A HealthIT Town Hall: Learning to Move the Needle Together

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Introduction

Who's Steering the Ship?

Technology should enable action. Ultimately, though, people must facilitate the course of that action. The challenge is doing so in a world so heavily influenced by systems and features. People should decide what questions are most important to address. They are the ones to decide how and when to act. When there is an imbalance between people and systems—in influencing a decision-making process—both the relationship and solutions are flawed.

Technology is both an abstract and an absolute. It is the amalgamation of systems, processes, connectivity and theoretical limits. It is not a person. Technology does not know when it is being used to address questions absent of context, absent of the perspective of social norms, community sensitivities, or industry practices. People do. In many ways, advancing the healthcare industry comes down to how people facilitate the course of action and not simply how feature-packed a technical solution may be. That said, modern systems enable more efficient ways to deliver care, improve our understanding of health, and improve patient outcomes for communities around the world. Still, these systems are supported by more than just their features alone.

A Town Hall Scenario

What happens when a community has an issue to address? Community organizers will setup a safe, accessible space for debate and brainstorming. The event is advertised to community members with hopes of inviting as many perspectives as possible from all those potentially affected. Community leaders establish the rules of etiquette for debate before facilitating discussion. The meeting is documented. Action items are recorded. The meeting adjourns and the community waits with hope that leaders will make the best decision possible for everyone impacted.

But what happens if key members of the community do not attend? What happens if part of the conversation takes place in a closed-door meeting? What happens if the opinions of certain segments of the community are given more weight because of a relationship to community leaders? What happens if the financial cost of doing the right thing is great compared to the cost of maintaining the status quo? What happens if the people who make decisions don't understand the complexity of the issue? What happens if the propaganda is used to influence the body voting on the measure? What happens if there is no recourse for making the wrong decision? What happens if there is no incentive for making a timely decision? What happens if people die as a result of action or inaction?

It quickly becomes clear that the structure of debate matters less than the questions surrounding debate or the people involved. The question of "why?" begins to supersede the

question of “how?”. The consequences of misalignment on principles and values carry significant weight for the people affected by the results of those decisions. In many cases, it carries greater weight than for those who make the decisions. In healthcare, there is no greater consequence than death or illness. And for those making decisions, doing so deliberately—informed and with great care—is a responsibility not to be taken lightly.

Why “Why?” Matters

Many healthIT projects fail. By real numbers, according to a recent study, 71% of IT projects fail to meet expectations of time, budget, or satisfaction results (InfoQ, 2015). That alarming failure rate is attributed to many factors. As we’ve explored thus far, factors of system design, user engagement, and organizational culture and structure often play a role. So how can healthcare organizations ensure their healthIT projects find success? Acknowledging the realities of an industry in transition and look to work better together.

We acknowledge that systems cannot live in silos. Even when working to create interoperability between these healthIT systems, however, the *people silos* often remain. The problem with the U.S. healthcare system is not system design—it’s system approach. System design is how healthIT professionals interpret requirements and create a framework for solving those issues, technically. System approach, however, is a conversation around they why and it is often more difficult to understand if all parties are not included in the conversation.

We need to stop thinking about systems as systems. We need to start thinking about systems as people. People need to understand that they have the power to shape problem solving—not just automate the construct.

People, Process, and Technology

Let’s revisit the community town hall. This time, replace the word “community” with “patients” and consider how your perceptions and attitudes change. Now, replace the word “leaders” with...

Wait, with what? Who leads the conversation? This matters deeply when discussing how to move the needle in healthcare. Discouragingly, the debate on healthcare in this country is dominated by politics rather than outcomes. This whitepaper project works to provide the background on how the healthcare industry is all things at once—flawed but advancing, struggling yet innovating, accessible and inaccessible. In other words, it’s complex.

In order to address the issues of today and tomorrow, all parties must be invited to the town hall. All parties musts have power to influence. All parties must have a means to hold the others accountable for action or inaction. All parties must work to

combat misinformation and promote truth and understanding. And all parties must own the success and failures of the systems they design and processes they create.

This whitepaper will provide context for those questions patients, the healthcare industry, and legislators will need to address. These are the parties that matter and these are the parties to consider when reviewing the challenges of technological innovations, organizational and cultural differences, influence and regulatory pressures. Upon completion of this review, consider your role in shaping healthcare in this country. Decide if the support, advocacy, accountability, and action are in place to change the narrative of healthcare from one of politics and misinformation to one of improved quality and patient outcomes.

This whitepaper is for industry professionals who wish to affect change in both the culture of the industry and the conversation around care in the U.S.. Additionally, from a IT infrastructure and legislative angle, it is important for the next generation of influencers to consider their role in shaping that conversation. This includes Health Informatics students as well. Before leading change, one must understand the industry pain-points, the people involved, and the complexities of working together in a digital age.

The State of the Union

Understanding the components of a working healthIT infrastructure matters—from design, to culture, to how government and community leaders shape the conversation around care.

Question: How can we influence industry culture through legislation and community advocacy to develop systems better aligned with our values?

Healthcare Infrastructure

Health Management Information Systems (HMIS)

Creating a healthIT infrastructure supportive of accurate data collection, decision support, and usability is key to ensuring that users will see these systems as a value added efforts. When these elements are in place, users can make better inferences about the data they see. Ultimately, the goal is to turn data into action—to deliver better health outcomes for patients and populations while improving health practices in the industry through innovation. To understand the relationships and causality of that data.

The more robust and complete a health management information system is, the more likely it is to accomplish the goal of the supporting both the patient and the business. When both parties begin to realize benefit, healthcare in this country will be altered for the better. To get to that point, a technical foundation must be laid to help facilitate those activities and actions which support innovation and improved health outcomes.

Data, Information, and Knowledge

Data alone does not yield understanding. The analysis of data and the context of that analysis help to create the confluence of measurement and meaning. Modern healthIT systems are designed with this in mind and help us more quickly turn information into understanding. “Organized information and captured experience will, in turn, yield the essential knowledge and business intelligence for guiding healthcare services” (Tan & Payton, 2010). The ability to translate data to fuel decision making processes is at the heart of any health management information system.

Hardware, Software, and Network

The various hardware, software, and network components used to deliver that stream of data within an organization is critical to meaningful discovery. This working knowledge system provides healthcare organizations with a framework for collecting and distributing information used to make business and healthcare decisions. “The technology layer must be supporting of the people (internal users), aiding the performance of tasks to be accomplished” (Tan & Payton, 2010). Health management

information systems must enable action and create transparent and accessible information throughout the organization.

Process, Task, and System

Similar to the efforts of the hardware, software, and network components, these systems must support organizations in building operational and clinical process efficiencies. Doing so creates a well-functioning working knowledge system. Decision-making utilizes system capabilities to enable logical and meaningful processes of collection, analysis, and delivery of data. HMIS applications "must be designed to collect relevant data and accumulate useful information for organizational task-processing and decision-making activities" (Tan & Payton, 2010). Well-designed processes, tasks, and systems will more effectively leverage the infrastructure's ability to collect, analyze, and infer knowledge from data.

Integration and Interoperability

Successful integration of any HMIS application relies heavily on the ability of an organization to design a system capable of handling current business needs as well as anticipating future environments based on technological trends. While the former is certainly, and reasonably, much easier to accomplish, the activities required to accomplish the latter should not be neglected. As Tan and Payton write, "Knowledge of the market structure and changing characteristics of the healthcare services industry and how the different current systems should be designed to fit well with every other HMIS application to achieve an integrated, enterprise wide HMIS" (2010).

User, Administration, and Management

If all components are designed and functioning properly, then a user has at his or her disposal an efficiently designed set of tasks or processes supported by sophisticated infrastructure with meaningful and accurate information. This is the industry's aim—a scenario of user and organization empowerment to create real change. The synergy created by all of these elements enables a simple and intuitive user experience which places decision supporting elements at the fingertips of those in positions to elevate the organization and the manner by which patient care is delivered.

What Does it Mean?

Healthcare organizations, providers, researchers, and regulatory bodies have a responsibility to the public and the communities they serve to provide accurate health information and the best quality care possible. When healthcare organizations leverage advances in technologies and apply modern information system methodologies, they will remain agile as we enter a more digital world.

Understanding Design

Critical Success Factors

The success or failure of any HMIS project depends on several success factors: user characteristics, system design characteristics, and organizational characteristics. Satisfying the expectations of both the users and the organizations is a mixture of user engagement and system design, planning, and implementation. Successful implementation of any HMIS manages expectation, implementation, and engagement in balance.

HMIS deliver many benefits to organizations. However, simply offering a product that performs required functions does not ensure successful implementation of a system. User engagement and the ability for an organization to operationalize those functions in alignment with their culture and structure play a critical role in success. This leads to great variation in the industry, especially with the government trying to balance playing a limited role in the industry while still providing general guidelines and recommendations.

HMIS depend heavily on satisfying expectations from organizations and the users which support them. Reliable, accurate, and effective systems help satisfy user requirements and expectations. To implement such systems, attention to user, system design, and organizational characteristics plays a critical role.

User Characteristics

When designing systems, consideration for user sensibilities and expectations must be taken seriously. With HMIS in particular, a user must be extremely comfortable with the system environment and feel empowered to do his or her job effectively, efficiently, and enjoyably. This can be challenging because end-users often have little involvement with system design and specifications and may feel as though expectations were not met. Still, organizations must give careful consideration to user's attitudes, expectations, or other sensibilities.

Organizational Characteristics

Similar to user characteristics, organization characteristics influence how expectations are measured and satisfied. These characteristics include hierarchy, culture, and leadership involvement. In many organizations, 'champions' work to garner support throughout the organization. These champions facilitate

sponsorship and advocacy within the various levels of an organization. Buy-in from leadership is crucial. Planning, strategy, and effective budgets alone will not satisfy an organizations appetite for progress—alignment with organizational culture is often the greatest measure of acceptance and success. This message is often leveraged by champions to build support.

User Involvement

Creating a user experience that is engaging is one of the best ways to ensure utilization. In addition to a system that is engaging, the process of developing such a system must also be engaging. When both pillars of the user experience are in balance, the system, organization, and active users will be more likely to meet expectations. A user is more likely to feel satisfied if they are engaged frequently throughout planning, design, and implementation. Creating rapport and comfortable means for communicating concerns, ideas, and requests helps users feel more empowered to take ownership of their responsibilities in the process.

Process Involvement

In addition to creating a comfortable platform for communicating ideas, concerns, and requests, inviting users for periodic review of system iterations is a great way to engage users. In this way, the users will be more likely to accept system limitations and provide important information as details evolve with circumstance and understanding. Doing so helps ensure that information in built upon prior understanding.

System Design Characteristics

Creating a system that caters to the user is only one key factor to a successful HMIS implementation. A system must also function effectively and as well as expected. To satisfy such requirements, careful and meticulous attention to inputs, processes, and appropriate output is crucial. The system must complete tasks as expected while using resources appropriately and executing actions timely. “Most information needs demand a certain amount of flexibility, notwithstanding the needs for completeness, accuracy, validity, reliability, frequency, and currency (timeliness) of information to be supplied to the user” (Tan & Payton, 2010). The ability of a system to accommodate business needs is a combination of appropriately selected hardware and software as well as attentive and accurate capture of business requirements.

What Does it Mean?

People make the difference even in complex and sophisticated technical projects like those found in healthcare. The ability to effectively manage user engagement and expectation is a challenge but also a requirement. Doing so in balance offers a useful and satisfying mechanism for change. User satisfaction

with both the system and the process of its creation will help increase user acceptance and utilization. Careful consideration for system factors and organizational culture and structure also work to support system implementation and the users affected by it. Designing systems for healthcare demand success because of the significant financial commitments and the impact a failure could have on both cost and care for patients.

Understanding Culture

Culture

With a strong culture, healthcare organizations will be more equipped to tackle challenges related to implementing quality improvement initiatives. Organizations rich in culture are free, more agile, and better suited to ask more of their people and get more in return. While there are many components to successfully completing a quality improvement project, the environment in which these initiatives are carried out often has more to do with the shaping of outcomes than other factors. For this reason, leaders must be adaptive and understand the various styles and tools available in order to accommodate the ebbs and flows of a quality improvement initiative.

Showing executive transparency to all affected departments or individuals helps secure buy-in and adoption to change. Communicating how a project met or did not meet expectations and what the organization intends to do to meet expectations in the future also matters a great deal. This shows accountability, self-awareness from the organization, and a willingness to keep transparency throughout the process. While other technical or process specific factors may also assure levels of success, a lack of organizational culture will most assuredly invite failure.

Improving quality first starts with recognizing that deficiencies, areas of weakness or struggle, exist. Having discussions around these topics is difficult for most individuals and the issue can be compounded when speaking in terms of organizations. The larger the enterprise, the more voices to be heard and the more difficult consensus and perspective can be. With a strong culture, however, healthcare organizations will be more equipped to tackle challenges related to implementing quality improvement initiatives.

Organizational Structure

Establishing an organization culture that is authentic and widespread throughout an organization takes efforts of individuals at all levels of an enterprise. Messages cannot come only from the top, nor can advocacy for change come only from the bottom. Organizations rich in culture are free, more agile, and better suited to ask more of their people and get more in return.

Executive Leadership

There are many types of leadership approaches to be considered when leading a quality improvement initiative. The

most important characteristic of all these styles is authenticity. Leaders must know that people are perceptive and can often tell when they are being disingenuous. For this reason, leaders must be adaptive and understand the various styles and tools available in order to accommodate the ebbs and flows of a quality improvement initiative. “Good leadership systems adopt, teach, and use a good change leadership model and consistently execute both small and large-scale changes” (Ransom, et al, 2008).

Project Champions

With an adaptive or transformative leader in place, the initiative must be supported throughout the organizations by ‘Project Champions’. These individuals help secure buy-in and establish a point of communication between staff and leadership. They also serve a role as an advocate for change for the organization and motivator to staff. “Project Champions actively aid their project implementations by providing strong leadership, helping with project coordination and control, maintaining administrative help for the project team, and often supplying technological expertise” (Pinto, J. K. & Slevin, D. P., 1989).

Employee-Led Advocacy

Another important organizational structure pillar is employee-led. This can come in the form of committees, groups, or advocacy groups. These groups of employees serve as a voice for their peers and offer great levels of insight to executive leadership as to the amount of change and type of change staff is equipped to handle. If there are concerns with legitimacy, the organization has an opportunity to address those concerns before asking those individuals to accommodate a change. This type of culture focused approach ensures that an initiative is not sabotaged before it even begins.

Transparency and Standardization

Developing standardized methods for data collection is not the only area within an organization’s control where standardized or repeatable measures show benefit. Having a process improvement methodology in place, understood by all participants, helps an organization improve the manner by which initiatives are assessed, measured, controlled, and implemented. Furthermore, showing executive transparency to all affected departments or individuals helps secure buy-in and adoption to change. Leaders must remain engaged and manage those impacted by change. This is supported by developing standards and resources which support accountability to those standards as well.

Process Improvement Methodology

There are many process improvement methodologies and many have seen various levels of success in healthcare. From Six Sigma to Project Management Institute’s Project

Management Body of Knowledge (PMBOK) and others, each organization must choose an approach that suites the needs of their initiative and their abilities. To improve clinical outcomes, any methodology chosen must support some sort of standardization or accreditation model. This assures that the project will be evaluated in a way that provides meaningful assessment so as to inform and direct leadership, regardless of process improvement methodology.

Adaptive Leadership

To accommodate the variables that arise from implementing a quality improvement initiative, like those found in healthcare, leaders and organizations must be agile and responsive. Using benchmarks or standards assist in gauging reaction to less desirable outcomes or issues and provide a level of certainty in response (Project Management Institute, 2004). Still, there will inevitably be issues where good judgment and, often, pliability must be within the scope of a leader's skill-set. Between managing the technical or procedural aspects of an initiative or securing good will or buy-in from stakeholders, a strong leader will find balance and continue to steer a project on the right path and within scope.

Accountability

In many cases, blame must be laid for shortcomings or failures. Leaders who hold not only their staff accountable for their role in an initiative but also their own will be more successful. Acknowledging failure and moving immediately to ownership and problem solving shows good will and humility. While shortcomings can hinder a project and invite temporary frustrations, accountability and a positive organizational culture willing to focus on what can be controlled and let go of what cannot, can more positively reorient a project than a leader or organization that plays the 'blame game'.

Initiative Closure

Celebrating successes can significantly improve perceptions and feelings around a change initiative. In quality improvement efforts, those whose opinions were solicited must feel as though their time, energy, and expertise mattered. Communicating how a project met or did not meet expectations and what the organization intends to do to meet expectations in the future matters a great deal. This shows accountability, self-awareness from the organization, and a willingness to keep transparency throughout the process. Closing a project successfully works to acknowledge the efforts that when into the project while, simultaneously, works to promote an adaptive attitude throughout the organization that goals can be accomplished, changed can be managed, success can be celebrated, and the individual has value.

What Does it Mean?

While there are many components to successfully completing a quality improvement project, the environment in which these initiatives are carried out often has more to do with the shaping of outcomes than other factors. For this reason, organizational culture, adaptive leadership, change management, staff engagement, organizational accountability, and transparency are vital to success. While other technical or process specific factors may also assure levels of success, a lack of organizational culture will most assuredly invite failure

In healthcare, the organizations are extremely complex regardless of size or scale. This is due to the external stakeholders. The patients, the vendors, and the regulatory bodies. Creating a system that works for everyone can only be done with a good foundation. Many healthIT projects fail and do so at great cost. Many fail for technical reasons, budget shortages, and the like, but many more are sabotaged by poor culture. Patients and communities depend on these organizations to do the right thing the right way. Investing in culture is a significant step towards a successful healthIT implementation.

The Role of Government

HITECH Act and Meaningful Use

To help stimulate the desired industry movement, a provision of the stimulus bill, known as the Health Information Technology for Economic and Clinical Health (HITECH) Act, was established to create financial incentives to physicians, hospitals, and health organizations. According to the Office of the National Coordinator for Health Information Technology (ONC), the goal is to "improve healthcare quality, safety, and efficiency through the promotion of health IT" (The Office of the National Coordinator for Health Information Technology, 2017).

With incentives in place and defined, measurable criteria for achieving objectives outlined, organizations began the great work of modernizing the U.S. healthcare system. The Centers for Medicare & Medicaid (CMS) facilitated and continues to facilitate the incentive program. This is measured in stages, where money is allotted for meeting different criteria at different stages. This is known as Meaningful Use.

Meaningful Use, Stage 1 outlines objectives to level-set the industry's digital infrastructure. To receive an incentive award, organizations had to implement a certified electronic health records (EHR) system. Additionally, the type of data that should be collected was categorically defined. This is crucial to gaining insights into population health by avoiding regional or system biases based on the type of information collected. Measures 8-10 speak to the capacity to submit patient information electronically to public health agencies or registries (Centers for Medicare & Medicaid, 2017).

Meaningful Use, Stage 2 outlines objectives for connecting the patient, systems, and organizations to improve and advance clinical processes. This stage encourages organizations to "choose a path." In other words, organizations can select the measures they wish and are awarded incentives based on how they use those capabilities to advance clinical processes. For population health, organizations could choose to submit immunization, syndromic surveillance, cancer cases, or specific case data (Centers for Medicare & Medicaid, 2017).

For organizations who decide to go down the path of population health management and public health, these data streams expand collective knowledge. This collective knowledge is what fuels research and improved outcomes in Meaningful Use, Stage 3. Meaningful Use, Stage 3 also explicitly outlines focus on improving population health management. To this point,

systems have been implemented and interoperability has been achieved through a “more rigorous health information exchange (HIE)” (The Office of the National Coordinator for Health Information Technology, 2017). The next leap forward is leveraging the new infrastructure and data to affect real change.

Patients First

With the HITECH, providers were tasked with creating a patient-centric platform to improve engagement. This was achieved most commonly through use of patient portals. In order to connect with these patient portals securely, and to meet patients where they are, many of these portals were integrated into mobile applications. Due to this, and the increased saturation of wearable technology in consumer markets, some health providers began to allow access of shared data collected by such devices. According to Richard Krohn, “doctor[s] can remotely monitor the patient’s vital signs, perform simple medical diagnosis tests…before the patient has even noticed any symptoms” (2017). This type of engagement has the potential to provide increased insight into diagnosis, treatment, and a variety of other medical relevancies.

For patients, as well as the industry, there is a delicate balance of providing the best care while respecting privacy. Because of that balance, determining the impact of this new data stream can be challenging due to the nature of early technology adoption and regulatory constraints from the Health Insurance Portability and Accountability Act (HIPAA). Additionally, determining which conditions and treatments might benefit most from such technology is likely to evolve over time. Chronic illnesses, for example, are commonly tracked conditions on such devices today and provide early case studies (Krohn, 2017). Therefore, specific treatments and diagnosis markers may be easier to explore as compared to other conditions. Yet, the potential to impact great portions of communities and populations exists and makes the effort of exploring the medium worthy of pursuit.

Population Health Outcomes

From a population health standpoint, particularly in dense and diverse populations in large metro areas, spikes in emergency room or acute care visits can be examined much differently. For example, when trying to understand why so many people were seeking treatment for illness in Flint, Michigan in 2015, Epic, an electronic health records system, was used to determine that the patients were localized around the same water source (Epic, 2016). By leveraging a localized data stream, health professionals could quickly address what was occurring and notify government officials. For wearable technologies, consider synthesizing the data pool to more than those who were seen by health professionals. Consider the alarm sounding before patients even arrived in the emergency room. Readiness and

responsiveness could certainly improve and potentially save more lives. The increased potential to evaluate outbreaks or population health issues can be dramatically shifted with more information.

The Single Payer Conversation

Single-party payers attempt to create a platform where the entity collecting healthcare fees is the same entity which pays for healthcare services. In essence, this platform would functions similar to managed care where in-network/out-of-network concerns disappear. Unlike managed care plans however, the narrative of a single-party payer in today's politics is considered radical. Senator Bernie Sanders of Vermont, for instance, presented a case in his campaign for a federally administered single-party payer system—mirroring systems of other countries (Sanders, 2016). While controversial in the industrious and provider-centric system of healthcare in the United States, such an idea is adopted, for better or worse, in many countries around the world.

In order for a nation to adopt a single-party system, many things would need to occur. Political climate, public support, provider compensation and economic impact are should all be critically evaluated and considered before a discussion can begin. If support from the public, aligned political forces in from the executive, legislative and judicial branches, and a plan for compensation for providers being forced to evaporate from the system that currently drives the U.S. healthcare market were to exist in harmony, then perhaps it would be possible. Perhaps this is the better question because other nations are proving that such a system can be equitable for the delivery of healthcare in terms of cost and care.

What Does it Mean?

Governments can create the boundaries of the sandbox. They can also control the activities that take place inside. Societies, however, may not have the appetite or understanding to live within those boundaries. This is part of the reason progress can be slow at times. Industries will try and innovate and societies will establish norms, yet it is the responsibility of a people's government to assess the course and determine if movement needs to be directed towards a more complete or equitable answer for all citizens. Playing that balance has proven to be challenging for government because the debates and conversations are passionate. Still, because of the financial weight of decisions in this industry, the government is being looked at to lead movement even though it may not have all the comprehensive industry insight or an accurate pulse of its people to know what type of movement is best.

Healthcare Literacy

Consumer Health Dissemination

According to the Pew Internet and American Life Project, August 2006 survey, more than 80% of women and 75% or men have actively looked for health information online (Tan & Payton, 2010). If people are looking online, the information from legitimate sources should be available online. Online information, however, is both enlightening and dangerous. Information overload or misinformation can lead to series health issues. As such, the sources of information become almost as important as the content itself.

Healthcare for the Digital Age

To combat misinformation in the growing digital age, healthcare organizations, providers, researchers, and regulatory bodies must work to make health information accessible and easily understood. Meet people where they are. Leveraging social media platforms to augment the various government, academic, or professional healthcare sources may resonate more effectively with younger individuals. According to the U.S. National Library of Medicine National Institutes of Health, "social media can also improve patients' access to healthcare information and other educational resources;" furthermore, "through social media, patients can join virtual communities, participate in research, receive financial or moral support, set goals, and track personal progress" (Ventola, 2014).

Increased access to health information online may lead to more see self-diagnosis. This can lead to series health complications, depending on the severity of systems. While it is not uncommon for individuals to perform some research on symptoms before speaking with a healthcare professional, projecting a complete understanding based on information available online is dangerous. This is the risk when the right parties do not prioritize healthcare literacy.

What Does it Mean?

When organizations prioritize healthcare literacy, they have the ability to control the narrative online. This is true today in the ongoing misinformation surrounding vaccines. The medical community has an opportunity to lead the conversation. More focused communication on the causes, symptoms, and treatments can have a lasting impact. Engagement and investment can work to dispel myths and misunderstanding.

Winners & Losers

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The decisions of our past shape the consequences of our future. The cost of doing business is high and the stage has been set for inevitable winners and losers.

Question: How can we evolve our processes and systems to lift the fortunes of everyone, not just those who depend the least on services?

Cost Shifting

Cost Shifting

Many Americans receive no care, uncompensated care, or are left to face the financial burden of medical expenses due to a lack health insurance. Institutions like Medicare and Medicaid lessen the burden for the poor and elderly who are often left uninsured or underinsured. This leads, however, to cost shifting from those who can afford access to care to those who struggle to do so. This not only affects an individual and his or her government—cost shifting is also a cycle of power and money between carriers attempting collect as much reimbursement and pay as minimal a fee as possible for services.

Distributing the burden of healthcare costs fairly and proportionately is a point of great concern for both the government and the public it serves. As costs continue to climb due to more specialized care, technological advances, market pressures, greed, and bureaucracy, a need to ensure that care can continue to be provided and that providers will be compensated will continue to be a focal point.

Cost Shifting

Receiving healthcare generally results in one of several financial outcomes—a hardship, a reliance on health insurance to pay, or personal finance. For many Americans, the cost of healthcare was so great that they simply chose not to seek care. The Affordable Care Act placed restrictions on insurers to protect consumers from unfair costs. This protection was to prevent insurers from offsetting their costs by shifting the burden to consumers. “Insurers must justify any premium increase of 10% or more before the rate takes effect” (Assistant Secretary for Public Affairs, 2014). As more individuals gain access to health insurance under the ACA, providers now have to make their insurance more attractive to those entering the market. “To prevent the threat of cost shifting, make healthcare markets more competitive” (Morrisey, 2003). These markets increased access to insurance to promote the utilization of care and the reimbursement for services.

The State of Health Care

Since the ACA became legislation in 2010, there have significant changes in both the access to and delivery of care. More Americans can gain affordable health insurance—some even qualifying for assistance. “This year, about 8 in 10 of the uninsured who are eligible for Marketplace coverage qualify for financial assistance to lower the cost of their monthly

premiums" (Centers for Medicare & Medicaid, 2016). Individuals who could not get insurance because of pre-existing conditions now have the ability to obtain insurance to help them pay for the care they need. Young adults can stay on their parents insurance until the age of 26. Provisions are in place to keep premiums lower—or at least premium increases by carriers justified. The current state of healthcare in the U.S. is promising, imperfect, and evolving.

The Future of Health Care

The future of healthcare in the U.S. depends on many factors: the economy, advances in technology, and utilization of care due to increased access. Perhaps the most deciding factor, however, is political influence. There is great contention about the ACA as a divided government and public have continued to debate vehemently for or against it. While the national debate over the ACA continues, more Americans are projecting to have access to care because of the healthcare marketplace and mandated requirements are forcing providers and insurers to reduce or eliminate inefficiencies. One could project that in addition to increased access, quality should improve as well over time.

What Does it Mean?

Uncompensated care and the effects of regulatory and market pressures on cost shifting have brought a unique and imperfect enterprise of healthcare. Payers and providers will try and collect as much as possible—that does not look to change in the future. What has changed, and perhaps more profoundly, what will continue to change, is that more Americans have access to care than ever before. The likelihood that these individuals will utilize insurance and get the care they deserve increases every year. This evolution in healthcare will continue to push the national debate over the effects of the ACA.

Baby Boomers

High Deductible Health Plans (HDHP)

HDHPs in the U.S. have grown in popularity over the last decade. “In 2013, HDHPs covered 20% of the workers in employment-based plans, up from just 4% in 2006” (Shi & Signh, 2015). This surge in popularity is due to the attractiveness of lower monthly premiums. People confident they are less likely to use certain services may find HDHPs to be a better option than traditional plans. Traditional plans generally have higher monthly premiums because insurance companies pay a greater share of cost for particular services.

HDHPs are paired with Health Savings Accounts (HSA). These accounts are designed to allow consumers to save for the greater out-of-pocket expenses as a result of these plans. The lower premiums of HDHPs are the trade-off for the greater share of cost for an individual will pay for specific services. HSAs provide tax incentives to encourage individuals who choose HDHPs to save for their greater share of cost.

For aging Americans, it may be more challenging to save for greater out-of-pocket expenses than a younger or healthier individual less likely to utilize services frequently. With an entire generation of Baby Boomers about to enter retirement age the trade-offs may be too steep. More Americans are approaching retirement with little or no savings—forcing them to work longer to make ends meet. For those individuals, these HDHPs may not provide as a great a value. Compound that issue with the political climate around Medicare and there is great concern and uncertainty around how services will be paid for.

Economic Impact

While HDHPs are a relatively new option for Americans, studies have shown them to increase the utilization of some services. “HDHP enrollees were more likely to use prescription medications and specialty care after enrolling in the plan” (Waters, Chang, Cecil, Kasteridis, & Mirvis, 2011). Access to health insurance is also more ubiquitous due to these plans. Combined with regulatory pressures and tax penalties of the ACA, more Americans have access to healthcare options than ever before. With a greater percentage of the population enrolling in HDHPs and more people using HSAs to offset the share-of-cost, consumers are becoming more informed and more in control of their healthcare.

What Does it Mean?

High deductible health plans provide consumers with another option to manage their healthcare. When paired with a Health Savings Account, consumers have more control over the financing of their care than ever before. Such products may have a niche in the market, however, because young and healthy individuals are likely to see the greatest savings over time. Baby Boomers and elderly Americans still in the workforce may suffer the consequence of insurance companies shifting costs to services more likely utilized by that population than young, healthy Americans. Still, such plans continue the dialogue of an evolving healthcare system and approach in paying for care. As that dialogue continues to emphasize preventative care and the awareness grows around the cost savings of HDHPs for healthy individuals, the U.S. is likely to continue to see an increase in enrollment.

Privacy & Security

eHealth

Perhaps no industry collects as much personal, specific data as the healthcare industry. Every person on the globe presents a unique case study for health and disease. From an analytical perspective, the study of human health provides tremendous amounts of data, mystery, and unanswered questions. Still, the pursuit of wellness and understanding drive continued research, innovation, and a global economy. Consequently, technological advancements in medicine, as well as other industries, have created an exciting, yet dangerous, time in our history.

The discussion over ethics, privacy, and the application of technology in the healthcare industry are of great concern to consumers. Consumers are more informed than ever because information is more accessible than ever. That same information, however, creates vulnerability because the mishandling of that information can be damaging (Milutinovic & De Decker, 2016). There is often no precedent for abuse of emerging technologies because current laws may not have the language to protect consumers from these new abuses. According to Laudon and Laudon (2014, p. 125), time is required for institutions to develop laws and often action is taken only after some harmful act has occurred. The discretion used when handling and protecting information, therefore, is the basis for ethics in the information age.

Privacy

To provide care and to receive care, mutual trust and understanding between both parties must exist. This relationship extends beyond just clinical care—the privacy of information is a crucial factor in maintaining such trust. Consumers have significantly more protection today with regards to privacy. In 1996, the Health Insurance Portability and Accountability Act (HIPAA) was signed into law. This act of legislation was designed to protect consumers through the proper use of sensitive information in the current, and at the time, emerging digital formats. “Doctors, hospitals, and other healthcare providers must limit the disclosure of personal information about patients” (Laudon & Laudon, 2014).

For those working in the healthcare industry, privacy of patient information is a highly sensitive and monitored issue. In addition to a question of ethics and privacy, organizations can face severe legal action for non-compliance. The Centers for

Medicare & Medicaid Services has issued publications for consumers to protect their patient data when searching for a provider—a partner in healthcare. “Don’t give your Social Security Number (SSN) or credit card or banking information to companies you didn’t contact or in response to unsolicited advertisements” (CMS, 2016).

Consent

Consent and privacy of information go hand-in-hand. If a consumer enters into an agreement with a provider, then they should do so willingly. Still, willingness is not the only measure of consent—enough information should be available for consumers to make informed decisions. “Clinicians are concerned that the informed consent process leaves research participants and patients not informed about how their data will be used” (Cato, Bockting, & Larson, 2016).

Disclosure of information varies from agreement to agreement. Often, consumers are not equipped to compare the details of how their information may be used and stored. The task of doing so can be daunting and complacency or apathy may set in. In an increasingly digital age, this become more problematic and issues compound as health data travels in and out of systems.

Accountability

Due to the complexity of regulations regarding privacy and consent, there are inevitability instances where patient information is not properly handled. The ethical dilemma of how to handle such occurrences leaves to question who is accountable for such mishandling. In almost all cases, the accountability is left to the provider who stores information in physical and digital information systems.

Consumers concerns over data breaches, for example, have merit due to the frequency of occurrence and severity of consumer fraud as a result. According to the Journal of Health Care Compliance, large-scale breaches led to numerous class actions lawsuits and federal investigations (Melnik, 2016). Compensation to patients for the misuse of information is often not enough—the damage of mishandling information can take more than money to repair.

What Does it Mean?

As the healthcare industry continues to expand the use of immersive and patient-centric information systems, the ethical challenges of privacy, consent, and accountability will continue to exist. The delivery and cost of care may drive the narrative of healthcare in the United States, especially in political arenas and as consumers consider the financial impact. Consumer

information and privacy protection, however, should be discussed with equal fervor.

The information age has invited the collection and sharing of greater amounts of data than has ever been seen before. For this reason, as the healthcare industry continues to process patient data, they must do so ethically. Consumers will demand it and legislation will enforce it because the risks associated with failing to do so is too great.

A Paradigm Shift

3

Putting the patient front-and-center through modern engagement—systems built to create a better view of the patient and more paths to tailored care.

Question: How can advances in technology be used to give patients more power in guiding the conversation and defining what matters most?

Flooding the Databases

More Data, More Problems

Decision Support Systems (DSS) help businesses and organizations evaluate possible outcomes given numerous and complex variable sets. These systems and tools help businesses project outcomes with greater certainty and consider more viable alternatives. To help create a better system, organizations must be more involved in championing initiatives and customizing system solutions. As the healthIT landscape continues to evolve, these systems must remain agile and solution-oriented to keep pace. DSS increase an organization's ability to improve operational processes, manage cost, and explore alternatives to challenging business requirements.

Anticipating Market Changes

The healthcare landscape has changed greatly over the last decade. As the political landscapes have more aggressively continued the debate on the best manner to administer healthcare in this country, it is more important than ever for organizations to be adaptive and realistic with what is in and out of their control. Designing systems whose scale can change quickly and vastly are key. Additionally, investing in new standards and flexible technologies can make organizations more agile as the healthIT landscape continues to evolve.

Utilizing Data

Data is collected at a greater speed and shared more rapidly than ever before. The ability to process that volume of data just as swiftly will add great business value. However, finding the value in data is what adds utility to a business, not just the amount of data that is collected. For example, collecting unrelated patient information may not offer any insight into a business decision and waste valuable resources. Choosing the right things to collect and measure will help keep parameters in scope and offer a focused approach to solving business problems.

Decision Support Systems

The next generation of DSS must involve greater participation of business leaders and the end users of operational processes. An effective plan will leverage the process knowledge of the business with the system and functional expertise of developers. The modern system will consist of

users who are “service oriented and technically astute” (Tan & Payton, 2010). Organizations expect these systems to do more than collect data—they expect better data visualization and meaningful results from complex and robust sets of tools. To achieve this, heavy involvement from the organization will be crucial to meeting expectations and delivery of the next generation of DSS.

Measuring ROI

Measuring the return on investment (ROI) of information technology initiatives can be challenging. According to Tan and Payton, the mixed results with regards to return on investment is known as the “information technology paradox.” The challenge to accurately measure ROI is due to the heavy investment organizations must make to implement these complex systems. While these systems may solve the business problems, the investment is not always offset by the hardware, software, or human capital resource required to develop and maintain them. In some cases, these concerns often prevent more conservative firms from even considering system upgrade or integration. We will explore, however, case studies where organizations absorbed those costs rather than shifting them to consumers or ignoring progress. In each instance, this was done to adhere to culture principles and ethics—putting the patient and consumer first.

‘The Enterprise Model’

The idea of the enterprise model suggests that system integration is not reserved for particular departments or isolated business solutions. Protection of enterprise-wide resources requires that any initiative maintain system integrity or jeopardize other areas of the business. With network security, for example, data and resources are only safe so long as all terminals, devices, and users adhere to guidelines and measures for security. The mindset and culture of the organization heavily influence user acceptance. This concept of an enterprise culture/model is a critical factor in system success. Everyone is on board or no one is on board.

What Does it Mean?

Businesses must be well informed when making decisions. Healthcare is complex—involving many parties with different interests and motivations—and these organizations often need better tools to support their decision-making processes. Integrating decision support systems into their workflow and system landscape can greatly improve the decision making-process. However, depending on the nature of the business need and scale, the return on investment for such a system can be difficult to evaluate. Utility of these systems varies by use case and organization, yet the DDS continue to evolve in anticipation and response to evolving business needs.

Telehealth

Digital Connections

Telemedicine and e-Health are the products of the inevitable shift towards technical progress in medicine. All aspect of healthcare feel the impact of adoption (to varying degrees) and the sooner organizations adapt to the changing system landscapes, the quicker they will find success in the industry.

Telehealth

Telemedicine is an evolution of care seeking to more effectively and imaginatively leverage current technology. The ability to offer consultations, mentoring, education, and monitoring expands the uses and reach of modern medicine.

Tele-consultations offer benefits of physician consultations without geographical restrictions. Use of videoconferencing and teleconferencing free patients to engage with their physicians wherever they are. This can be especially beneficial to those patients who have a difficult time getting to the doctor or for those living in rural areas or areas without many medical options.

Tele-education allows physicians to continue to expand their knowledge-base as new information about disease, practice, and population health are discussed and explored. “Physicians can rely on ACCME-accredited programs offered online” (Tan & Payton, 2010) to stay current in their understanding of disease and health. In addition to service to practitioners, such courses have offerings for consumers, as well, furthering the idea of an informed and engaged public.

Many diseases and treatments result in the need for extended of extensive monitoring. The cost incurred to keep a patient for monitoring can be great for the consumer, payers, and facilities. Tele-monitoring is an alternative solution which allows patients to continue to receive monitoring after discharge. “They can communicate with their physicians concerning their current status, and the ongoing treatment scheme can be modified accordingly” (Tan & Payton, 2010). For those living in rural areas or for those who well enough to be at home, this type of exchange is not only convenient, but cost-effective as well.

Tele-surgery is a fascinating advancement and opportunity for the healthcare industry. According to Tan and Payton, the two main types of tele-surgery are to assist in mentoring surgeons in different regions and to use robotics to perform surgery

remotely. The idea of mentoring surgeons around the world provides a great opportunity to help people receive the care they need by offering greater resources for the healthcare professionals, regardless of region. Consider the scarcity of established healthcare in third-world countries—such advancement could offer much needed support to those helping patients around the world.

e-Health

e-Health exists in broad strokes defined as the integration of solutions supported by technology leveraged by those in the healthcare industry. While the definition may be expansive in scope, the principal that health is improved when all available resources can be utilized to make medical decisions faster and more accurate remains.

Attitudes Toward Behavior

Health organizations must be willing to shift behaviors if they are to fully adopt the practices and experience the benefits of the investment in e-Health. For this to occur, the organizations must see the benefit within their organization and project improved performance or equity. “An individual’s perceptions toward his or her performance of particular behavior (i.e., adopting technology)” (Tan & Payton, 2010) is a crucial self-assessment organizations must be willing to explore before e-Health can become a cultural mindset.

Subjective Norms

As government mandates to conduct business using the most cost-effective solutions continue to mount, the concept of e-Health shifts from a suggestion to a norm. The idea that to avoid adopting what is socially, culturally, or professionally standard leaves businesses and organizations in vulnerable place. More commonly referred as peer-pressure, social norms often help influence behavior of rigid entities simply as a way for them to survive or remain marketable.

As with many changes, it is a responsible activity to consider how difficult going down a particular path may be given current resources, circumstances, and other known considerations. The idea of perceived behavioral control suggests that “an individual’s perceptions about ease or difficulty of performing a particular behavior (i.e., adoption of technology can be influenced by his or her efforts)” (Tan & Payton, 2010) can greatly affect the desire of an organization to move forward with change. Belief that it can be done and the scope of the effort required falls within one’s range of abilities will greatly improve the likelihood of adoption.

What Does it Mean?

Moving from “the way it’s always been done” does not happen quickly or lightly. Many things must be considered before an organization or government works toward incorporating

systems and solutions that are a departure from the status quo. However, the benefits of engaging in e-health solutions cannot be ignored. Benefits to business efficiency, market presence, public health, and equity are all reasons for organization to consider and adopt the rich environments of a healthIT landscape. To refuse, is to surely invite failure.

Wearable Technology

What Wearables Provide

The evolution of consumer technologies has been dizzying over the last decade. With the introduction of smart phones, like the iPhone in 2007, consumers have an increased comfort using portable computing devices. In fact, the conveniences are so apparent that adoption of these technologies have made them truly ubiquities in developed countries like the United States. According to the Pew Research Center, 95% of adults in America own a cell phone and 75% of all Americans own one, overall (Pew Research Center, 2018). The rate of adoption has made engagement with new and evolving technologies an easier pill to swallow for many and companies are taking aim at satisfying the needs of consumers while advancing the capabilities of new devices.

For wearable consumer technologies, cell phones provide an essential state of symbiosis. This is why the saturation of cell phone use matters. From devices geared toward monitoring medical conditions to ones aimed to increase physical activity, these devices simply need to provide the mechanical means to capture and distribute data. Applications that can easily be downloaded and secured on cell phones provide the user experience and make interaction seamless, comfortable, and convenient. By splitting the components into function and experience, companies can craft iterations of their products that can evolve quickly with technological advances as well as consumer expectations and appetites.

Categories of Need

According to Koo and Fallon, wearable technology falls into three main categories—physical activity, physical and psychological health, and environment and daily lifestyle tracking (2018). Physical tracking can be done with pedometers, heart monitors, smart watches and bands. Perhaps the most commercialized segment of wearable technology, these devices are often used to help motivate increased physical activity or overall health improvements by providing consumers with relevant activity related information and by building personalized, historical data sets which can be used to measure progress over time.

For physical and psychological health, as well as environmental and daily lifestyle, Koo and Fallon conclude that wearables can also encourage behavioral changes. “Since people’s behaviors are the biggest barriers to health, wearables can encourage

users in health self-management, self-efficacy, and healthy habits" (2018). Motivation, then, becomes a large component of the experiences companies build into their products. This is true in the Apple ecosystem, for example, where a wearer will receive notifications to highlight activity achievements or to encourage movement and increased activity.

Motivation and the hierarchy of needs, as explored by Rause et al, for example, is essential for helping adults, particularly older populations, increase activity and healthy habits (2016). Interestingly, as Rause considers Abrahams Maslow's Hierarchy of Needs theory, the connection is apparent between physical well-being and fulfillment of physiological needs. Many people today struggle with living healthy and active lifestyles. Today's societal and financial pressures have created new home dynamics and sedentary behaviors. Many children today grow up in homes with two full-time working parents with one or both even commuting a good distance for work. This type of dynamic invites prolonged inactivity, depending on profession and travel, and the strain is evident in increased obesity rates in adults and children (Centers for Disease Control and Prevention, 2018).

What Does it Mean?

Wearable technology certainly has forged its own niche in consumer markets, but it has done so because a need has existed. People wish to live better, healthier lives and struggle to do so. For general well-being, many of these devices do a suitable job of providing that level of encouragement and information to achieve desired results. For some, however, particularly those suffering from poor health or chronic disease, encouragement and information are not enough to see improvement. For these individuals, physician care is paramount. These new devices, however, are now finding a secondary niche and, while so doing, are changing the way care is provided and how disease is managed moving forward.

Moving the Needle

4

An exploration of some of the challenges of building a healthIT infrastructure—from organizational scale, patient privacy, interoperability, innovation, and patient-centered core values.

Question: What can we learn from the our experiences to improve safety, quality, and the state of healthcare in the U.S.?

Dryden Family Medicine

Electronic Medical Records (EMR) offer many benefits to organizations. From improved accuracy of documentation, prescriptions, and medical records to improved research and operational efficiency, EMR systems are attractive to many organizations. However, being attractive and being able to implemented are two different things. The Dryden Family Medical practice and its journey to deploying an Electronic Medical Record system provide insights into challenges of deployment on a smaller scale.

Dryden Family Medicine's EMR implementation offers a unique view into the world of systems integration on a small scale. The family practice lacks infrastructure afforded to larger organizations and had to make concessions in order to fulfill its EMR implementation.

Pay for Performance

Pay for performance with respect to EMR, refers to quality and incentives. From a federal perspective, incentives for Medicare and Medicaid reimbursement can be tied to 'quality-of-care' benchmarks. These incentives can affect broad change for across the healthcare landscape by promoting certain practices and standards.

Cost Benefit Analysis

According to Tan and Payton, "cost-benefit analysis (CBA) has frequently been used as a tool to decide whether to invest in EMR" (2010). Cost is an extremely sensitive matter for smaller practices where scale and available resources may be more greatly limited compared to larger organizations. Some practices, like Dryden Family Medicine, lacked an IT infrastructure. While weighing the fiscal impact and long-term benefits, Dryden Family Medicine was able to invest in EMR. However, it was not financially responsible for the small practice to invest in a custom-build. The practice chose a suitable, established product that met many needs but proved to introduce time into workflows just as much as it saved time as well. These types of trade-offs are often the results of performing a cost-benefit analysis.

EMR Cost/Impact

Implementing an EMR solution carries a real cost. So too does choosing not to implement an EMR solution. The genesis of EMR solutions was to improve accuracy, search-ability, and

portability of captured medical information. The benefits of those improvements impact cost, quality of care, and operational effectiveness. Furthermore, “the long-term benefits of EMR – such as prevention, fewer hospitalizations, and a lower disease burden” also impact community health (Tan & Payton, 2010). To decide not to implement an EMR is to accept that these improvements will be much more difficult to achieve and measure.

IT Readiness

For an EMR to be successfully implemented, regardless of scale, any practice or organization must first take inventory on its IT infrastructure and determine its readiness. According to Tan and Payton, IT readiness includes: prior relationship with software vendor, increased autonomy of staff, need for in-house IT support, and importance of coding issues (p. 370). These milestones or benchmarks give an organization categorical measures for evaluating readiness.

Scale of Organization

Making the decision to invest in an EMR has varying barriers depending on scale. Larger organizations, while they may have infrastructure, have greater budgets and organizational complexity. Smaller organizations, often lacking infrastructure, must weigh the benefits of system implementation and cost. From a public health perspective, advancing the acceptance of EMR has immense benefit but is also reasonably challenging for organizations of any scale to manage whether the endeavor makes meaningful business sense.

What Does it Mean?

The journey of Dryden Family Medicine’s road to electronic medical records was a fascination view into the challenges facing smaller scale practices. Unlike large organizations which may have greater resources and financial capital for customized systems, smaller organizations may have to choose off-the-shelf products if they are even able to adopt an EMR system. Dryden Family Medicine was able to secure a product that met its needs and has since benefited from fully integrating an EMR system.

St. Clair Hospital

St. Clair Hospital serves nearly half a million residents in Pennsylvania. Within that community, St. Clair discovered that in 2011, roughly "28% of patients had a primary diagnosis of diabetes" (Schaeffer, 2014). With over a quarter of its population suffering from the condition, action was needed to help those individuals manage their diabetes and improve their quality of care. Beyond diabetes care, though, St. Clair also invested in exploring ways to improve healthcare infection prevention and pneumonia. In order to address these issues, quality improvement efforts were made leveraging their electronic health records system (EHR) by focusing on structure, process, and outcomes.

Structure

St. Clair decided to use additional features of their Allscripts EHR system and other 'bolt-on' applications in concert with their EHR to address their initiatives. For diabetes care, a diabetes risk assessment was added to their system to help maintain regular monitoring and HbA1c testing of their patients. For healthcare infection prevention, Theradoc's Infection Control assistant was integrated to evaluate a number of parameters and key health indicators. For pneumonia, the EHR was programed to search a patient's medical history "for any chronic condition and asks the nurse to validate the information" (Schaeffer, 2014). These integrations laid a foundation for improved processes to elevate care.

Process

The process improvements of each initiative were heavily automated. The EHR was programed to evaluate a series of patient markers, conditions, or medical history events to drive suggested or required actions by staff. For diabetes, for example, alerts were added based on key health markers to determine if a patient was potentially undiagnosed. The physician would then be able evaluate the data and health record and inform the patient of any potential risk. The system was designed to allow for easy ordering of testing right from the alert screen. Similar automated evolutions were integrated for healthcare infection prevention and pneumonia to assist the physician in providing care.

Outcomes

Outcomes for each of the three initiatives varied greatly, though all saw improvement. The area which saw the greatest level of

impact, and which also received the most effort in design of structure and process improvements, was diabetes management. Within a three-year span after implementation, "the rate of severe hypoglycemic episodes fell from 4.6 to a low 1.86 per 1,000 patient days" and "incidence of hyperglycemia dropped to 416 per 1,000 patient days," down from 659 in 2011 (Schaeffer, 2014). For pneumonia, St. Clair closed the gap on a fully vaccinated population. As Schaeffer writes, by 2013, "100% of patients met the measure" (2014). With health infection prevention, however, there were challenges in both expectation and outcomes and some of the results proved inconclusive.

Davies Enterprise Award

When St. Clair Hospital submitted its findings for consideration of the Davies Enterprise Award in 2014, they were doing so at a time when EHR integration was relatively new. The HITECH Act of 2009 and the Affordable Care Act of 2010 were only five years old. Considering the infancy of legislation, the amount time the industry had to implement EHR systems, let alone see improved outcomes as a result, is likely why St. Clair was awarded the distinction. Surely, by modern standards and implementation strategies, there were opportunities to do better. Still, at the time, this was a significant step for an organization serving nearly half a million people.

What Does it Mean?

According to the Office of the National Coordination for Health Information Technology (ONC), the federal government and its industry partners (hospitals, providers, etc.) should work to satisfy four main goals. These included advancing patient-centered care, transforming healthcare delivery, fostering innovation and research, as well as enhancing the nation's health IT infrastructure as a whole (ONC, 2011). St. Clair advance many of those goals. Where they fell short were the goals which indirectly benefit their patients, but directly impact the nation and industry at large. Where they succeeded, however, were in the goals that related to improving quality of care and community health of their patients.

St. Clair Hospital was determined to realize improved care through use of new EHR tools. St. Clair succeeded in improving outcomes for a significant portion of its population. As federal influence and support continues working toward creating an infrastructure supportive of more advanced efforts, St. Clair seems determined use that support to live its mission fully and – "continually seek opportunities to improve quality, reduce cost, and provide a positive patient experience" (Schaeffer, 2014).

MedRec

Blockchain was originally designed as a way to record financial transactions for the cryptocurrency Bitcoin. The idea behind blockchain was to create an immutable, timestamped record which could only be added to—not altered or deleted. This worked to secure a ledger that could easily be audited and maintained while preserving the integrity of transactions living in an open web domain.

Path Toward Innovation

MedRec saw the potential for using blockchain technology to meet the challenges of today's silo-based health data systems. The main issues are "fragmented, slow access to medical data; system interoperability; patient agency; and quantity for medical research" (Azaria, Ekblaw, Vieira, & Lippman, 2016). These issues address both technical hurdles and people challenges in the current healthcare ecosystem.

An example of a 'people challenge' is patient agency, which refers to advocacy for the rights and conveniences of patients. In the current healthcare systems, information is stored with providers and patients must request information from each silo and stitch their health record together as an aggregate. This is not ideal for patients wishing for a convenient means to validate and manage their health data. As other industries offer convenient manners of engaging with data, the healthcare industry is falling further behind those industries in meeting increasing consumer demand for data accessibility.

An example of a technical hurdle is system interoperability. While there are many initiatives, both privately funded and with federal support, each attempting to solve the complexities of the issue, they seem to work to simply make bigger silos. This is because the different approaches still require systems and information to travel through an enterprise slightly differently. "This lack of coordinated data management and exchange means health records are fragmented, rather than cohesive" (Azaria, Ekblaw, Vieira, & Lippman, 2016).

Alternative Solutions

MedRec uses blockchain to provide a platform for appending data to health records using hashing exercises. These exercises are computationally intensive and must be completed before a node can be appended to the chain. With this in place, references to data are accessible as a "bread crumb trail for medical history" (Azaria, Ekblaw, Vieira, & Lippman, 2016).

Those appending the records are referred to as miners. Miners, in terms of a healthcare environment, are the various providers than a patient may see.

What Does it Mean?

Blockchain allows all those providers to view and update the same record. From the patient perspective, as well as that of the provider, having a singular platform is both efficient and convenient. The record itself becomes fixed will all other elements moving around it. A patient is able to change providers more freely and it puts greater control in the hands of the patient with respect to choice and flexibility while also allowing the various providers to have a more comprehensive view of the patient.

Langley Medical Center

Organizations will often find themselves in positions of challenging their mission and culture values when faced with significant financial decisions. Langley Medical Center is facing this exact challenge. Presented with a solution that is sure to improve patient safety, the enterprise is hesitant to pursue it because of its significant investment being made to improve the technology infrastructure. With no immediate decision in sight, the organization must decide what they value more and what they will prioritize ahead of the other.

Langley Medical Center has invested heavily in positioning itself to serve patients in a technologically demanding age. With the investment in a new electronic health record system, LMC is committed to creating an infrastructure supportive of the enterprise's goals and vision. Before the different clinical segments can be upgraded, the core EHR must be operational and interoperable. In its current state, challenges with rolling out the EHR have created a potential for compromise and reprioritization of initiatives and strategies.

Patient Present vs. Patient Future

With heavy investment in facilities, technologies, and operational costs, LMC has placed restrictions on its annual budget to ensure completion of its facilities master plan. To keep with its vision, LMC must continue to champion and their technical strategy even with budget restrictions. Because of the scale of the entire facilities master plan, however, there is little room for error or deviation.

What Matters More

The chief information officer, Marilyn Moore, PhD, has embraced the suggestion of nurses and pharmacists to purchase equipment which will improve patient safety and reduce medication administration errors. The cost of this equipment will consume half of the annual budget—constrained by the FMP strategy—and has presented the enterprise with a dilemma. The dilemma? Postpone or reprioritize technological and FMP initiatives to improve patient safety or push forward at the expense of patient safety. While it can be argued that embracing the new equipment falls within one of LMC's goals—to "improve patient outcomes" (Wagner, Lee, & Glaser, 2013)—some within the organization are struggling to accept the potential impact on the FMP.

Now vs. the Future

Paul Robinson, PharmD, the director of pharmacy at LMC has concerns about the capital investment and effort required to plan and implement the proposed equipment. Much of the concern may be attributed to the lack of certainty around the Phase I implementation of the EHR system. What has not been stated is whether resolution of implementation issues will require additional financial resources. The assumption would be that, at the very least, delays will create operation cost increases. The uncertainty puts the enterprise in a difficult situation—postpone good ideas in order to gain certainty around ongoing initiatives or proceed ahead?

What Does it Mean?

Langley Medical Center is facing an organizational dilemma. Presented with a solution that is sure to improve patient safety, the enterprise is hesitant to pursue it because of the significant investment being made to improve its technology infrastructure. As organizations face these challenges, the best approach for determining how to proceed will be to have enough information to evaluate and make decisions supportive of their mission, culture, or vision. In this scenario, there was not enough information surrounding the complications with the EHR implementation to assess the full risk of purchasing new medical equipment. Balancing significant financial decisions and patient safety must be guided by organizational culture, vision, and values. These types of considerations are common to all organizations embarking on infrastructure upgrades.

Kaiser Permanente

Organizations must be self-aware and willing to admit fault when there is blame to share. As technologies continue to evolve at a rapid pace, and consumers preference is placed at the center of those technologies, there will be higher stakes for error. Patient data, privacy, and safety could potentially be at risk. In 2000, Kaiser Permanente learned a valuable lesson about breakdowns in technical, individual, group, and organizational security as patient information was wrongfully distributed.

Security

When Kaiser Permanente embarked on its modernization efforts, the patient was clearly at its center focus. In many ways, the organization was ahead of its peers and legislation in that regard. However, while advancing the way the delivered care and engage its patients, it failed to understand how, organizationally, it had many flaws in security and process. Breakdowns in security were the result of the technology, people, and organizational culture that allowed for errors to go unnoticed or unvoiced.

Security Breach Mitigation

The security breach was quite significant—personal health information from one patient was mistakenly emailed to another. HIPAA was relatively new at the time and health organizations were under a lot of scrutiny during its infancy. Disseminating patient information in this way could have opened the organization up to significant law suits and fines. No organization wishes to put patient information at risk, and certainly Kaiser is no different. Today, however, consumers are more aware of their protections and would be quicker to seek legal action for breaches than in 2000.

Crisis Team

In many deadline driven ventures, errors are likely to occur when proper time is not allotted for proofing, testing, or any other means of checking quality. In order to assess exactly what type of error occurred, Kaiser formed a ‘Crisis Team’ to evaluate the situation. It was not immediately known where the initial error took place—associating the wrong email to the wrong account, mixing up records, a technical issue, or a transmission issue. Kaiser performed an organizational assessment to determine whether the issue was isolated or

indicative of system or process issues which could put patient information at risk again in the future.

Underlying Issues

Kaiser identified emerging technologies and the managing of security and interoperability as an organizational issue. This is an not simply a Kaiser concern, however, it is an industry concern as well. Regulation and the cultivation of best practices have helped to build in safeguards. Technical processes, unlike many people-driven processes, are more repeatable and trackable. Issues can be addressed system-wide with regular frequency and audit trails to reduce organizational risk for the mishandling of information.

The other underlying issues identified by Kaiser boiled down to managing people and information. This includes proper training and support, reasonable project management, and allowing appropriate amounts of time for activities like testing and fair distribution of resources. Unlike technical responses, however, measuring improvement can be difficult to do and is heavily dependent on management to oversee and facilitate. Depending on the skill of leadership, the results can vary greatly and the amount of time it takes an organization to see results can vary significantly.

When organizations work in departments or specialties, like those found in healthcare, it is easy for silos to be formed where variation between operational processes becomes more difficult to control. This illuminates the need for strong organizational culture—how the organization asks its people to cooperate, communicate, and share knowledge and best practices.

Leadership

The answer to the question of what role should administrative leadership take follows up on the question of culture. While organizational leaders may not have the expertise or governance to influence or make decisions within the IT department, the organization does have a role in shaping the practices, spirit of collaboration and communication, and invite the level of trust needed for anyone to call out a problem when they see it. Building that type of trust, that type of culture can be very challenging. Still, leadership must lead here and help those at every level of the enterprise feel as though they can own those cultural values.

What Does it Mean?

Although the issue at hand was a security breach—the emailing of patient data to the wrong individual—the solution was a balance of approaches. Both procedural and technical answers were required to understand both what went wrong and what the organization can do to prevent similar issues in the future. Significantly, this case study highlights that no matter how well

a system is designed, people will ultimately drive more of the processes. Consequently, success comes down to people—how well they are trained, kept informed, supported, allowed to participate in discussion, advocated for, and held accountable. As healthcare organizations become more complex and serve more people as access to health insurance grows, it will be critical to answer those questions and support not just the systems, but the people who drive healthcare.

Changing the Narrative

5

In order to advance the discussion, systems and people must work together to place the patient at the center of it all.

Question: How are the actions we take, the systems we design, the pathways towards transparent communication we create, influencing the perception of progress in healthcare?

Systems Allows vs. Systems Enables

Clinical Decision Support Systems (CDSS)

Clinical Reminder Systems help clinicians provide patients with evidence-based medicine. These systems generate suggestions based on historical information, new research, observations about the patient and treatments. While users can benefit greatly from these systems, acceptance results are mixed and organizations must work to identify and understand the barriers for staff leveraging system capabilities.

Clinical care is a practice of using historical, researched, and observed information and making the best medical decision possible for the patient at hand. This task is challenging and requires a depth of understanding and reasoning the be perfumed accurately. In order to assist in this process, complex decision-making tools can offer suggestions to physicians based on that data to improve quality of care.

Components

The major components of a CDSS are the ability to “improve the management and utility of patient information, clinical knowledge, population data, and other information relevant to patient care and community health” (Tan & Payton, 2010). This is accomplished by an adaptive system which uses established medical practice information as well as emerging research and evidence-based medicine. The depth of patient and historical treatment information is considered by the system to offer a physician suggestions in the patient’s best interest.

Evidence-Based Medicine

Evidence-based medicine is a term used to express the output of clinical decision support systems to physicians. In other words, it is the result of research, context, and most up to date information presented to a physician when making a decision about patient care. “Its real purpose is that by the use of the best possible evidence doctor chooses for his patient the best possible solution, wanting to provide to him the optimum healthcare in every aspect” (Masic, Miokovic, & Muhamedagic, 2008).

Free-Text

Expressing a though free from rigid format or precise language is natural and simple. For many users, “canned notes” or notes

and syntax that benefit a system understanding can seem forced and reduce the likelihood of adopting such format. Allowing users to input free-text helps the confluence and exchange of information between humans through the system. While benefits for engagement do exists, there are also pitfalls. Often, data which can be communicated using an appropriate segment or logic chain are abandoned. Notes are used as a "catch-all" and the system may not be able to use the valuable information contained within.

Electronic Health Records System

The idea of creating the best decision-making system possible is not restricted to a CRS. In order to fulfill that goal, the system must be designed to be an effective communication tool. Similar to EHR systems, modern CRS have evolved into "'lite' electronic health records (EHR) system[s], providing necessary functionalities for managing clinical work flow and recording patient health conditions" (Tan & Payton, 20105). By extension, these tools are integrated and dependent because they serve the same function—communicate available information to improve understanding and decision-making.

User Acceptance

User acceptance is a challenge faced by any HMIS. This is especially true in clinical decision support systems because patient information is communicated through the various interactions during a visit. If vital signs are not taken at the appropriate time, the next medical professional to care for the patient may not get appropriate suggestions from the system because the inputs were neglected. This neglect is not in control of the system—rather, the system is completely dependent on user engagement and utilization.

Change Management

As with most disciplines, managing change and leading adaptation within an organization is crucial to evolving business cultures and technologies. The healthcare industry is no different. To affect the desired change, organizations must work to present the benefit and utility of these platforms and not simply the functional capability. Engaging with users by department or role and effectively showcasing how use of these systems can greatly improve efficiency, reduce the stresses of decision-making, and free up time through innovation, can prove valuable in changing minds and championing change.

What Does it Mean?

Clinical Reminder Systems offer a wealth of decision support technology to physicians providing clinical care. These engines of reason make determinations based on available data (both historical and observational) and attempts to guide clinicians toward safe, reliable care in the best interest of patients. While these systems face challenges of user acceptance and

obviously are most effective when utilized, they act as a catalyst for change whether used or not. While adoption may be slow, these complex systems are furthering clinical research and understanding and will one day be viewed as an essential partner in clinical decision-making.

Enabling Innovation

Advancing Systems

Health Management Information Systems (HMIS) deliver more accessible public health information. The organizations that deploy these robust and efficient systems have far better tools for decision-making. However, with all the benefits of these patient-centric management systems, one of the greatest obstructions is user resistance. If users do not leverage the technology, they cannot experience their value. The complex nature of these systems must not be user-facing—rather, these systems should be engaging, easy to use, and intuitive to improve user acceptance.

The manner in which public health information is captured, stored, exchanged and understood has been dramatically altered over the last decade. Modern information systems provide robust and efficient means of collecting and analyzing data, making inferences about the relationships and causality of that data, and streamlining processes which support user activities.

User Acceptance

Patient-centric management systems are designed to support physician's ability to provide care. These systems help facilitate man common tasks and many complex series of tasks and departmental communications. The benefits seem obvious, especially considering many such systems are customized to meet very specific business requirements. However, users resisting system utilization can stifle any potential benefits. User acceptance is the greatest hurdle in implementing any system.

Computerized Physician Order Entry

A Computerized Physician Order Entry systems (CPOE) is a tool within the electronic medical information delivery and exchange system. This tool, when effectively utilized, "will electronically capture the attending physician's instructions so as to help eliminate errors caused by illegible handwritten orders" (Tan & Payton, 2010). Laboratory orders and prescription are particularly affected by the potential errors. While there are many benefits of a CPOE system, the effectiveness of such a system is dependent on a user acceptance.

Benefits of User Acceptance

If a user is reluctant to utilize the system, whether that is due to poor design, lack of understanding, or fear of change, the

likelihood of continued errors will be present. For example, should a physician be uncomfortable using CPOE system when ordering new labs based for a patient, he or she may order inadvertently or accidentally order a duplicate or unnecessary test. In addition to avoiding potential errors of understanding due to poor penmanship, CPOE systems have many error checking capabilities. Still, without buy-in from the medical professionals for whom these patient-centric tools are designed, all the impact of such benefits will not be felt. Managing change, adaptation, and user acceptance is a key component of any successful management system.

Web Services

Creating a user experience that is engaging is one of the most impactful ways to ensure increased utilization. Familiar, robust, and functional system design is a boon to any HMIS system. Therefore, web services and the systems that support them are a critical success factor in developing an effective patient-centric management system.

Proliferation of Services

Web services are concurrently running protocols, exchange mechanisms, and language standards that work to create a secure, malleable, and robust platform for communication. These complex systems, subsystems, languages and protocols reduce many barriers by supporting a singular user-facing platform. While the support system of a single user-facing platform sound complex, they platforms themselves are very common and comfortable for most people to use. People interact with these types of systems daily – from social media websites, to employee timecards, to online news sources.

Benefits of HMIS on Web Services

A Health Management Information System, or HMIS, opens up a world of possibilities and enhancements to web services. “Web services provide a distributed computing technology environment for integrating HMIS applications on the Internet using open standards and XML encoding” (Tan & Payton, 2010, p. 152). The expansion of these services may in the future allow for even more cross-platform communication between providers and systems. This increased level of synergy and may help create a more patient-centric experience.

What Does it Mean?

Healthcare organizations are continually working to offer the highest quality care possible. This effort is aided by advances in technology and management and information delivery systems that put the patient at the center of it all. With CPOE, web services, and HMIS integration in healthcare, physicians, hospitals, and providers are in maximizing efficiency like never before.

Building Community Trust

An Informed Public

The United States healthcare industry is transforming its system infrastructure to meet the needs of a modern, digital ecosystem. To encourage organizations to adopt emerging technologies, legislation was passed to provide compensation for meeting measured criteria. While organizations are free to tailor their systems to meet organizational objectives, they must select paths outlined under Meaningful Use to receive incentives. One such path is population health management and public health. The modern, digital infrastructure allows organizations to communicate effectively and make meaningful inferences from greater amounts of standardized data. This drastically improves the ways in which researchers, physicians, and organizations approach improving health outcomes.

Making Strides

Population health management and public health reporting are key areas of focus in the modernization of healthcare in the U.S. when President Obama signed the American Reinvestment and Recovery Act (ARRA) of 2009, swift changes to the ways in which patient data was to be collected and used was at its core. Affecting outcomes in population and public health in the new healthcare technology ecosystem cannot be achieved until systems are implemented and interoperable. Movement in this area has been sluggish, with only a small portion of the industry modernizing.

Lingua Franca

Sourcing patient data in a modern, connected age requires interoperability. This applies in both the technical and semantic senses. It is not enough for systems to have the ability to transmit data—they must also possess the ability to be understood. This is achieved through data standards.

The most common communication standard between systems is Health Level-7 (HL7). The goal of HL7 is to “provide a comprehensive framework and related standards for the exchange, integration, sharing, and retrieval of electronic health information that supports clinical practice and the management, delivery and evaluation of health services” (Health Level 7 International, 2017).

Vocabulary standards for various exchanges (e.g., rxNORM, LOINC, SNOMED) depend on the nature of the exchange—lab,

pharmacy, and imaging. Data standards like HL7 allow systems that use different system identifiers to “speak” the same language. This interoperability facilities collective knowledge. It is that collective knowledge with allows for greater data pools to expand the opportunity for population and public health insights. One of the greatest barriers to that collective knowledge is a lack of semantic interoperability—common language.

Improving Population and Public Health Outcomes

Organizations are attempting to improve the areas of population and public health in different ways. As defined by Meaningful Use criteria, organizations can choose to share information with several agencies. The organizational approach varies, but the goal is the same—to improve health outcomes.

Optum is one of the largest healthcare technology companies in the U.S. A division of United HealthGroup, this health technologies services company helps organizations modernize their operations. One of Optum’s initiatives is OptumOne – a healthcare analytical product and solutions suite.

In 2010, Wilmington Health, a North Carolina based health provider partnered with OptumOne to improve patient health and operational spending with a model of value-based care. They determined that value-based care was the way of the future. This future trend is also reflected in the way payers will be awarded incentives under Meaningful Use, Stage 3.

To get ahead of the trend, Wilmington Health used the patient data collected with their EHR and used Optum’s analytic software to analyze trends, treatments, and outcomes. The results were significant. 37.6% lower hospitalization rate; 38.6% reduction in emergency room visits; 20.5 % lower 30-day hospital readmission rates (Optum, 2016). This level of improved care by analysis of population and public health data highlights the type of improved outcomes envisioned when ARRA was signed into law.

What Does it Mean?

Improving population health management and public health outcomes requires a network of connected information and delivery sources. Before outcomes can be improved, however, these sources must be able to “speak” to one another and be understood. Through this dialogue, true insights can be achieved. Health organizations, like Wilmington Health, demonstrate how such insights can create measurable results and improved population health outcomes. Improved patient outcomes is the genesis of Meaningful Use, Stage 3—take all that has been learned by the standardized collection of data with modern, robust systems and advance understanding, safety, and quality of care.

What's Comes Next?

When the town hall meeting adjourns, what action items will be left to tackle for patients, the healthcare industry, and legislators in this country to create a system that works for everyone?

Answer: ...

It's Time to Start Getting Answering

In order to address the issues of today and tomorrow, all parties must be invited to the town hall. All parties musts have power to influence. All parties must have a means to hold the others accountable for action or inaction. All parties must work to combat misinformation and promote truth and understanding. And all parties must own the success and failures of the systems they design and processes they create.

As we've explored the healthIT landscape, more questions have been presented without answers than with. The challenge to solving any problem when the issue seems so large and complex that the starting line is unclear, is in defining the venue, the audience, and the mission first.

What Do We Know?

Patients have more power than at any other time in history. Systems are designed with them in mind and cater to a new level of expected engagement. The healthcare industry is being flooded with technological advances at a blistering pace. So much so that it is pushing organizations to question their values and culture and true reasons behind the paths of innovation they choose. Government is being looked at to make decisions —to lead the way on a complex and contentious issue. They are being looked to do so as a point of authority from citizens, but not necessarily the industry. There is a disconnect in perceptions of influence and the realities of influence. This must change. It has to change. It will change.

How does each pillar—each party at the town hall—contribute to moving the needle forward? Advancing the healthcare industry comes down to how they facilitate the course of action together. It will not be solved simply by choosing the most feature-packed a technical solutions available. Technology does not know when it is being used to address questions absent of context, absent of the perspective of social norms, community sensitivities, or industry practices. People do.

Questions Moving Forward

1. How can we influence industry culture through legislation and community advocacy to develop systems better aligned with our values?

2. How can we evolve our processes and systems to lift the fortunes of everyone, not just those who depend the least on services?

3. How can advances in technology be used to give patients more power in guiding the conversation and defining what matters most?

4. What can we learn from the our experiences to improve safety, quality, and the state of healthcare in the U.S.?

5. How are the actions we take, the systems we design, the pathways towards transparent communication we create, influencing the perception of progress in healthcare?

> *"If I had an hour to solve a problem and my life depended on the solution, I would spend the first 55 minutes determining the proper question to ask for once I know the proper question, I could solve the problem in less than five minutes."*
>
> *-Albert Einstein*

The Answers Lie Ahead

We live in a moment of transition. Transition from paper to digital, from closed doors to open debate, from system limitations to innovation overload. What can and cannot be done is hard to assess with how quickly things evolve. Still, knowing that people drive action and there are things we can continue to do to empower more people to participate in the discussion is the only path forward. Social and industry norms will continue to evolve, but it is important that the debate occur with equal representation and accountability. This ensures that the way solutions are sourced will consider more perspectives equally. If we can reducing any imbalance between patient, industry, and government, then we increase the likelihood that the solutions will work for all. While the solutions are important, the questions and the time and exercise of asking them should not be overlooked.

Appendix

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