Digital Technology to Supercharge Patient-Provider Relationships

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Abstract. Recent initiatives promoting the efficiency and effectiveness of the U.S. health care system are grounded in strengthening the relationship between the primary care provider and the patient. Examples of these include Patient Centered Medical Home (PCMH), Medicare Shared Savings Accountable Care Organizations (MSSP ACOs), and Meaningful Use (MU). These incentivized programs re-energize the link between providers and consumers and recognize the use of Health Information Technology (HIT) as key to the success of the models. The objective of this paper is to explore innovative digital processes that supercharge patient-provider relationships by: Health Information Integration; interactive patient surveys, Remote Monitoring Systems (RMS), and the Patient Health Record (PHR); and Data Prioritization through the consolidation and stratification of health information.

Keywords: Accountable Care Organization, Digital, Efficiency, Engagement, Meaningful Use, Medical Home, Patient Centered, Primary Care, Technology.

1 Introduction: The Communication Chasm

In the article entitled “When a Patient Asks, ‘Why Won’t Anybody Just Talk to Me?’” author Alicair Peltonen recounts her personal experiences with health care communication challenges: “Again and again over the course of months, I felt too intimidated to ask the questions echoing in my mind. Nor did my health care team initiate the conversations I desperately needed.”¹ She quotes Harvard School of Public Health professor and former pediatric surgeon, Lucian Leape, as stating that poor patient-doctor communication is “probably the single greatest source of missed information that leads to erroneous treatment, treatment not followed properly, and unnecessary anxiety...an informed patient, who is consulted on their own care, makes different decisions than a passive patient...” Leape, who helped author the 1999 report by the Institute of Medicine that attributed the leading cause of medical mistakes to the fragmented health care system, broadens the scope of accountability with this statement: “Nobody is

¹ Peltonen A. (2013) “When A Patient Asks, ‘Why Won’t Anybody Just Talk To Me?’

Obtained from:

<http://commonhealth.wbur.org/2013/09/patient-doctor-conversation>

responsible for coordinating care...That's the dirty little secret about health care."² A 2009 review published in the journal *Medical Care* further demonstrated that "...the odds of patient adherence are 2.16 times higher if a physician communicates effectively."³ Correspondingly, studies have shown that patient-physician communication barriers are cited in 40% of malpractice suits and "...the dominant theme in these studies' findings was a breakdown in the patient-physician relationship, most often manifested as unsatisfactory patient-physician communication..."^{4,5}

Primary care, due to the comprehensive scope it comprises, is frequently a victim of the communication chasm. The American Academy of Family Physicians defines primary care with the following: "Primary care includes health promotion, disease prevention, health maintenance, counseling, patient education, diagnosis and treatment of acute and chronic illnesses in a variety of health care settings (e.g., office, inpatient, critical care, long-term care, home care, day care, etc.)."⁶

Imagine a primary care world where an innovative clinical specialist proposes that their expertise and qualifications will increase patient satisfaction, improve quality of care, and decrease cost. Their aptitude includes assessing patients' support systems, self-care challenges, and tracking patterns of health behaviors. The team member candidate is an expert in motivational interviewing, patient engagement and goal setting, and they perform real-time patient screening and risk assessments that impact clinical decision making at the point of care. The question remains: Are health systems prepared to empower and revitalize patient-provider relationships by employing Technology as the newest member of the primary care team? This presentation examines models and concepts for innovative digital health tools that supercharge the link between providers and patients in the primary care setting.

2 Background: Incentive versus Reality

Initiatives are underway in the U.S. to improve the efficiency and effectiveness of the health care system by promoting the relationship between the primary care provider and the patient. Examples of this include Patient Centered Medical Home (PCMH), Medicare Shared Savings Accountable Care Organizations (MSSP ACOs), and

² Rabin, R. C. (2013) "Health Care's 'Dirty Little Secret': No One May Be Coordinating Care."

Obtained from: <http://www.kaiserhealthnews.org/stories/2013/april/30/coordination-of-care.aspx>

³ Zolnierok, K. B. and M. R. Dimatteo (2009). "Physician communication and patient adherence to treatment: a meta-analysis." *Med Care* 47(8): 826-834.

⁴ Huntington, B. and N. Kuhn (2003). "Communication gaffes: a root cause of malpractice claims." *Proc (Bayl Univ Med Cent)* 16(2): 157-161; discussion 161.

⁵ Moore, P. J., et al. (2000). "Medical malpractice: the effect of doctor-patient relations on medical patient perceptions and malpractice intentions." *West J Med* 173(4): 244-250.

⁶ American Academy of Family Physicians. Policies. Primary Care. Definition #1-Primary Care

Obtained from:

<http://www.aafp.org/about/policies/all/primary-care.html>

Meaningful Use (MU). These incentivized programs re-energize the link between providers and consumers and recognize the use of Health Information Technology (HIT) as key to the success of these models. PCMH is a comprehensive model of care that promotes the relationship of the patient with their primary care team, recognizing that the coordinated management of care is best achieved by engaging patients with their primary care physicians.⁷ Similarly, the MSSP ACO allows that health systems may share in savings for their successful management of a specified population of patients, with the attribution of the beneficiaries determined by the plurality of primary care services, thus focusing the management of care back to the patient and primary care provider relationship.⁸ Likewise, MU includes incentive payments for the use of electronic health information to: engage patients and families in self-care; promote patient-controlled data; and increase patient access to self-management tools for goal setting and behavior change.⁹ These initiatives have the potential to become innovative translators of care between the provider and the consumer.

Translation of care is needed, as health information communication challenges contribute to poor quality outcomes, preventable high-cost utilization, decreased patient and provider satisfaction, and an increase in medical errors.¹⁰ These are due to things such as deficient data at the point of care, inefficient electronic health record processes, and lack of interoperability among systems.¹¹ On a patient-provider interaction level, these are further complicated by the lack of standardized shared decision making and patient engagement strategies.¹² Compounding these challenges is the shortage of physicians' time. Yarnall, et al (2009) state the following, "On the basis of recommendations from national clinical care guidelines for preventive services and chronic disease management, and including the time needed for acute concerns, sufficiently addressing the needs of a standard patient panel of 2,500 would require 21.7 hours per day."¹³

⁷ Ewing, M. (2013). "The patient-centered medical home solution to the cost-quality conundrum." *J Healthc Manag* 58(4): 258-266.

⁸ McWilliams, J. M., et al. (2013). "Delivery system integration and health care spending and quality for Medicare beneficiaries." *JAMA Intern Med* 173(15): 1447-1456.

⁹ Krist, A. H., et al. (2014). "Electronic health record functionality needed to better support primary care." *J Am Med Inform Assoc*. doi: 10.1136/amiajnl-2013-002229. [Epub ahead of print]

¹⁰ Carnicero, J. and D. Rojas (2010). "Lessons Learned from Implementation of Information and Communication Technologies in Spain's Healthcare Services: Issues and Opportunities." *Appl Clin Inform* 1(4): 363-376.

¹¹ Kortteisto, T., et al. (2012). "Clinical decision support must be useful, functional is not enough: a qualitative study of computer-based clinical decision support in primary care." *BMC Health Serv Res* 12: 349.

¹² Gordon, J. E., et al. (2014). "Delivering value: provider efforts to improve the quality and reduce the cost of health care." *Annu Rev Med* 65: 447-458.

¹³ Yarnall KSH, Østbye T, Krause KM, Pollak KI, Gradison M, Michener JL. Family physicians as team leaders: "time" to share the care. *Prev Chronic Dis* 2009;6(2):A59. http://www.cdc.gov/pcd/issues/2009/apr/08_0023.htm. Accessed [January 11, 2014].

Escalating the scope of necessity for linking providers and consumers are two significant events: the exponential increase in the number of expected patients in a physician's practice panel over the course of the next ten years, and an increase in the acuity level of the patients in a physician's panel.¹⁴ This will be due to a combination of the aging U.S. population, and an imminent increase in the number of insured patients by the expansion provided by the Affordable Care Act (ACA). This will increase the number of patients who are eligible to enroll in Medicaid by approximately 13 million persons by 2023, which is over half of the anticipated 25 million patients to obtain insurance due to the ACA.¹⁵

The Association of American Medical Colleges (AAMC) states the following: "According to AAMC estimates, the United States faces a shortage of more than 91,500 physicians by 2020- a number that is expected to grow to more than 130,600 by 2025."¹⁶ A recent study published in *Health Affairs* made the following observations related to mitigating the impending provider shortages by the use of Health Information Technology: "We estimate that if health IT were fully implemented in 30 percent of community-based physicians' offices, the demand for physicians would be reduced by about 4–9 percent. Delegation of care to nurse practitioners and physician assistants supported by health IT could reduce the future demand for physicians by 4–7 percent. Similarly, IT-supported delegation from specialist physicians to generalists could reduce the demand for specialists by 2–5 percent. The use of health IT could also help address regional shortages of physicians by potentially enabling 12 percent of care to be delivered remotely or asynchronously. These estimated impacts could more than double if comprehensive health IT systems were adopted by 70 percent of US ambulatory care delivery settings."¹⁷

3 The Challenge: Organize and Prioritize

What digital applications do health systems, physicians, and patients require to improve efficiency and effectiveness? It is clear that health systems desire to channel patients back to primary care in order to decrease unnecessary high-cost utilization,

¹⁴ Petterson, S. M., et al. (2012). "Projecting US primary care physician workforce needs: 2010-2025." *Ann Fam Med* 10(6): 503-509.

¹⁵ CBO's May 2013 Estimate of the Effects of the Affordable Care Act on Health Insurance Coverage. Obtained from:

http://www.cbo.gov/sites/default/files/cbofiles/attachments/44190_EffectsAffordableCareActHealthInsuranceCoverage_2.pdf

¹⁶ Association of American Medical Colleges. GME Funding: How to Fix the Doctor Shortage. Projected Supply and Demand, Physicians, 2008-2020. Obtained from: https://www.aamc.org/advocacy/campaigns_and_coalitions/fixdocshortage/

¹⁷ The Impact of Health Information Technology and e-Health on the Future Demand for Physician Services. Weiner, Jonathan P., Yeh, Susan, Blumenthal, David.

doi: 10.1377/hlthaff.2013.0680 *Health Aff November 2013 vol. 32 no. 11 1998-2004*

and to improve the quality of preventive and chronic care.¹⁸ Likewise, primary care providers, in a time-constrained environment, desire to comprehensively address acute, preventive, chronic, and psychosocial care needs through technological processes that do not further contribute to stress and burnout.¹⁹ In regard to patients, the International Journal of Medical Informatics explored the impact of HIT on patient satisfaction: “Despite being a promising tool to increase patient satisfaction, health information technologies did not show a clear evidence of positive impact on patient satisfaction in this literature review.”²⁰ How then can these seemingly off course trajectories become realigned to obtain mutually beneficial results?

The proposal of this paper is that HIT innovations to link providers and consumers include two complementing areas of focus: Health Information Integration and Data Prioritization. It is also the premise of this presentation that data integration without prioritization hinders the efficiency and effectiveness of health systems. Similarly, prioritization for quality improvement is inadequate without comprehensive data integration. In terms of integration, the following three tools are considered: the use of interactive patient surveys and questionnaires to obtain real-time actionable health information, the incorporation of Remote Monitoring Systems (RMS) to expand the point of care beyond the clinical setting, and leveraging a Patient Health Record (PHR) for patient engagement. In terms of Prioritization, this includes the two main concepts of: the consolidation of patient health information from across the continuum of care, and the categorization and organization of this health information. It is proposed that the combined efforts of Health Information Integration and Data Prioritization will have the greatest compounding effects in efficiently linking providers and consumers.

4 Supercharge Step One: Engaged Patients, Efficient Providers

This presentation suggests that an obvious use of patient surveys has traditionally been overlooked; engaging patients to obtain as much relevant and actionable information as possible to inform providers at the point of care. Many studies have been completed for patients’ use of publicly reported data on provider performance, as well as the use of performance reports by providers for quality improvement of technical and health outcomes.²¹ The most common uses of patient survey results include process improvement efforts for appointment wait times, timely triage of phone calls,

¹⁸ Basu, J., et al. (2014). “The Small Area Predictors of Ambulatory Care Sensitive Hospitalizations: A Comparison of Changes over Time.” *Soc Work Public Health* 29(2): 176-188.

¹⁹ Babbott, S., et al. (2014). “Electronic medical records and physician stress in primary care: results from the MEMO Study.” *J Am Med Inform Assoc* 21(e1): e100-106.

²⁰ Rozenblum, R., et al. (2013). “The impact of medical informatics on patient satisfaction: a USA-based literature review.” *Int J Med Inform* 82(3): 141-158.

²¹ Safran DG, Karp M, Coltin K, et al. Measuring patients’ experiences with individual primary care physicians: results of a statewide demonstration project. *J Gen Intern Med*. 2006;21(1):13-21.

and customer service.²² Research on the use of patient surveys has also found the following: “We identified potentially important correlations between clinical performance and patient reports of clinical interactions and integration of care, reinforcing the need to maintain a focus on patient experiences as part of an overall program to improve chronic disease care.”²³

An innovative digital survey product bridging this gap is Tonic Health, cofounded by Sterling Lanier of Palo Alto, California. In a 2012 interview with *Healthcare IT News*, Mr. Lanier offered the following logical advice in regard to the average ten minute physician visit: “Instead of spending six minutes trying to figure out what's wrong, then four minutes on treatments, why not use the data to spend nine minutes talking about the solution?”²⁴ Tonic Health is an interactive and engaging digital patient survey tool, with behind the scenes cloud-based reporting features, and the ability to create and customize surveys that can include intuitive skip logic algorithms based on patient responses and medical history. The survey platform can be deployed on the iPad in the clinic, via a laptop in a patient's home, or via a Smartphone on the go. Tonic's real-time patient screening and on the spot risk scoring capabilities not only optimize care opportunities, but Tonic can also dynamically serve up personalized patient education in the form of videos or articles based on the results of each screening (e.g. patients who screen in as high risk for diabetes may see one type of video, while those who screen in as low risk see another). The result is clear: dramatically higher completion rates of patients willing to offer more information than per traditional paper-based questionnaires, improved accuracy of data collection, labor and workflow efficiencies, significant savings in the form of preventative care, and increased patient satisfaction due to the Disney-like experience provided by the questionnaire platform. Also featured in the February, 2014 edition of *Inc.* magazine in an article entitled “The Startups Saving Healthcare”, the author surmises the following: “Tonic provides a partial solution to one of the most vexing challenges in all of the multitrillion-dollar health care industry: How do you get patients to provide the information that health care providers desperately need, and rarely get, in order to improve care while cutting costs?”²⁵

5 Supercharge Step Two: Health at Home

An exponentially growing opportunity to link providers and consumers using digital technology is that of Remote Monitoring Systems (RMS). Although more studies

²² Friedberg, M. W., et al. (2011). “Physician groups' use of data from patient experience surveys.” *J Gen Intern Med* 26(5): 498-504.

²³ Sequist, T. D., et al. (2012). “Measuring chronic care delivery: patient experiences and clinical performance.” *Int J Qual Health Care* 24(3): 206-213.

²⁴ Harris, B. (2012). “3 Ways Tech Can Help Patient Engagement.” *Healthcare IT News*. Obtained from: <http://www.healthcareitnews.com/news/3-ways-technology-can-facilitate-patient-engagement?page=1>

²⁵ Freedman, D. (2014). “The Startups Saving Health Care.” *Inc.* Obtained from: <http://www.inc.com/magazine/201402/david-freedman/obamacare-health-technology-startups.html>

are warranted for this newly emerging technology, recent research has found, "...the use of an RMS is feasible and effective in promoting activation, self-care, and QOL [Quality of Life]."²⁶ In their intriguing article in *The American Journal of Medicine* summarizing mobile health in the U.S., the authors of "Telemedicine, Telehealth, and Mobile Health Applications That Work: Opportunities and Barriers" state the following: "Mobile health is currently undergoing explosive growth and could be a disruptive innovation that will change the face of healthcare in the future."²⁷ An example of a progressive RMS company is Vivify Health based in Plano, Texas. In a recent mHIMSS article entitled "Mobile Technology; Revolutionizing Healthcare," a Vivify pilot at Christus Health, Texas was featured. Preliminary results showed, "A data review completed for 44 patients who completed the RPMS [Remote Patient Monitoring System] program showed a ROI [Return on Investment] of \$2.44" and "In addition to the positive ROI, RPMS patients' utilization of St. Michael Health System decreased – prior to enrollment in the RPMS program, these 44 patients had an average cost of care of \$12,937 compared to \$1,231 post- RPMS program enrollment."²⁸ The Vivify Health RPMS is a cloud based application that harnesses evidence based care plans to create customized patient questionnaires that upload patient responses to a care management platform. It also offers an input format for patient recorded biometric data. This supports patient management opportunities such as medication reminders, customizable alerts, and social network integration. Proliferation of RMS is likely to continue, as supported by, "We speculate that implementation of patient-centered medical homes (PCMH) and emergence of accountable care organizations (ACOs) may reduce current barriers to RMT [Remote Monitoring Technology] use in primary care by providing incentives to collaborate and proactively manage patient care."²⁹

6 Supercharge Step Three: Stop Boredom, Save Lives

The third link of Health Information Integration is that of Patient Health Records (PHRs). A PHR is "a digital Web-based collection of a patient's medical history in which copies of medical records, reports about diagnosed medical conditions, medications, vital signs, immunizations, laboratory results, and personal characteristics like

²⁶ Evangelista, L. S., et al. (2013). "Examining the Effects of Remote Monitoring Systems on Activation, Self-care, and Quality of Life in Older Patients With Chronic Heart Failure." *J Cardiovasc Nurs*.

²⁷ Weinstein, R. S., et al. (2013). "Telemedicine, Telehealth, and Mobile Health Applications That Work: Opportunities and Barriers." *Am J Med*.

²⁸ Clifton S, Collins DA, Fanberg H, Ford E, Webster L. (2013) "Mobile Technology; Revolutionizing Healthcare" Obtained from: http://himss.files.cms-plus.com/FileDownloads/2013_Christus%20Health_mHealth%20Readmission%20Pilot%209-13-13_v6.pdf

²⁹ Davis, M. M., et al. (2014). "A qualitative study of rural primary care clinician views on remote monitoring technologies." *J Rural Health* 30(1): 69-78.

age and weight are stored.”³⁰ The use of PHRs has recently been scrutinized due to the demise of ventures such as Google Health. Although formal research is lacking pertaining to the failure of Google Health, it is speculated that contributing factors were: requiring patients to enter their own data, an inability to inform or entertain users, and a lack of enabling social communication.³¹ However, information is emerging to support the use of PHRs, such as Kaiser Permanente’s My Health Manager, in which “Use of the system was associated with up to 10 percent fewer visits to the physician and a significant reduction in telephone calls. A survey of members who were actively using this technology showed that most perceived it as useful and easy to use.”³²

One hypothesis for improving the success of PHRs is that broadening the functionality of the PHR by relationships with vendors of health gaming apps and social networking will result in improved patient engagement and behaviour change. An example of this is found with Dossia, a PHR that makes health information actionable by combining it into a single platform that integrates games, social dynamics, incentives, and messaging in a customizable format. As quoted in a recent interview with Forbes magazine, David Goldsmith, Executive Director of the Dossia Consortium states, “We know now that unlocking the real value of PHR’s resides in our ability to use data to engage the right patient at the right time.”³³

In the primary care setting, methods need to be further developed to incorporate PHRs into the care continuum. One study shows: “Feedback received from our provider panel included a recommendation to better integrate data from the...central data repository with PHR data to give a more complete view of individual patient records and a dashboard view of their patient panels for use in the provider’s clinical workflow.”³⁴ The value of integrating survey, RMS, and PHR data with a centralized data repository is that it minimizes disruptions in clinical workflow and allows for corresponding Data Prioritization.

³⁰ Halamka John D, Mandl Kenneth D, Tang Paul C. Early experiences with personal health records. *J Am Med Inform Assoc.* 2008;15(1):1–7. doi: 10.1197/jamia.M2562.

<http://www.pubmedcentral.nih.gov.proxy.medlib.iupui.edu/articlerender.fcgi?tool=pubmed&pubmedid=17947615.M2562>
[PMC free article] [PubMed] [Cross Ref]

³¹ Lohr S. (2011). “Google to End Health Records Service After it Fails to Attract Users.” Obtained from: http://www.nytimes.com/2011/06/25/technology/25health.html?_r=0

³² McDonald K. (2012) “Why Did Google Health Fail?” Obtained from: http://www.pulseitmagazine.com.au/index.php?option=com_content&view=article&id=954:feature-why-did-google-health-fail&catid=16:australian-ehealth&Itemid=327

³³ Nosta J. (2013) “For Dossia, Digital Health Isn’t Just Personal Anymore.” Obtained from: <http://www.forbes.com/sites/johnnosta/2013/11/27/for-dossia-digital-health-isnt-just-personal-anymore>

³⁴ Do, N. V., et al. (2011). “The military health system’s personal health record pilot with Microsoft HealthVault and Google Health.” *J Am Med Inform Assoc* 18(2): 118-124.

7 Supercharge Step Four: Diagnose the Data

Data Prioritization includes two critical elements: the consolidation of patient health information from across the continuum of care into a dashboard environment that can be categorized and sorted, and the application of risk scoring and prioritization tools. In discussing these two components, the potential exists to accomplish both goals while incurring a small IT footprint. An example of this is the innovative menu of products of the company Clinigence of Atlanta, Georgia. Clinigence, a Software as a Service (SAAS) company, found its niche by facilitating the achievement of Physician Quality Reporting System (PQRS) and MU reporting goals. Clinigence expanded these specialized services to ACOs by offering a product that maps data from multiple EMRs and formats the information into a cloud-based dashboard that provides performance outcome measurements for the ACO as an entity, per practice, per physician, and drills down to patient-level health information.³⁵ The power of the application is in its ability to link data previously “held captive” in disparate server-based legacy systems to the cloud-based environment, where it creates dashboards that are useful for data analysis by administrators, physicians, case managers, health coaches, and health educators. The Clinigence platform greatly expands the strategies of patient and population health managers by automating the application of benchmarks to things such as real-time biometric data, medication refill patterns, and overall care plan adherence. Consider the contrast between the traditional use of claims and demographic data to identify high risk patients, with a dashboard that contains these, as well as actionable information such as referral adherence, utilization patterns, psycho-social needs, patient survey responses, and PHR and RMS summaries. The result of the combined strength of these digital tools is the prioritization of actionable data that defines the clinician’s focus, strengthens the link between providers and consumers, and supercharges patient-provider relationships.

8 Conclusion: The Consumer Connection

The epiphany for U.S. health care systems will be that the standalone EMR will not improve efficiency, decrease costs, and increase provider and patient satisfaction. The integration of adjunct digital platforms has the potential to engage patients, prioritize plans of care, and strengthen the link between patients and providers. In representation of this model, consider the use case of Ms. Smith; a 45-year-old patient of Dr. Wise. Ms. Smith takes one medication due to a diagnosis of high blood pressure, which is complicated by her obesity. Her goals include a low salt diet and walking 15 minutes a day, three times a week. She records her weight, blood pressure, and medication administration schedule using an RMS that automatically

³⁵ “The Importance of Using Data to Improve Care Quality and Lower Costs.” (2013). Obtained from: <http://www.clinigence.com/news-blog/2014/1/12/the-importance-of-using-data-to-improve-care-quality-and-lower-costs>

uploads the readings to a PHR. Via the PHR, she joined a social network that connected Ms. Smith to others with goals of exercising and making dietary changes, and she downloaded a competitive gaming app that promotes accountability among members of the network. At her 6-month appointment with Dr. Wise, the receptionist who hands her an iPad greets Ms. Smith. Check-in at the doctor's office has been much more enjoyable since the paper survey was replaced with a colorful and interactive digital questionnaire that is based on Ms. Smith's personalized goals and health status. At the conclusion of the questionnaire an encouraging message congratulates Ms. Smith on achieving her goal of walking three times per week, and that she lost five pounds since her appointment six months ago. The survey tool asks Ms. Smith if she would like to watch a short video on a low salt diet while she is in the waiting room. Ms. Smith watches a two-minute video clip, and at its completion answers a few questions to ascertain her understanding. Behind the scenes, Dr. Wise reviews a dashboard that includes Ms. Smith's RMS values, the progress she is making toward achievement of her goals, any alerts related to the responses Ms. Smith documented on the survey, and a summary of gaps in her chronic or preventive care. A priority of care document is generated for use by the primary care team, which now has nine of the ten minutes of the average primary care appointment remaining to reinforce the most vital link: Ms. Smith.