Chapter 1 : Barriers Over Time to Full Implementation of Health Information Exchange in the United States

The purpose of this study was to identify barriers that negatively influence communication and information exchange during the patient transfer between hospitals and the Center for Treatment.

This is an open-access article distributed under the terms of the Creative Commons Attribution License http: The complete bibliographic information, a link to the original publication on http: This article has been cited by other articles in PMC. Research has been conducted to explore the concept of HIE and its benefit to patients, but viable business plans for their existence are rare, and so far, no research has been conducted on the dynamic nature of barriers over time. Objective The aim of this study is to map the barriers mentioned in the literature to illustrate the effect, if any, of barriers discussed with respect to the HITECH Act from to the early months of The search criteria primarily focused on studies. Results The 28 articles identified 16 barriers. Conclusions The frequency of barriers mentioned in literature demonstrates the mindfulness of users, developers, and both local and national government. The broad conclusion is that public policy masks the effects of some barriers, while revealing others. However, a deleterious effect can be inferred when the public funds are exhausted. Public policy will need to lever incentives to overcome many of the barriers such as cost and impediments to competition. Process improvement managers need to optimize the efficiency of current practices at the point of care. Developers will need to work with users to ensure tools that use HIE resources work into existing workflows. It was prioritized in a national agenda in the United States by President Bush in [1]. Physicians understand and agree with the altruistic benefit that HIE can enable [2], but many barriers prevent its widespread adoption. Many studies have examined the barriers to adoption, but no research has examined these barriers over time. An HIE is the electronic transfer of clinical and administrative information [3], across diverse and often competing health care organizations [2], at the state or regional levels [6], delivering the right information to the right person at the right time. The HIE concept also has the potential to improve infection control practice. For example, Kho et al found that across a large metropolitan area, unique patients generated admissions accounting for inpatient days where the receiving hospital was not aware of the prior history of methicillin-resistant Staphylococcus aureus MRSA [8]. The Institute of Medicine IOM determined that automation of clinical data through electronic methods would result in better patient care [8]. What followed in , was Executive Order which set a goal to fully adopt electronic health records EHR within ten years [1]. Within a short amount of time, several HIEs, under both public and private funding, appeared on the health care landscape in the United States. There was no standard for an organization that enabled the exchange, or the exchange itself. Lack of standards continues today, which enables innovation in design, but also does not help new startup initiatives start with a successful model. Studies demonstrated the advantages to the concept of health information exchange: The HIE is defined in concept, as in the previous paragraph, but not in design. Barriers to adoption were listed in the literature: States were encouraged to match the federal dollars to also incentivize the HIE concept. The intent was to help new HIE initiatives overcome the initial fiscal problems until the concept of HIE was accepted and supported in the health care community. The act also enables the comingling of private and public funds because the public money was issued as a grant. Private organizations interested in the pursuit of an exchange could augment their own budget with public grant money to provide an advantageous fiscal position not previously available. The HITECH Act promotes the electronic exchange of clinical health data across organizations with the expectation that access to comprehensive patient information will help clinical decision-making. Once again, the federal government defined what the HIE should do, but stopped short of defining how it should be done. Interoperable health information may also help to identify and avoid medication complications, thus increasing patient care and safety. However, the fragmented health system in the United States presents many structural, economic, and cultural challenges to achieving a robust environment of electronic data exchange [4]. A basic EHR includes patient demographics, patient problem lists, medication histories, clinical notes, electronic orders for

prescriptions, laboratory results, and imaging results [15]. In regard to the advancement of HIEs, the e-Health Initiative Survey on Health Data Exchange identified 84 data exchange initiatives out of that are at advanced stages of operation and thus able to support data exchange. This represents an increase from 57 advanced initiatives in However, it is important to note the distinction between HIE capacity to exchange data from the actual rates of data exchange by providers and health organizations. The absence of a viable business plan or standard organizational structure of the exchange may have caused the rate of exchange to be lower than desired. A recent study identified similar growth in hospitals exchange of health information with other entities. In contrast, data on HIE utilization rates among office-based providers is more limited to narrower studies that focus on specific specialties, user types, and geographic regions [17]. Although research has analyzed the EHR, HIE, and barriers to adoption of both, no study maps the barriers reported over time. This gap in the literature provides the basis for this article. From this analysis, a data map over time is developed to better understand the dynamic nature of the results. The results of this study enable future researchers to develop empirical models and policy makers to exploit the successful levers that generate a desired result. Methods Search terms were selected based on the experience of the authors in the field of health care administration. The time-frame for the literature review of was selected out of convenience. It was assumed that two decades would be sufficient to capture trends. The years under study were Jan Mar This span was chosen because of the incentives grants enabled by the ARRA, and also a concentrated study on these years was expected to enhance the results. Figure 1 illustrates the literature review process that identified sources consisting of empirical studies, articles, editorials, commentaries, opinion papers, organizational theories, and text books. The window of time for this study eliminated records. Focusing on studies, full-text, English, academic journals, and eliminating duplicates resulted in the removal of an additional records. After 27 articles were identified and reviewed, one additional article was selected from the references of multiple studies. The final sample was

Chapter 2 : How Health Information Exchange Models Impact Data Analytics

Health Information Exchange. HIEs are the paths through which patient-level information is shared electronically across different organizations, increasing the coordination of care with potential to improve public health, health status, health care safety and quality of health care [18, 27].

HIE has been reported to improve access to test results and other data from outside the practice, to improve referral processes and claims processing, and to decrease staff time required for handling these processes. However, these efficiencies may not translate into reduced costs in small practices because of the multiple roles assumed by support staff. A personal health record is one example, envisioned as portable, patient-controlled electronic record derived from various sources, including the EHR. Personal health records may be well suited to patients with chronic diseases who are encouraged to be active in self-care, and full access to electronic records could facilitate engagement with their providers and improve quality and safety. The most clear-cut savings resulting from HIE participation have been in reducing the cost of testing agencies that deliver test results. Practices may be unable to downsize because staff often perform multiple office tasks. Medicare and some states provide financial incentives to physicians who use health IT. Start-up costs include direct costs of hardware, software, and technical assistance, as well as the indirect costs of reduced productivity during the early stages of adoption. Privacy concerns are perceived as barriers that must be addressed early in the formation of HIE initiatives. Two decades ago, provider resistance to relinquishing patient data to a centralized database contributed to the failure of community health information networks. There is scant legal precedent to offer guidance about the liability of a physician who acts on clinical information made available in such situations. Almost two thirds of primary care physicians surveyed in cited the lack of a strategic plan as a barrier to health IT implementation. Broader HIE in the community may erode this advantage and may be opposed by those who already have effective data sharing. The lack of interoperability between proprietary EHR systems is currently a significant technical barrier encountered by communitywide HIEs, and the lack of nationally recognized standards for data codes, storage, and retrieval is one root cause. The Department of Health and Human Services has encouraged adoption of nationwide standards 68 to overcome known disagreements and competition among vendors and other stakeholders. From the perspective of the small primary care practice, however, the overall balance sheet of benefits versus barriers remains an open ledger. At this time, the barriers to adoption of HIE by small practices are significant and include financial and technical barriers as well as concerns about security breaches, liability, and competitive disadvantages. HIE leaders will need to meet these barriers with specific solutions for financial and technical support, as well as a clear and compelling vision of benefit. Financial incentives for the meaningful use of EHRs are one attempt to address the cost barrier and encourage more practices to acquire technologies that can form the basis for broader HIE. Since this literature review was concluded there has been ongoing progress in defining meaningful use and in plans for Medicare and Medicaid to provide incentive payments to eligible professionals and hospitals that are meaningful users of certified EHRs. The evidence that HIE improves the quality and safety of care is more limited, yet it is certainly reasonable for practices to conclude that speedier access to clinically useful information will benefit patient care and prevent errors. We recognize some limitations in this literature review. We used a comprehensive set of text word searches in an extensive set of bibliographic databases; however, it is possible that some publications were omitted because the term health information exchange was not used and alternative terms were not captured in our search. Finally, our search of the Internet was, by necessity, focused on the most respected and informative websites; a complete search of the web would be boundless. Previous Section Next Section Conclusion Overall, our literature review helps to identify the key issues that will need to be addressed for HIE to be broadly adopted and for the Nationwide Health Information Network to become a reality. As HIE initiatives and pilot projects proliferate, there is a pressing need for them to be formally evaluated with research methods that will provide

robust evidence about the financial impacts and actual efficiency, quality, and safety gains that are achieved. Previous Section Next Section Appendix: Databases, Search Strategy, and Process of Article Selection The literature searches included the following databases: Both teams consulted medical librarians regarding appropriate databases and search algorithms. Both searches were restricted to English-language publications between January and September A manual search of reference lists identified additional relevant publications. To further refine the search, given the large number of citations, we limited to the predetermined areas of interest, ie, barriers or obstacles and benefits. Two investigators reviewed the titles and abstracts of citations from Medline and from other databases. Duplicates were eliminated and unduplicated citations were judged for inclusion. If there was disagreement about whether the citation met inclusion criteria, the full text was reviewed and the decision to include or exclude was made by consensus. A total of 72 citations remained, with publication dates ranging from to

Chapter 3 : Systematic Review of Health Information Exchange in Primary Care Practices

Health Information Exchange offers providers and payors a window into the complete patient record. HIE offer providers services including encounter notification, a portal for querying patient medical history and encounter reporting.

Online Population Health Tool Illuminates Socioeconomic Factors Additionally, without stringent data governance guidelines , the centralized model is prone to suffering from duplicated records, especially if all participating organizations do not share a single system of identifying and tagging patient data. Centralized models may work best in areas where healthcare providers are largely users of a single HIE vendor or are especially savvy about adopting technologies that rely on industry-wide data standards. Health information exchange organizations based on the centralized model have seen success on the regional and state level. All of these communities include population health management and data analytics as part of their core missions, and have successfully used centralized HIE to provide reporting that can help providers improve quality of care and patient outcomes. The federated or decentralized model The decentralized or federated model for health information exchange eschews the single data warehouse strategy all together. Data stays at its source, giving healthcare providers control over their own patient information. Participation requires an agreement on the part of the provider to allow other organizations access to their data, which has both its benefits and drawbacks. On the plus side, this prevents some of the potential problems with privacy and security that may arise from keeping data in one large pool. It also removes the question of data ownership that has been a significant stumbling block for some health information exchanges looking to connect fiercely protective participants. As healthcare data becomes an increasingly valuable business asset to providers competing for market share and patient loyalty, the question of ownership can derail negotiations quickly. A decentralized model also ensures that the entire structure does not collapse if one healthcare provider experiences a technical difficulty. Only a small number of records would be unavailable until the problem can be resolved. The RLS manages requests between organizations, acting as a fetch-and-carry messenger for clinical data when a query is received. While this ensures that data is accessed only when necessary, it also presents difficulties in the setup and maintenance of a far-flung, interconnected web of providers with dozens of points of connection. The hybrid HIE model The most common structure for a health information exchange combines both the centralized and federated model into a hybrid structure. A centralized data repository is present, as is a record locator service. The hybrid model is the choice of the majority of Beacon Community Program participants, and has produced long-term success for many. Hybrid models, as well as centralized infrastructures, can provide several critical care coordination and population health management tools that are much more difficult to deploy in a fully decentralized system. Admission, discharge, and transfer ADT alerts, for example, require a master patient index MPI or other matching engine that can coordinate the proper delivery of the reminders without the need for action on the part of an individual provider. The hybrid structure also facilitates clinical analytics, risk stratification, and medical research by allowing the development of patient cohorts through the data warehouse. Participants can extract data from the centralized repository, add the information to their own EHR data, or track patient outcomes. The centralized model and the hybrid structure are significantly more suited to this type of advanced population health management than a fully decentralized set-up. While each type of HIE has its pros and cons, the hybrid approach balances the need for provider autonomy with the high impact of the data warehouse for significant results.