Formal teaching of ACP communication skills and mentored skill-based feedback prepared residents to engage in meaningful patient ACP discussions in ambulatory and acute settings.

Innovation in Medical Education (IME) - Medical Ethics, Professionalism, and Humanities

THE VA MY LIFE MY STORY CURRICULUM: CONNECTING MEDICAL STUDENTS TO VETERANS DURING COVID-19

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LEARNING OBJECTIVES 1: Develop skills for eliciting and recording a life story

LEARNING OBJECTIVES 2: Appreciate the impact of storytelling and context on a Veteran's healthcare experience

SETTING AND PARTICIPANTS: Third year UCSF medical students on their medicine clerkship at the San Francisco VA Medical Center.

DESCRIPTION: My Life My Story (MLMS) is a nationwide VA program in which Veterans share their life stories. We designed a MLMS curriculum for medical students which we then adapted to a virtual setting during the COVID-19 pandemic.

The MLMS curriculum begins with a session introducing the VA health system and Veteran demographics followed by guided practice of narrative medicine skills. Students then select a hospitalized Veteran, conduct 90-minute interviews, transcribe, review, and edit the Veteran's life story, and upload the story in the medical record. The program concludes with a session where students reflect on the experience.

EVALUATION: Six cohorts completed the curriculum. The first cohort (n=6) completed MLMS in person. When medical students were removed from clinical settings due to the COVID-19 pandemic, we converted didactic sessions to videoconference. The second and third cohorts (n=12) conducted interviews and story reviews over telephone. For cohorts four through six (n = 17) we transitioned MLMS interviews to videoconference.

In anonymous surveys scored on a five-point Likert Scale, students reported developing new skills for eliciting and recording a life story (mean \pm SD: 4.66 \pm 0.67) and understanding how Veterans sharing their life story can impact their healthcare experience (4.80 \pm 0.40). Stratification by method of interview (in person vs telephone vs videoconference) revealed that favorable evaluations of the MLMS program persisted despite iterative structural changes.

DISCUSSION / REFLECTION / LESSONS LEARNED: In survey responses and during reflective sessions, students reported valuing the life story exercise for rapport-building and patient engagement. They noted that life stories often echoed societal issues and reported a greater appreciation of the impact of social determinants on patients' overall health and wellbeing. They emphasized the importance of communication skills extending beyond illness and appreciated protected time for this form of exchange with both patients and each other.

We encountered several logistical challenges as we iteratively redesigned the program to accommodate remote interviews. Solutions included establishing video connections between interviewer and Veteran with donated tablets and hotspots, protecting student privacy with cell phone masking software, and coordinating with on-site staff to help establish and troubleshoot video connections.

The VA MLMS program teaches medical students how to get to know their patients as people, a central skill to patient-centered care. A flexible program ensures these skills are taught even when there are limitations on in-person contact. Our experience can inform implementation of similar remote and in-person programs at other institutions.

USING AN EXERCISE IN ASSESSING EMPATHY TO ENHANCE MEDICAL STUDENTS' RECOGNITION AND DEVELOPMENT OF EMPATHY SKILLS

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LEARNING OBJECTIVES 1: Identify core skills for empathy

LEARNING OBJECTIVES 2: Appreciate use of observation and assessment for skills development

SETTING AND PARTICIPANTS: Clerkship students

DESCRIPTION: Empathy, a set of cognitive, teachable skills, has been shown to improve health outcomes and decrease physician burn out. A core challenge for curriculum on empathy is helping learners move past "taken-for-granted" ideas of empathy to appreciate the complex cognitive, skill-based nature of practicing empathy. And despite the availability of many empathy measures, we have not yet achieved a shared understanding of what empathy is and looks like in clinical practice. Therefore, we created an empathy exercise for ambulatory care clerkship students in which they viewed an intense, compelling film depicting the challenges of sharing bad news and then assessed the degree of empathy displayed by the physician. Primary goals were to build skills in perspective taking and in recognizing opportunities for and skills in practicing empathy. Students completed these empathy assessments: Patient perspective (Consultation and Relational Empathy Measure); Observer assessment of empathy skills (Resident Empathetic Communication Evaluation Form) and Observer assessment of physicians' level of response to opportunities for empathy (Empathic Communication Coding System).

EVALUATION: 28 students completed the exercise and provided thoughtful reflections on their observations of empathy. Students' assessment of empathy from the patient's perspective and as an observer of specific empathy skills both showed strong internal consistency (Cronbach's $\alpha > .84$) and moderate-to-strong inter-rater agreement (Kappa/ICC $> .40$). However, students' assessment of the level of empathy that best captured the physician overall showed substantial variation: 11% Level 0 (Denial/Disconfirmation),

41% Level 1 (Perfunctory Recognition), 37% Level 2 (Implicit Recognition), 7% Level 3 (Acknowledgement), 0% Level 4 (Pursuit); 4% Level 5 (Confirmation) and 0% Level 6 (Shared Feeling or Experience). Students able to articulate more sophisticated initial definitions of empathy gave the physician lower empathy ratings on this scale (mean of 1.2 vs 2.2, $p < .05$). Student feedback on the exercise was positive; this active learning opportunity appeared to prime students for engagement in subsequent in-person, group sessions on empathy.

DISCUSSION / REFLECTION / LESSONS LEARNED: This exercise provided a focused opportunity for students to observe and assess specific aspects of empathy and is expected to bolster future recognition of empathic opportunities and deployment of empathy skills. Greater agreement among students in patient perspectives on and the discrete skills of empathy than in judgments of the general empathy level of the physician suggest both that further effort to create shared understanding of what makes for an empathic physician is warranted and that accounting for the importance of context in both our teaching and assessment of empathy is imperative.

ONLINE RESOURCE URL (OPTIONAL): <https://www.empathyproject.com/>

Innovation in Medical Education (IME) - Mental Health and Substance Use

A VIDEO- AND CASE-BASED CURRICULUM ON THE MANAGEMENT OF ALCOHOL USE DISORDER FOR INTERNAL MEDICINE RESIDENTS DURING AMBULATORY PRE-CLINIC CONFERENCE

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LEARNING OBJECTIVES 1: To prescribe appropriate pharmacologic treatments for patients with alcohol use disorder (AUD) depending on patient goals and comorbidities.

LEARNING OBJECTIVES 2: To counsel patients effectively on mutual support groups and psychological treatment for AUD.

SETTING AND PARTICIPANTS: Our curriculum was delivered to all internal medicine (IM) residents at 4 clinic sites at an urban academic residency program. Three 30-minute sessions were delivered over 3 months by various faculty preceptors during pre-clinic conference time.

DESCRIPTION: AUD is a common but undertreated condition. Prior curricula are time intensive or do not address pharmacotherapy. We developed a case and video-based curriculum to improve knowledge, attitudes, and confidence with management of AUD, including 3 sessions: mutual support groups and psychotherapy, pharmacotherapy, and case vignettes. Two sessions began with 12-minute videos with didactic white board animations followed by preceptor led, case-based content application; the final session consisted of case vignettes. Content was developed using national guidelines and local expertise. Preceptors received a facilitator guide and link to the video prior to each session.

EVALUATION: We developed a survey to measure knowledge, confidence, and attitudes regarding treatment of AUD which was administered via email pre- and 3 weeks post-curriculum. Knowledge was measured by mean percent correct of 30 true/false items. Confidence was measured by mean 7-point Likert-scale score on 3 items. Attitudes were measured by a mean composite score on 12 7-point Likert-scale items from a modified Survey of Attitudes and Perceptions (SAP) Questionnaire. Knowledge, confidence and attitudes were compared pre- versus post with paired sign tests or Student's t-tests.

We also included 2 open-ended questions asking for residents to set a goal for future practice and identify any lingering questions. Two authors categorized comments with discrepancies resolved by consensus.

Of 153 residents receiving the curriculum, 35 (22.9%) completed both pre- and post-surveys. The mean percent correct on knowledge questions improved from 68% pre- to 80% post-curriculum ($P < 0.001$). Confidence increased significantly for all 3 items with a particularly notable increase in confidence with pharmacotherapy (2.9 pre- versus 4.5 post-curriculum, $P < 0.001$). Positive

attitudes toward people with AUD increased from mean SAP score 3.4 pre- to 3.9 post-curriculum ($P < 0.001$). Learners most frequently a set goal to increase pharmacotherapy prescribing and identified logistical questions such as cost and coverage of intramuscular naltrexone.

DISCUSSION / REFLECTION / LESSONS LEARNED: A 3-part curriculum delivered by clinic preceptors improved residents' knowledge, attitudes, and confidence regarding treatment of AUD and learners set a goal to increase pharmacotherapy prescribing. Future iterations should include specific logistic information.

IMPACT OF A WEB-BASED CURRICULUM ON INTERNAL MEDICINE RESIDENT USE OF STIGMATIZING LANGUAGE FOR SUBSTANCE USE DISORDER

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LEARNING OBJECTIVES 1: Create a module to teach terminology for substance use disorder (SUD), discuss stigma associated with SUD, and address why these issues have implications for patient care

LEARNING OBJECTIVES 2: Improve trainees' usage of appropriate terminology for SUD **SETTING AND PARTICIPANTS:** UPMC Internal Medicine residents participated in fall 2020. ~150 residents are in the program.

DESCRIPTION: Addiction is a chronic, treatable disease, yet it carries considerable stigma. Stigmatizing language has been shown to bias how clinicians view patients with SUDs. While national medical organizations have recommended educational initiatives to reduce stigma for SUDs, studies of specific initiatives are lacking.

We created an online, interactive video curriculum about addiction, vocabulary for describing addiction, and why language matters. Prior to taking the curriculum, participants viewed a video encounter between a physician and a 'challenging' simulated patient with SUD. Participants then completed a short case write-up and a stigma survey that assessed perceptions of patients with SUD. Eight weeks later, participants watched a different patient encounter, and again completed a case write-up and stigma survey. We analyzed stigma levels and the frequency of stigmatizing language in write-ups pre- and post-curriculum. Lists of preferred clinical terms and terms considered stigmatizing were derived from national agencies.

EVALUATION: 98 participants completed the pre-curriculum assessment; 39 completed the entire course. To determine if a significant change in terminology use occurred pre- vs post-curriculum, a linear mixed effects regression model was constructed with a fixed effect for time (pre- vs post-) and a random effect for participant. This modeling technique allowed us to utilize all participant data, even if not all participants have post- data.

In pre-curriculum write-ups, stigmatizing terminology was used 4 times more often than clinical terminology ($p = 0.032$). Clinical terminology was used 134% more often post-curriculum than pre- curriculum, but the result is not significant. There was no statistically significant difference between measured stigma levels pre- and post-curriculum. Data analysis is ongoing; plans include analyzing responses to the interactive questions and using natural language processing to capture more details of language usage.

DISCUSSION / REFLECTION / LESSONS LEARNED: This initiative faced several challenges. Scheduling issues from the pandemic reduced the number of participants who were able to complete both assessments. In addition, prejudice and bias are complex behaviors that are not easily measured. Finally, one would expect that attitudes (e.g., stigmas and biases) would change more slowly than behaviors (e.g., use of preferred terminology).

While the number of participants who completed both assessments limits the statistical significance of our results, the design of the curriculum – a short, web-based module – allows for easy delivery to workers across the healthcare sector.

ONLINE RESOURCE URL (OPTIONAL): edpuzzle.com, class code igotada

TRANSLATING A PSYCHOSOCIAL HISTORY INTO THERAPEUTIC MANAGEMENT: TEACHING INTERNAL MEDICINE RESIDENTS THE MENTAL HEALTH CARE MODEL (MHCM) IN THE OUTPATIENT PRIMARY CARE SETTING

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LEARNING OBJECTIVES 1: Integrate into their medical history the skills of an evidence-based patient-centered interviewing (PCI) method - ACGME Competency 2 Interpersonal and Communication Skills

LEARNING OBJECTIVES 2: For patients identified with depression and/or anxiety, integrate the five skill components of the MHCM - ACGME Competency Patient Care

SETTING AND PARTICIPANTS: Participating programs require dedicated time for residents to learn, practice, and apply PCI and the MCHM to patient care, using the following: review of pertinent chapters from textbooks; didactic discussion with faculty; recorded videos; and finally visits with real patients that are observed and supervised by faculty, using PCI and the MHCM. Appropriate supervision requires training faculty on the models and potentially involving behavioral health professionals in the training sessions. Equipment also may include a one-way mirror or video technology for observation.

DESCRIPTION: Practicing clinicians and trainees face the consistent challenge of incorporating and applying psychosocial perspectives in their evaluation and treatment of patients, especially those with mental health problems such as depression. Clinicians' work requires attention to such perspectives; these include the patient's own story as well as an understanding of their behaviors and symptoms. The PCI provides this for non-mental health patients, while the MHCM, which incorporates the PCI, guides clinicians' therapy for patients experiencing anxiety and depression. Both PCI and MHCM integrate a biomedical approach to disease. The MHCM consists of five steps: Communicate to create an effective relationship; educate the patient; obtain a commitment to patient participation; determine the patient's goals; negotiate a specific treatment plan, which includes medications. The MHCM has demonstrated efficacy in randomized controlled trials, and has showed superiority to standard IM training.

EVALUATION: Educators can use a reliable, valid coding method designed to evaluate the resident's conduct of the MHCM, and a patient satisfaction questionnaire that is a reliable, valid measure of interaction with the resident. Such quantitative methods allow for a summative evaluation of teaching. Additionally, formative evaluation can occur through formal meetings during and after training, and through routine coordination with the residency program directors and clinic leadership.

DISCUSSION / REFLECTION / LESSONS LEARNED: The MHCM adds new perspectives to patient care by using discrete steps of information gathering, communication, counseling and use of therapeutics. As planned and implemented the MHCM model required a minimum of 16 contact hours over eight 2-hour sessions. Additional time is valuable, particularly for assisting patients with serious mental health disorders or prescription substance problems associated with chronic pain. Programs seeking to systematically prepare residents to respond effectively to common mental health problems in primary care settings will need to generally commit more time in the curriculum to succeed.

Innovation in Medical Education (IME) – Quality Improvement and Patient Safety

AN UNEVEN JOURNEY; FOLLOW UP VISITS FOR COVID 19 PATIENTS IN AN ACADEMIC- BASED CLINIC

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LEARNING OBJECTIVES 1: To address the need for a close follow up after COVID 19 diagnosis to improve quality of care and patient safety (PC, Prof)

LEARNING OBJECTIVES 2: To improve the communication between inpatient and outpatient team (ICS, PC, Prof)

SETTING AND PARTICIPANTS: Retrospective cross-sectional study among patients who were diagnosed with COVID 19 from March to December 2020 in a teaching outpatient clinic.

Electronic health record of 136 patients were reviewed and data were compared. Variables include chronic medical conditions, history of tobacco use, weight, office visits and hospitalizations. We calculated mean, variance, and standard deviation by using statistical methods.

DESCRIPTION: The spectrum of COVID-19 in adults ranges from asymptomatic infection to mild respiratory tract symptoms to severe pneumonia with acute respiratory distress syndrome (ARDS) and multiorgan dysfunction.

Long term complications of this disease are still unclear. Outpatient continuum of care requires a close follow up.

For most outpatients, telehealth visits are scheduled four, seven, and ten days following the onset of clinical illness (1).

Most patients discharged from the inpatient setting require a follow-up clinician visit within one to two days following discharge.

EVALUATION: From 136 ordered COVID tests, we found a 14.7% (n=20) positivity rate. Most patients were black (75%), female (65%), with average age of 53.5 (SD=6). Hypertension (65%), diabetes (60%) and obesity (50%) were the most common risk factors among these patients.

50% of orders were placed in outpatient setting. Patients were informed about the test within a day of the results' availability (SD =0.44), however the waiting time between the order and the result was averaged 3.7 days (SD = 0.22). No communication between inpatient and outpatient team was done upon diagnosis. 30% (n=6) of patients did not have any follow up appointment with their PCPs since their diagnosis. Among 5 hospitalized patients (25%), one didn't have any follow up appointments and others had an average wait of 6.25 days.

DISCUSSION / REFLECTION / LESSONS LEARNED: There has been a significant improvement in managing COVID 19 in inpatient setting.

Most patients require a follow-up with clinician soon after discharge, depending on their unique clinical situation. There is no specific time frame for a follow up among these patients yet. However, it has been suggested to be within one to two days following discharge (1).

We found that the follow up in 30% of our patients are either delayed or missing.

We concluded that a close outpatient follow-up is required in all COVID patients. Communication between inpatient and outpatient team improves patient care. A quicker and more reliable test for diagnosis of COVID 19 would prevent any delays in management.

Using templates is one of the options to improve written communication and encourage evidence-based practice. It also guarantees the need for a close post-hospital appointment.

ONLINE RESOURCE URL (OPTIONAL): (1) Virtually Perfect? Telemedicine for Covid-19 | NEJM 10.1056/NEJMp2003539

Innovation in Medical Education (IME) - Research

PROFESSIONAL IDENTITY DEVELOPMENT WITHIN LONGITUDINAL INTEGRATED CLERKSHIPS: A QUALITATIVE, MULTI-SITE, INTERNATIONAL STUDY

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LEARNING OBJECTIVES 1: Explore how medical students enrolled in Longitudinal Integrated Clerkships (LICs) develop their professional identities.

LEARNING OBJECTIVES 2: Analyze how professional identity development within LICs may support commitment to professionalism, ethics, and sensitivity to diverse and underserved patients while minimizing the negative hidden curriculum experienced during medical training.

SETTING AND PARTICIPANTS: 33 LIC students from four medical schools across the USA, UK and Ireland were enrolled.

DESCRIPTION: Prior research has shown that LIC graduates are more likely to practice in underserved areas and specialties and LIC programs can mitigate the negative effects of the hidden curriculum. It is theorized that LIC programs

strengthen professional identity development and provide strong mentorship, both of which are important for career decisions.

A longitudinal qualitative study was conducted to explore students' experiences and identity development during their LIC. Extensive, semi-structured interviews were conducted with participants at the entrance (n=33) and exit (n=29) of their program. Students also completed audio diaries throughout. Themes were extracted from the raw data to answer the central question of how an LIC curriculum affects medical student professional identity development.

EVALUATION: Four themes were identified:

1. Through continuity and increasing responsibility, students can perform a more 'doctor-like' role in their LIC
2. Longitudinal relationships are crucial in student identity formation
3. Longitudinal experiences shape a student's moral identity
4. LICs influence career aspirations

DISCUSSION / REFLECTION / LESSONS LEARNED: The results of this study show how LICs encourage relationship-building, educational continuity and the realization of students' professional identities. Students' roles within LICs permit them to perform identities which adhere more closely to their perceptions of what a doctor should be and allow them to receive recognition; be that through becoming a patient advocate, adhering to the standards of professionalism, becoming increasingly 'competent', or assuming an increased level of responsibility. Continuity manifested differently between sites and systems, though there was evidence of enhanced benefit when students move between settings. Longitudinal relationships with patients were a source of moral identity development, as continuity of care challenged the ways in which students thought about their patients and promoted patient-centered care. Relationships influenced career aspirations through challenging negative stereotypes, emphasizing the importance of continuity of care, and facilitating a sense of belonging. By highlighting the ways in which LICs influence professional identity development, these findings offer important insight for health professions education regarding the future development, delivery and promotion of LICs. Further, for non-LIC programs, this work offers transferrable findings regarding ways to center and encourage relationships which foster identity development within medical education.

Innovation in Medical Education (IME) - Resiliency and Wellness

ALONE.... TOGETHER: REIMAGINING A WELLNESS CURRICULUM FOR RESIDENTS DURING A PANDEMIC

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LEARNING OBJECTIVES 1: Identify engaging initiatives supporting professional identity development and personal wellness

LEARNING OBJECTIVES 2: Design wellness activities for a virtual interactive platform

SETTING AND PARTICIPANTS: Internal Medicine residents (106) engage in wellness curricula weekly in a socially distanced session. Other monthly virtual activities are scheduled in Zoom platform, organized to optimize resident attendance.

DESCRIPTION: The COVID-19 pandemic significantly impacted residents' personal and professional lives causing isolation and diminished opportunities for collaborative work and personal relationships. Trainees may experience uncertainty and fear caring for patients with COVID-19. They encounter disruption in rotation schedules and transitions to virtual learning. Wellness curricula are vital to address these challenges, however, traditional activities have limitations in a pandemic. Using existing wellness curricula, we designed new virtual experiences, created with the premise that residents have diverse backgrounds and extracurricular interests and singular preferences for coping and engaging with others.

We initially focused on activities that are part of residents' daily life. Once weekly, residents gather in a socially distanced Wellness Wednesday noon session to pick up a boxed lunch and engage in conversation with peers and program leadership. Additional monthly virtual activities are scheduled during usual didactic time or evening hours, including reflective story writing, dinner clubs, meditative practice, and art sessions (painting, photography, art appreciation) to foster creativity and bonding. Program leadership visits residents

monthly in team rooms for well-being check-ins and program communication. We re-tooled existing mentoring program into a Family Mentoring program so each intern can spend a virtual hour with faculty and upper level resident mentors in conversation covering social, work, and career topics.

EVALUATION: Survey of 70 residents revealed most common approaches used for processing significant life events/stressors: talking to family/friends (66), physical activity (43), prayer/meditation (27), and talking to colleagues/mentors (23).

Reflective story writing was positively rated, highlighting appreciation of self-expression, listening to peer experiences, and lessening of loneliness. Forty-nine of 70 residents reported "never" doing reflective writing. Post-survey to determine frequency of writing since workshop is in progress. Early feedback reveals residents appreciate learning to cook new ethnic foods and share meals in virtual dinner clubs. Qualitative evaluation of program is ongoing.

DISCUSSION / REFLECTION / LESSONS LEARNED: Creating wellness activities is more difficult under pandemic protocols. Increased clinical responsibilities hinder attendance. Brief qualitative assessments allowed us to define most impactful interventions. Activities utilizing shared reflection and distraction were appreciated by residents (reflective writing, virtual dinner club). A variety of experiences targets diverse preferences of trainees.

HOUSE STAFF ARE HUMAN, TOO: GUIDED DEBRIEFINGS AFTER PATIENT DEATHS HELP RESIDENTS COPE IN THE TIME OF COVID

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LEARNING OBJECTIVES 1: Improve house staff's ability to cope with death and the dying patient.

LEARNING OBJECTIVES 2: Provide upper level house staff with a framework for debriefing traumatic situations with junior level house staff.

SETTING AND PARTICIPANTS: This pilot study took place among Baylor College of Medicine Internal Medicine residents on core rotations in Ben Taub Hospital's Medical and Cardiac Intensive Care Units in Houston, Texas. Participation was voluntary. 15 residents participated in the study.

DESCRIPTION: A self-identified individual serving as both project leader and facilitator invited participants to attend debriefing sessions once per 4-week block to discuss patient deaths. Methods from study are outlined in a project and facilitator guide and are adapted in part from "Death rounds: end-of-life discussions among medical residents in the intensive care unit" by Hough et al. published in the Journal of Critical Care in 2005. Notable differences from the prior intervention included the use of peer-guided debriefings, free-form discussion prompts, and closing each session with a moment of silence and sharing of wellness resources.

EVALUATION: An anonymous, 10-question printed survey was provided to participants at the end of each session. Most questions used a Likert scale and results showed that the majority of residents found the debriefing sessions to be worthwhile, aiding in their ability to cope with dying patients. Survey responses will be described in tables and figures. Following each session, the facilitator took notes in order to derive common themes across debriefing sessions.

DISCUSSION / REFLECTION / LESSONS LEARNED: This pilot study directly addressed this curricular gap present in our internal medicine program and expanded upon previously published debriefing interventions using several innovative approaches, including the incorporation of peer-to-peer debriefing, a moment of silence, and sharing institutional wellness resources. This study demonstrated an easily implemented and reproducible program while simultaneously empowering house staff to be peer leaders. By being a peer facilitator, senior level house staff are able to acquire new skills valued by the ACGME and are able to achieve increasing levels on competency on ACGME specific milestones. Additionally, this pilot study served as an opportunity to share institutional mental health resources and normalized their use.

Limitations of this project include balancing the unpredictable clinical burdens in a busy clinical unit with resident schedules and relying on self-identification

of the facilitator/leader. Future directions are to schedule the debrief sessions at shift change or to create a virtual forum. Few other published studies have documented specific themes shared by house staff during debriefing sessions. Additional academic areas of exploration include consenting participants to recorded discussions in order to perform qualitative data analysis of specific themes contributing to provider burn out and conversely, well-being.

Innovation in Medical Education (IME) - Women's Health

MULTIDISCIPLINARY APPROACH TO AMBULATORY WOMEN'S HEALTH

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LEARNING OBJECTIVES 1: Recognize the value in clinical teaching via a broadly multidisciplinary approach in providing ambulatory care to women.

LEARNING OBJECTIVES 2: Understand how to best utilize systemic resources to provide highly effective patient care.

SETTING AND PARTICIPANTS: Setting: Ambulatory academic health care center; the GIM section in a multidisciplinary Center for Women's Health provides care to about 3500 patients annually Participants: Internal Medicine residents participating in monthlong rotations

DESCRIPTION: Providing effective, patient-centered ambulatory training is a crucial aspect of residency education, but can be difficult to accomplish. Teaching primary care in today's increasingly complex medical care delivery environments means ensuring residents understand how to participate in multidisciplinary care teams. Acknowledging the health disparities that women suffer in our health care systems, we have created an ambulatory Women's Health rotation that serves to provide residents with a broad yet comprehensive overview of the many facets of primary care for women. Our rotation takes place both within and beyond our multidisciplinary clinic; primary care IM clinics provide ~1/3 of the clinical experience, with additional clinical experiences interspersed throughout the month. Residents have an opportunity to learn from providers in pelvic floor physical therapy, reproductive psychiatry, radiology, urogynecology, endocrinology, behavioral health, pain management, and more.

EVALUATION: Residents have described the rotation as a valuable addition to their training. Specifically, residents rated the rotation on average 5.0 (out of 5.0) regarding "The rotation provided a meaningful educational experience" (overall avg for all other rotations = 4.7/5). Similarly, residents had strongly positive feedback regarding "The number and variety of patients seen was appropriate to allow for learning and safe care" (avg for this rotation = 4.75/5, avg for all other rotations = 4.49/5)

Representative comments include: "I found it to be very valuable having time to work with other non primary care IM specialists (i.e. mammography, PT, urogynecology, etc), as so often we refer patients to these areas without having a concrete idea of what actually happens there."

"I really enjoyed attending the other multidisciplinary clinics."

As an elective rotation, maintaining a full annual schedule is another indicator of demand; the rotation has been 100% full by resident request over the past several years.

DISCUSSION / REFLECTION / LESSONS LEARNED: Providing access to a broad variety of clinical experiences adds a depth of experience to resident education on this ambulatory rotation. Building enthusiasm for and interest in ambulatory careers in GIM is an important potential downstream benefit of a positively regarded ambulatory clinical experience. Teaching high quality, interprofessional, effective patient care to any groups that suffer health disparities serves not only our immediate patient populations, but has far reaching benefits as our learners carry these lessons beyond training.