

Health Information Exchange

Current Challenges and Impediments to Implementing National Health Information Infrastructure

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Abstract

The inability to exchange health information of patients across diverse healthcare organizations and providers is a critical component responsible for both the increase in medical errors, which may result in premature death of the patient and the continuous increase in healthcare costs and redundancies. It is projected that by 2020, national healthcare expenditures will reach \$4.8 trillion; nearly 20% of the GDP. This may be attributed to the lack of standardization of health information technology. Because the private healthcare market has failed to resolve this issue, government intervention is necessary to lead and establish a standard platform for the exchange of health information. In the absence of standardization, the goal of attaining a national health information exchange network will not materialize. The standardization of the World Wide Web and the financial sector during the early 1980's should serve as a model for policy makers and industry experts. This paper proposes federal government intervention to standardize health information technology and adoption of the health record bank model as proposed by researchers Ball and Gold (Ball & Gold, 2006). Adoption of the health record bank model can be realized by utilizing current e-commerce technologies. Furthermore, adoption of this model in health information exchange will be less expensive and at the same time will lessen the government's financial burden as it relates to the development of health information technology.

Introduction

Health information exchange (HIE) is described by policy makers, researchers, healthcare experts and other industry experts as the sharing of electronic health information among different healthcare providers (Vest & Gamm, 2010). However, development of an HIE has been an arduous journey in the United States. Kleinke (2005) defines market failure as the failure of healthcare organizations to develop a system capable of exchanging health information. This failure is the consequence of the government's lack of technology standardization in creating a common language in health information technology (HIT). The absence of standard policies and standardization is an economic problem exclusive to the healthcare arena. The consumer financial information technology (IT) sector provides an exemplary model of the government's and the financial industry's aggressive initiative during the mid-1980's to develop and standardize the exchange of consumer's financial information. Since then, the financial sector has invested approximately \$40 billion to develop a worldwide conglomerate that provides the ability to exchange current and accurate information about consumers' financial health status (Ball & Gold, 2006). This success is largely due to the standardization of infrastructure development, regulation of technology and socioeconomic policy developed by the federal government.

The financial industry should serve as a model for the healthcare industry to advance HIE. Infrastructure and technology that can quickly transform the healthcare industry is readily available. However, because these models cannot be developed in a private healthcare marketplace, aggressive government intervention is required (Kleinke, 2012). For this reason, the Committee on Systemic Interoperability, established through the Medicare Modernization Act of 2003, was formed by political leaders to confront the issues constraining the advancement of HIT and interoperability (Hersh, 2004). More recently, the federal government enacted Title XIII of the American Recovery and Reinvestment Act of 2009, also known as the Information Technology for Economic and Clinical Health Act (HITECH) (Vest & Gamm, 2010). Since the passage of these acts not much has materialized to advance HIE. Thus, more active involvement by the federal government is needed to develop HIT and system interoperability. This paper seeks to explore and identify critical issues and challenges confronting the exchange of health information and suggests adopting the proposed financial industry's model, the health bank record (HBR) to develop National Health Information Infrastructure (NHII). Additionally, this paper will focus on the critical role the federal government has in the advancement of the development of NHII.

How Does HIE Take Place Today?

Electronic HIE can greatly improve health outcomes while simultaneously reducing healthcare costs. It also offers other intangible benefits that include enhanced patient-provider relationship, lean workflow processes and positive perception of the healthcare organization to improve the health of the patient and the community (Scalise, 2012). The federal government has awarded approximately \$139 million in grants and contracts to build Regional Health Information Organizations (RHIO). These state and local organizations are formed by various stakeholders (e.g. community leaders, health plans, physicians and hospitals) to support and advance HIE on a regional basis and to standardize healthcare delivery methods in a particular marketplace (Scalise, 2012). Currently, over 200 RHIO's exist in the country, differing in architecture, types of data exchanged and number of collaborating organizations within the network (Vest & Gamm, 2010). Architecturally, RHIO's utilize one of the two models for HIE: Community Health Management Information Systems (CHMIS) or Community Health Information Networks (CHINS) (Vest & Gamm, 2010). These, however, are the failed models developed during the 1990's to advance the exchange of health information (Vest & Gamm, 2010).

The CHMIS model follows the principles of centralized data repository which contain patient's demographic, eligibility and clinical data confined to the geographic boundaries of the community. Failure of this model was due to limited and expensive technology available at the time (Vest & Gamm, 2010). The CHINs model differed from the CHMIS. The CHINs model excluded community stakeholders and payers interested in making data available to the community. The CHINs model was strictly commercially based and gave precedence to the savings on the costs of exchanging data with other providers (Vest & Gamm, 2010). The architecture of the CHINs model is described as "transaction-based" as it encouraged independence of each provider. The failure of the CHINs model was related to its competitive nature.(Vest & Gamm, 2010). As a result, most CHINs that existed in the 1990's have failed to survive (Vest & Gamm, 2010). One of the primary factors for this failure was the lack of federal support to advance HIE. Nevertheless, RHIO's are being developed during times of fierce political support by the government.

Impediments and Challenges in the Adoption of HIE

Factors that impede full implementation of HIE include lack of interoperability among different systems, high provider costs, first mover disadvantages, the healthcare industry model, lack of defined standards and practices, privacy and security. These barriers must be addressed by the federal government.

Lack of Interoperability

The most important barrier to achieving NHIE is the lack of interoperability among systems owned and operated by different providers and health care organizations. Interoperability is defined as the ability to integrate and combine data from multiple systems throughout the country (Silva-Ferreira et al., 2012). Various differences among health care providers, functionalities, information architecture, system design, lack of standards, and various electronic health record (EHR) technologies are the major causes of interoperability (Kaushal et al., 2005). These applications were developed using different standards and data architectures, thereby making it impossible to integrate multiple systems. Because applications were built to the specific needs of the providers, data retrieved from these providers would have no meaning once collected from the provider's system.

High Provider Costs & First Mover Disadvantage

Research shows that the estimated cost for nearly 90% of hospitals adopting an interoperable electronic medical record system would be approximately \$98 billion (Hillestad, et al., 2005). It is also projected that the cost over the 15-year adoption period would be nearly \$6.5 billion (Hillestad, et al., 2005). Implementation costs for physicians are also high. It is projected that the cumulative costs for nearly 90% of the physicians will top nearly \$28 billion during the 10-year deployment phase and maintenance costs of about \$16 billion thereafter (Hillestad, et al., 2005). Besides the financial cost of the adoption, most providers are reluctant to adopt the system due to the first mover disadvantage. This refers to the consequence of paying high adoption costs while a majority of the benefits are obtained by those making no investment at all. Data shows that only 11% of the benefits will be obtained by the physicians covering the costs, while 89% will be covered by consumers and payers (Hillestad, et al., 2005). Other costs that impede the adoption of interoperable EMR systems include the uncertainty of financial payoffs and the disruptive effect on provider practices. (Hillestad, et al., 2005).

Healthcare Industry Model

One very important factor often mentioned by industry experts is the current healthcare industry model that rewards providers for delivering the most care. The lack of patient information is financially advantageous to the provider. That is, the less the provider knows about the patient the more services it can render and more money can be collected from billing the health insurer (Kleinke, 2012). It is clear that the healthcare industry business model has to be changed in order to compel providers to adopt interoperable electronic medical record (EMR) systems.

Lack of Standards and Practices

Standardization allows different users to interact and communicate information with others because it forces the capture of data to utilize the same terminology. It requires that everyone use the same system and processes (Stead, Kelly, & Kolodner, 2012). In the healthcare industry, lack of standardization is a result of deficiency in HIE.

Privacy and Security

Data illustrates that a majority of the U.S. population believes that access to EMR will improve the quality of care (McGraw, Dempsey, & Harris, 2006). However, according to data collected from a large sample study shows that a very large portion of the population is concerned

about the privacy and security of their EMR (McGraw, Dempsey, & Harris, 2006). A 2006 national survey revealed that an approximately 80% reported being very concerned with identity theft or fraud, 77% were worried about the wrongful use of their data for marketing purposes, 56% were apprehensive about employer access to data and 55% were nervous about insurer's having access to the data (McGraw, Dempsey, & Harris, 2006). In order to overcome the trust barrier that exists between the retainer of health information and the public, it is imperative to build trust with the health consumer.

Federal Government as the Catalyst of HIE

Because the private U.S. healthcare market is ineffective, there is an indispensable need for federal government intervention. Currently, the successes and accomplishments with respect to standardization of the financial market, interstate highway system, and the internet illustrates that without effective government action these achievements would not have materialized. Middleton (2005) stated that "the U.S. HIT market requires a third hand deftly and gently applied, to effectively promote HIT adoption and help transform U.S. health care." In his article, Middleton addressed the comments spoken by Michael Leavitt, the Secretary of Health and Human Services (HHS), which suggested that the federal government can lead the adoption of HIT by providing incentives through the public sector healthcare delivery system. The government can guide and stimulate effective development of RHIOs by constructing standards and principles of HIT certification, designed for developing national health information network architecture. It can also address issues of privacy, security and confidentiality and impose civil and criminal consequences for its abuse. In addition, the federal government can create a balance between privacy, security and the promotion of public health, a component that is absent today. This can be achieved by strengthening Health Information Portability and Accountability Act (HIPAA) for records maintained or exchanged among conventional healthcare participants and those who do not fall

under HIPAA regulation. The federal government can also define new rules and guidelines for those who are currently outside of the realm as well as resolve the meaning of consent and implement more robust enforcement methods (McGraw et al, 2006).

Others propose labeling HIE as a public good, as it will eliminate competition among providers and payers (Vest & Gamm, 2010). Furthermore, it will concurrently benefit both local and broader exchange networks and challenge the problems of sustainability. Vest (2010) also recommended that the federal government, the largest payer, could require mandatory participation in a RHIO in order to be eligible for Medicaid/Medicare reimbursement. The federal government can also mandate compliance by specifying the minimum number of RHIO partners, type of data exchanged and the volume of information exchanged (Vest & Gamm, 2010). The current business model of healthcare rewards providers for delivering extra services. However, some of these services may prove to be detrimental for the patient or have no effect in improving health outcome. Thus, it is necessary to improve the business model that rewards providers for improving the health of the patient through utilization of health information exchanged. Such an endeavor requires long-term commitment of funding from the federal government for purposes of research and development and maintenance costs (Detmer, 2003). Dr. Philip R. Lee, the former Assistant Secretary for Health, proposed a 10-year commitment from the federal government and \$14 billion to develop National Health Information Infrastructure (NHII) capability, which he claimed is the same level of investment that other countries have invested to build NHII capabilities in their countries (Detmer, 2003).

Moving Toward Building a National Health Information Infrastructure

NHII is described as an information and communication network that connects all providers through mixture of technologies and by means of established rules and standards to transfer patient data. Once fully implemented, this system will empower providers and health consumers to collaborate, share knowledge, improve services, and simplify complicated jobs across the healthcare realm (Stead, Kelly, & Kolodner, 2012). The importance of building a NHII lies in its potential to reduce costs by eliminating redundancy in health care. There is also the possibility that more patients will be involved in self-management of health, which can lead to long-term reduction in health expenditures. It is also worth mentioning that NHII will save more lives and reduce patient mortality due to availability of health information (Stead, Kelly, & Kolodner, 2012). However, the party responsible for constructing a NHII remains to be addressed (Detmer, 2003). Detmer (2003) asserts that a collective effort between the federal government and the private sector is required. Thus, government must provide leadership and the infrastructure for the private sector to build upon.

Strategies and suggestions for building NHII

The first financial industry model was proposed by Ramsaroop and Ball (2000) who described the concept of “banking on health”. This concept exploits the idea of using personal health records (PHRs) in the same way one uses personal banks, ATM's or credit cards to perform financial transactions (Ball & Gold, 2006). This model advocated patient comprehensive

management of PHRs. The authors proposed that the PHR would not replace the provider's record; instead the health consumer would decide with whom to share their health information (Ball & Gold, 2006).

Since the conception of this model, three additional models embracing similar features have surfaced: Shabo's non-centric independent health records bank, Yasnoff's e-health trust, and Gold's health bank record (Ball & Gold, 2006). Although all three models are slightly dissimilar from each other, they all have one thing in common: they are separate entities established outside of the healthcare arena with the aim of taking ownership and maintaining PHR's by freeing the provider from exchanging health information with RHIO's.

Independent Health Record's Bank (IHRB)

Shabo's model proposes the establishment of independent repositories in which patient's medical records are deposited and maintained by multiple competing IHRB's through the enactment of legislation. Shabo indicates that these IHRB's will be independently owned of the healthcare provider, health insurers, government agencies and consumers, avoiding conflict of interest (Ball & Gold, 2006). This model is labeled as non-centric because it does not cater to any specific entity or individual. It does not require the establishment of national repositories, thereby freeing the provider from maintaining records because health records are forwarded to IHRB's, and the health consumer does not care for or maintain health records (Ball & Gold, 2006).

EHealthTrust

Yasnoff's eHealthTrust model is described as a central repository that houses all patient information. This information is controlled and financed by the consumer. The key aspect of this model is that it places control of health information in the hands of the consumer (Ball & Gold, 2006).

Health Record Bank (HRB)

The HRB model is best described as a system that mirrors the functionalities of a commercial bank. This model allows the health consumer to deposit health records, akin to depositing money in a personal bank account. The account holder earns "dividends" as one earns interest in a savings account. However, dividends earned would be through the lease of de-identified information for research purposes. The HRB collects information from various sources (e.g., insurers, hospitals, physician's home health, dental records, pharmacies, laboratories, radiology and genomic data). HRBs can include living wills, advanced directives, names of legal guardians, fiduciaries and next of kin (Gold & Ball, 2007). The medical records are owned and managed by the health consumer and he/she decides how, when, where, what and with whom to give access to the record (Gold & Ball, 2007).

The HRB model could generate revenue through the lease of information to databanks for use by pharmaceutical and medical technology companies, insurance companies, research institutions, universities, and government agencies for research. Revenues could also be generated when records are accessed or updated by the provider or the insurer. Distinct accounts could be formed for depositing unique sets of health data (e.g., provider notes, lab reports, and radiological data or pathology reports) (Gold & Ball, 2007).

Discussion

The progression towards building a NHII, incorporating the current model (RHIO) appears difficult and very expensive to manage. Without clear standards and guidelines assisting its development, achieving this milestone will witness further failures. Even if this technology was standardized, building RHIO's across the country that will encompass all types of providers working with different technologies will make it difficult to manage and monitor. The RHIO models are not new; they have been around since the early 1990's and have continued to fail. Knowing this and the current pace of improvement, moving forward with this model is not recommended. As previously stated, the monetary costs of full adoption of interoperable HIT will cost billions of dollars and billions more in annual maintenance costs.

On the other hand, the HRB model provides a more realistic and feasible way to overcome the challenges confronting RHIO's. The proposed model can be built using current system architecture through utilization of existing e-commerce applications. This will greatly reduce implementation costs as the technology does not have to be reinvented. Another benefit of adopting this model is the elimination of risks associated with central repositories (i.e., privacy, security, access and management of large data). With the adoption of this model, multiple HRB's could form to service the consumer. Another benefit of this model is that it has the potential to succeed quickly and at substantially lower costs. This model will also lessen the government's financial burden that is projected through the current model by having the private market finance the development.

There are still challenges that must be addressed before the formation of HRB's. As discussed earlier, the most important aspect is the standardization of technology. The federal government must establish common language and address the problems of security, privacy and confidentiality. HIPAA laws must be reexamined and its language made clearer. Additionally, the government must reform the present business model by providing rewards and incentives based on the health outcome of the patient. The passage of the Pay-For-Performance Act in 2009 is an exemplary step towards controlling costs and improving patient health. As suggested, enacting laws requiring mandatory participation for exchanging health information for reimbursement must be debated.

Conclusion

This paper explored the challenges confronting HIE and suggested that government intervention is necessary in resolving this crisis. In doing so, it investigated current methods (i.e., RHIO's) and pointed to the continued problems in implementing interoperability. The source of the problem is due to lack of standards that allow software developers to use any means necessary to develop the application. For this reason, standardization is of utmost importance. However, with thousands of EHR applications in existence today, standardizing a single platform will not immediately solve the interoperability issues. For this reason, adopting the financial industry model for exchanging health information is more sensible since this model could use existing e-commerce applications to exchange data. However, it will still require active government involvement.

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