SPECIAL REPORT

Meaningful Use, EHRs, and the Era of Widespread Clinical Data Exchange

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CONTENTS

INTRODUCTION

Health information exchange (HIE) is the process by which electronic healthcare data is transferred from one source to another, allowing healthcare providers and patients to securely view vital medical information. HIE encompasses a range of activities, including medical record sharing, results delivery, and the exchange of continuity of care documents during transitions in care, among others. HIE is believed to prevent hospital readmissions, avoid dangerous medication errors, improve a provider's diagnostic capabilities, and decrease duplicate testing by ensuring that a patient's complete and comprehensive medical history is available at the point of care.[1] With the advent of the Center for Medicare & Medicaid Services Electronic Health Records Incentive Program, more providers than ever before are able to capture patient data electronically. As the prerequisite to information exchange, widespread electronic health record (EHR) adoption has ushered in a pivotal moment in laying the groundwork for national HIE. However, organizations working toward HIE now also face the challenge of bringing exchange to scale and connecting large numbers of independent providers so that they may share data. This paper seeks to demonstrate features of health information exchange solutions that can facilitate bringing HIE to scale.

BACKGROUND

Faced with rising costs and a system that is currently unable to deliver significant or sustainable increases in the quality of care, health information technology (health IT) has become the centerpiece of efforts to improve quality, safety, and efficiency in healthcare. Beginning with core components like the EHR, health IT is expected to enable providers to view and utilize information at the point of care to better coordinate treatment across disparate care settings. Health IT offers the tools to not only capture data from a clinical encounter, but to analyze that data in the context of the patient or a population of patients and share the results with other providers treating the patient.

The Health Information Technology for Economic and Clinical Health Act (HITECH), passed by Congress in 2009 as part of the American Recovery and Reinvestment Act, was the major first step in the effort to reshape the U.S. healthcare system. HITECH established a funding program under the Centers for Medicare & Medicaid Services (CMS) incenting healthcare providers to adopt and use electronic health records. The EHR Incentive Program, or "Meaningful Use" program, offers financial incentives to Medicare and Medicaid providers that adopt certified EHR technology and then demonstrate that they have used the technology in a meaningful way to improve patient care. Meaningful Use requirements cover a range of activities centered on the EHR, such as capturing medical data in a standardized format, sharing that information with other providers, and using the information in the EHR to engage patients in their care.[2] As more providers adopt EHRs, the requirements for demonstrating meaningful use will grow more stringent. While the program is currently still in Stage I, Stage II requirements include more rigorous exchange of healthcare information.[3]

Though only a few years old, the impact of the Meaningful Use program is already apparent. To date, CMS has allocated nearly $10.7 billion and more than 355,000 eligible providers and hospitals have registered for the program.[4] Up to 70 percent of providers in the U.S. have adopted electronic health records, and 40 percent have EHR systems capable of meeting Meaningful Use requirements.[5] Furthermore, EHRs are being adopted by smaller, independent practices that have traditionally delayed large-scale technology implementation.[6] As a result, an unprecedented number of providers have the capability to capture and store a patient's medical information electronically.

EHRs are relatively powerless without an environment conducive to information sharing. For example, data exchange is necessary to support transitions of care, perform longitudinal analyses of care for specific patients or populations, and meet public health needs.[7] Accordingly, the federal government and innovative private organizations have begun to develop new models of care delivery predicated on HIE to derive actionable value out of electronic clinical data. Accountable care organizations, patient-centered

medical homes, and pay-for-performance systems depend upon HIE to deliver patient-centered care, measure and report performance, share health information, and improve the quality, coordination, safety, and efficiency of care.

However, despite healthcare reform efforts that have created both a critical mass of providers capable of capturing patient data electronically and delivery systems that demand HIE, widespread adoption continues to lag. In fact, the number of providers using electronic health records presents a new set of challenges for HIEs. Whereas some organizations had attained regional health information exchange prior to the passage of HITECH, such efforts typically occurred within large, relatively homogenous health systems which, due to their size, may have distinct advantages in facilitating HIE. These organizations are more likely to use an EHR from a single vendor, have the financial and technical resources to support the adoption health IT, and already demonstrate organizational commitment to information exchange. Smaller independent providers, on the other hand, have fewer resources and are unlikely to use the same EHRs or practice management systems. Many healthcare organizations have taken a piecemeal approach to health IT adoption by implementing a variety of practice-specific solutions from among more than 350 certified commercially available EHR products for attaining meaningful use.[8] Though this means that more providers are utilizing EHRs, this approach can ultimately hinder interoperability and HIE.

As a result, one of the primary challenges to HIE today is ensuring connectivity at scale. Connectivity at scale refers to the process of connecting large numbers of providers as quickly and efficiently as possible in order to realize the visionary goals of population health improvement and accountable care. Healthcare has evolved to offer greater degrees of specialization, and the growing prevalence of chronic conditions leads patients to see multiple providers for their care.[9] Hospitals can no longer connect a handful of care settings and thereby cover most patients in a given region. Instead, for new views of healthcare to become a reality, smaller provider practices that serve as access points to the healthcare system for many patients must be able to exchange patient information. These characteristics of the healthcare system have left some with the perception that HIE has become mired in the interfaces required to connect independent practices to larger HIE efforts already underway. Yet, rather than detracting from HIE overall, interfacing with these providers is as critical a step toward high quality and efficient care as EHR adoption.

BARRIERS TO CONNECTIVITY AT SCALE

Broadly speaking, there are three primary barriers to scaling health information exchange: lack of interest, cost, and interoperability/technical challenges. Many providers are unclear about the benefits that can accrue from information exchange, leading to disinterest in pursuing connectivity given the financial costs and the potential for disrupted workflow. Other providers may worry that data exchange could weaken their competitive place in the marketplace, as patients will feel less compelled to receive treatment from a particular provider if their data is available to others.[10]

Although most providers recognize the importance of HIE, cost and interoperability frequently confound their decision to connect to an exchange. Because disparate providers use different practice management and/or EHR systems, an HIE may be unable to easily interpret or share the information from a given system. Constructing separate interfaces for each system is both costly to implement and challenging to maintain.[11] The Santa Barbara HIE is an example of an early initiative that struggled with connecting provider legacy systems to such a degree that half of the funding from a $10 million grant for implementing the exchange was dedicated to building interfaces.[12]

FACILITATING CONNECTIVITY

Engage Providers and Demonstrate Value

Given these challenges, delivering HIE at scale is difficult. Nonetheless, experiential data from early HIE efforts suggests ways to effectively scale data exchange. For instance, engaging providers early in the process and clearly demonstrating the value of HIE is imperative. Incorporating independent practices into the governance body of an HIE is an important way to build and reinforce trust.[13] Successful HIE implementations are often led by provider champions or groups of providers firmly committed to information exchange.[14] These champions not only help persuade others to participate in the exchange, they also frequently act to resolve issues and assist providers in understanding how to use the technology during implementation.[15]

Provider champions are often the first to tout the benefits of HIE to others. HIE has been associated with improved workflow efficiency, including referral processes and claims processing, improved quality of patient care and safety, and cost-savings.[16] HIE also offers an avenue for providers to electronically measure and report quality indicators required for quality-based payment models and programs like Meaningful Use.[17] By clearly demonstrating these known benefits of HIE, providers are more likely to participate in an exchange and share a common sense of purpose regarding data sharing. Importantly, benefits such as gains in efficiency do not necessarily need to be correlated with an increase in revenue to be viewed as beneficial.[18]

Keep It Simple

Making health information exchange simple for providers is another crucial element of bringing connectivity to scale. Because independent providers have fewer resources, technical problems or workflow disruptions have a larger impact. HIE needs to be responsive, functional, and reliable. User interfaces should display information in a manner that is readily available for users.[19] Ample technical support should be available to providers during and after implementation to assist with any issues that may arise.[20] This support should come from the technology vendor itself, as well as physician champions of the exchange or other stakeholders committed to HIE. The processes for exchange should also be simple. Some EHR and HIE applications have been recognized as cumbersome as they fail to translate clinical practices into actions within the software in a manner that adheres to a provider's workflow. While some alteration to workflow is expected, products that aren't designed with specific clinical practices in mind may be doomed to failure.[21]

Take a Modular Approach

A modular approach to information exchange can help simplify HIE for many providers. Modular HIE provides a customizable platform for exchange that providers can adapt to support their particular needs. A study of practice sites using HIE in Memphis, TN demonstrated that providers used HIE differently according to their context. A key barrier to HIE among these providers was low expectations that clinically relevant information would be available through the HIE, suggesting the need for user and role-specific customization to increase adoption.[22] HIEs such as CalRHIO have successfully adopted a "utility-service" approach which offers a suite of services that providers and healthcare organizations can select from.[23]

Develop Privacy and Security Models Prior to Implementation

Privacy and security are other issues that could benefit from simplification. Unfortunately, given the delicate nature of both, HIEs must remain careful and vigilant about their approach. A federated data model, in which providers retain control of their patient's healthcare information, has emerged as a popular approach to HIE and allows practices to utilize pre-established security protocols. Two-factor authentication is another simple approach to security.[24] Consent processes should be clear, indicating exactly what data can be shared, with whom, and for what purposes. More important than the actual

consent models that are used may be that HIEs have practices in place prior to engaging independent providers and scaling exchange. Providers often presume that privacy and security policies will be well established before they decide whether to connect.[25] In fact, part of the failure of the Santa Barbara HIE can be attributed to difficulties in creating data exchange agreements between participants.[26]

Leverage Federal Initiatives to Foster HIE

Perhaps the most important way to facilitate HIE at scale is to leverage the efforts of the federal government. Through Meaningful Use and other initiatives, the federal government has worked to create a set of policies, standards, and specifications to facilitate health information exchange. The Meaningful Use program helps to alleviate cost concerns by providing financial incentives to help cover the costs of implementing health IT systems. Regional extension centers offer rural and independent practices guidance and expertise in selecting and using health IT systems. Through ONC, the federal government has also brought together stakeholders to devise and propagate a framework for standards and interoperability, and has pioneered standards and specifications for HIE via the Nationwide Health Information Network (now the eHealth Exchange, a public-private partnership). ONC promotes the use of common standards, such as HL7, XML, CDA, CCD, XDS, and others through CONNECT, an open-source software solution for HIE.

Chief among ONC's efforts to enable HIE is a secure messaging system known as the Direct project. The Direct project is a rudimentary form of "push" exchange predicated on secure messaging over the internet that has been compared to secure, authenticated email. "Push" exchange refers to a process in which information is sent, or pushed, from one system to another. Push exchange is well suited to handle use cases such as transmitting a patient's laboratory results from the lab to provider, but is not as readily capable of establishing a composite of a patient's medical record from multiple disparate settings. "Pull", or query-based exchange, handles this function. Pull exchange refers to a process that aggregates data from a centralized database or federated repository.[27]

Employ a Phased Approach

Direct is important because it represents a simpler way of onboarding providers to an HIE. One strategy for scaling health information exchange is to adopt HIE through a phased approach. HIEs can introduce providers to exchange by initially offering core services such as consent services, identity services, and basic push exchange of simple data like admissions, laboratory/imaging results, and encounter summaries. Once providers are connected via these basic functionalities, advanced services including query-based exchange, clinical decision support services, quality measurement and reporting, and population health analysis can add further value to providers. The experience of providers in Colorado suggests that unidirectional information exchange (such as results delivery) can serve as a stepping stone to fuller HIE participation.[28] Likewise, services which save providers time by giving information are more valuable early on than services which require more intense workflow changes or provider input, such as order entry.[29]

CASE STUDIES

HIEs have already begun the process of bringing connectivity to scale. Provided below are two case studies that demonstrate how Baptist Health and Jersey Health Connect have used many of the strategies described above to expand their reach and connect providers.

Baptist Health

Baptist Health is a 2,400 bed health system serving more than 2.5 million patients in Kentucky. The system includes seven hospitals, employed physicians, and an extensive affiliate network encompassing urgent care practices, outpatient surgery centers, and home health. Baptist Health seeks to provide high-quality patient care driven by integrity, respect, stewardship, excellence and collaboration. To this end, Baptist has undertaken a number of health IT projects aimed at connecting providers within the system and ensuring that the clinical information they need is delivered seamlessly at the point of care. Facing stiff competition in many of its service areas from other hospitals and health systems, Baptist recognizes the importance of meeting the clinical information needs of its providers with an integrated health information platform. Through data exchange, Baptist hopes to reduce readmissions, improve patient accountability, and help providers make informed clinical decisions.

Baptist uses an enterprise health IT solution from RelayHealth, but given its impressive reach across Kentucky, providers within the Baptist system use a number of disparate health information systems and platforms. For example, employed physicians use the Allscripts Enterprise platform, while oncologists use Mosaic EHR and the emergency department uses T-Systems. Affiliated providers have adopted an even greater variety of systems, necessitating Baptist to construct interfaces and overcome interoperability challenges. Meaningful Use has had a noticeable impact on Baptist's health IT challenges. Whereas providers had expressed interest in connectivity prior to Meaningful Use, the number of practices requesting hospital-based results delivery implementations increased dramatically after the program was created, such that Baptist is still working through a backlog of requests.

Results delivery is the primary focus of current health IT efforts at Baptist, and much of the system's health IT infrastructure is geared towards moving data from the hospitals to provider practices. As more providers are able to receive lab and radiology results from the hospitals, the system hopes to expand their IT capabilities to support order entry and delivery via a provider's EMR, as well as the exchange of continuity of care documents. Ongoing health IT objectives are centered on exchanging data between ambulatory systems and moving data from those systems to the hospitals. Eventually, Baptist would like to create a single interface through which providers can view all of a patient's information, as well as a robust personal health record platform driven by data from the EHR.

Baptist faces similar challenges to other organizations working to implement health IT systems, such as a lack of technical expertise and resources to dedicate to health IT. In addition, Baptist has found it difficult to bring all of the stakeholders to the table when performing a system implementation. When connecting smaller provider practices, Baptist's health IT team must frequently coordinate between the practice, their health IT system vendor, and any third-party health IT consultants the practice has hired. This is a daunting challenge, further compounded by the unwillingness of some competing health IT vendors to work together.

To overcome these challenges, Baptist has employed a number of strategies. When possible, Baptist identifies providers using the same EHR system and works to build an interface for all of those providers at once. Similarly, Baptist has worked with some EHR vendors to create hub systems which interface between Baptist's health IT infrastructure and the vendor's system and can facilitate interface installs when providers using that vendor seek to connect. Baptist also has dedicated staff support from its enterprise health IT solution, RelayHealth, who are available to assist with system implementation.

Though Baptist's subjective experience indicates that providers are satisfied with the advantages afforded by being connected and sharing data, the system has not undertaken formal analysis of the benefits of information exchange. Nonetheless, Baptist believes that even if information exchange does not ultimately result in a positive financial return, meeting its provider's clinical information needs and enabling patients to take control of their data and become active participants in their care are worthy objectives that health IT can help the system achieve.

Jersey Health Connect

Jersey Health Connect is a health information organization (HIO) located in northern and central New Jersey. Twenty-five hospitals, two large multi-specialty practices and a long term care facility comprise the organization's membership and provide care for 6 million patients. The HIO itself covers more than 1.3 million patient records. Jersey Health Connect was established in 2010 via funding from ONC's State Health Information Exchange Cooperative Agreement Program. Jersey Health Connect seeks to ensure that health information is available when and where it is needed, accelerate overall HIE activity in the state, improve care coordination, access, outcomes and efficiencies, and encourage active and informed participation on the part of patients.

Jersey Health Connect has approached information exchange in a stepwise fashion. As member groups connect to the organization, Jersey Health Connect has generally focused first on connecting the larger hospitals and facilities before turning its attention to their smaller affiliated provider practices. This strategy ensures that there will be value in the exchange for the smaller practices. By combining hospital data in Jersey Health Connect's affiliated database, smaller practices connecting to the exchange will already have a body of data from which they can draw information about their patients once they are connected. New members to the exchange submit priority lists of their providers, based on factors such as the provider's perception of value and their capacity to interface quickly.

As it has grown, Jersey Health Connect has come to understand the importance of good governance and policy. The exchange spent a great deal of time developing legal agreements between participants and determining the roles that stakeholders would play in the organization. Because HIO's in New Jersey use an opt-out model for privacy, Jersey Health Connect also had to ensure that providers and hospitals were well equipped to explain HIE to patients and prepared procedures for patients to notify the exchange about their opt-out decision.

Jersey Health Connect cites interoperability, or the lack thereof, as its biggest challenge. As a large organization focused specifically on health information exchange, Jersey Health Connect has more financial and technical resources to dedicate to facilitating data sharing. However, the lack of standardization between competing vendor systems used by its member organizations requires the HIO to continue to need to build separate interfaces. While most of the EHR systems of its members are capable of delivering clinical results, few can generate or interpret continuity of care documents, for example. Issues related to data normalization, as well as a lack of defined standards for protected health information, have resulted in incomplete patient records even after organizations are connected.

Therefore, Jersey Health Connect advocates for shared standards that can facilitate true interoperability. The HIO recognizes the importance of the work of the federal government in this area, but notes that government processes are too slow and lag behind the needs of organizations like Jersey Health Connect that are currently working to build exchange. It hopes that certification for interoperability will one day actually mean that disparate systems can communicate without needing new interfaces.

Despite these challenges, Jersey Health Connect has managed to connect thousands of competing providers from across the state. The HIO attributes its success to its transparent processes and inclusivity. Participants feel that they have a stake in the exchange and are therefore willing to contribute data. Importantly, the HIO's platform is also built as a software as a service (SAS) model, which enables Jersey

Health Connect to deliver services tailored to the specific needs of its members without those members having to adopt new technology or build expensive infrastructure.

As it continues to connect providers in New Jersey, Jersey Health Connect seeks to expand the scope of the exchange to enable EHR systems to contribute data to its database. It is also working to increase connections with emergency departments and other HIOs in the state. It will continue to support new models of care delivery, such as accountable care organizations. For Jersey Health Connect, health information exchange is an essential tool to help providers track and manage their patient's care, so they will know where the patient has been and how they have been treated.

LESSONS LEARNED

The experiences of Baptist Health and Jersey Health Connect demonstrate a variety of ways that the organizations have worked to achieve connectivity at scale. Both organizations have worked to build health information exchange via a stepwise process. Baptist Health has focused first on results delivery, a chief need for many providers, and then on electronic order entry, continuity of care document exchange, and finally a comprehensive PHR platform populated with EHR data. Jersey Health Connect has focused on connecting its larger member organizations before targeting their affiliated provider practices. This strategy serves as both a means of demonstrating the value of HIE to those smaller practices and as a way to keep its technical connectivity burden manageable. Like Baptist Health, Jersey Health Connect has also focused first on hospital data and results delivery before expanding to incorporate ambulatory data. These stepwise approaches are well-suited to initially demonstrating the value of HIE to providers, establishing initial technical connections, and not burdening practices with too much data or workflow disruption before further services are added.

Furthermore, both organizations have taken steps to make health information exchange easier for participants. Baptist focuses on seamless integration as a critical feature of health information exchange. The health system has emphasized creating a platform which can serve as a single point of entry for providers to view patient information. Even when data is being drawn from multiple disparate sources, Baptist believes that its providers should only have to login once to see everything they need.

Jersey Health Connect delivers health information exchange via a software as a service model so that its members can use EHR and practice management systems that they are already comfortable with. Similarly, Jersey Health Connect spent a great deal of time creating standard policies and procedures for privacy and governance. These procedures cut down on the amount of work the organization would otherwise have to perform when bringing members on board, while also reassuring those members that issues such as privacy have been accounted for.

Although neither Baptist Health nor Jersey Health Connect highlighted the work of the federal government with regards to standards, interoperability, and privacy, both noted the influence of the Meaningful Use program in encouraging providers to adopt EHRs and want to connect to share information. Additionally, both noted that new healthcare delivery models advocated by the government, such as accountable care organizations, will require advanced data sharing beyond results delivery. It is likely that the momentum generated by these models will help organizations coalesce around standards for continuity of care in a similar fashion to the use of HL7 for results delivery processes.

Finally, the experience of Jersey Health Connect, in particular, lends credence to the importance of engaging providers and demonstrating value. As described previously, connecting larger hospitals before their affiliated practices created a critical mass of data that contributed to physician buy-in. Likewise, Jersey Health Connect worked to establish stakeholder roles as it built governance. One of the HIE's greatest achievements has been connecting 25 organizations that would otherwise compete with one another. Without transparency, inclusivity, and a clear demonstration that data sharing is additive to provider practices rather than a competitive loss, this likely would not have been possible.

CONCLUSION

Healthcare reform efforts in the public and private sectors have laid down the groundwork to improve the quality of care while reducing related expenditures. Care coordination, complete information at the point of care, and population health analysis are some of the key features of a reformed healthcare system. However, before these ideals can be realized, healthcare organizations must work to take advantage of the unprecedented level of electronic data capture afforded by the Meaningful Use program. While connectivity at scale is no easy feat due to disinterest, cost, and technical barriers, it is the next essential step in transforming the U.S. healthcare system. Fortunately, as demonstrated by the experiences of organizations like Baptist Health and Jersey Health Connect, connectivity at scale is possible. By engaging independent practices, demonstrating the value of HIE, simplifying exchange processes, ensuring privacy and security of data, and leveraging work by the federal government, HIEs can create large-scale communities built on data exchange among all stakeholders in their service area.

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