

## Introduction

When providers and patients have access to complete health information, they can make better decisions about their health, and care will be safer and more efficient. We are currently far from that ideal. Research has shown that only about 14 percent of discharge summaries reach the primary care provider within a week of a hospital discharge, and 25 percent of the time they never get there.<sup>1</sup> Although there is a growing consensus on standards for management of chronic care, only about half of all Americans receive recommended care for chronic disease.<sup>2</sup> Medication reconciliation has been a focus of safety and regulatory initiatives for the past several years. (Medication reconciliation involves making sure that all home medications are entered into the hospital record at admission, and ambulatory medications are updated at discharge.) However, in 27 leading healthcare organizations in the United States, only one-third report that medication reconciliation is always timely, complete, and accurate.<sup>3</sup> These are only a few examples of current failures in communicating the right information across settings in a timely fashion so that people get the care they need safely and efficiently.

Initiatives known as Health Information Exchanges (HIEs) are designed to solve communication problems by providing the capability to securely exchange health information across settings and among stakeholders so that quality of care is optimized and costs are as low as possible.

Interest in HIEs remains high. A straw poll of community hospital CIOs conducted in February 2008 found that 23 percent of respondents were currently participating in a multi-stakeholder HIE, and an additional 18 percent who were not participating planned to do so within a year.<sup>4</sup> According to a 2007 study, virtually all states in the U.S. are actively engaged in e-health strategies focused on utilizing information technology to improve healthcare.

- Almost 70 percent (29 of 42) of responding states believe e-health activities are “very significant.” No one rated e-health activities as “not significant”
- The top state e-health priority given by respondents was “electronic HIE adoption” (25 of 42 states) followed by “Electronic HIE Policy Development” (12 of 42 states), and “EHRs and EMRs” (9 of 42 states)<sup>5</sup>

Patients are increasingly aware of the benefits of HIEs as well. According to a 2008 CSC survey, 70 percent of Americans would be more likely to vote for a presidential candidate who supports creation of a nationwide health information network (NHIN) that gives providers access to more complete medical information electronically.<sup>6</sup>

Many efforts have started because of the increased focus on HIEs and the availability of grant funding, but a steady number of organizations are closing their doors without ever having exchanged any information. A study published in December 2007 finds that close to 25 percent of the 145 Regional Health Information Organizations (RHIOs) believed to have existed in mid-2006 are now “likely defunct.”<sup>7</sup>

- Overall, only 20 of the 145 initiatives identified were considered to be operational, at least “moderate” in size, and actually exchanging clinical data
- The most common types of data being exchanged were test results (17 of 20 initiatives), inpatient data (14 initiatives), and medication history (14 initiatives)
- Once operational, 13 efforts received regular fees from participating organizations to offset ongoing costs while eight continued to rely on grants as a “moderate or substantial funding source”

One conclusion from a study of failed exchange organizations is that most HIEs lack a viable business case. A 2008 study concluded that mature exchanges achieved viability by meeting specific business needs, e.g., more efficient delivery of hospital test results to physicians. Newer exchanges have struggled to identify and finance initial services because they do not have enough hospital participation.<sup>8</sup> The same study concluded that providers have few incentives, and in fact face substantial disincentives to share data with other organizations, and that, in general, health plans and employers were not willing to fund core clinical data exchange as a benefit for patients.

The first part of this paper reviews published experience with HIEs to extract lessons from two established exchanges and two efforts that did not succeed. The four initiatives are listed below.

The second part of the report examines case studies from two HIEs in Massachusetts.

Initiative	Details
Indiana Healthcare Information Exchange (IHIE)	<p><b>Years</b></p> <ul style="list-style-type: none"> <li>• 2004 – present</li> </ul> <p><b>Key Services Offered</b></p> <ul style="list-style-type: none"> <li>• DOCS4DOCS® Clinical Messaging Service — based on the Indiana Network for Patient Care (INPC) infrastructure</li> <li>• Quality Health First (SM) program — a clinical quality program for health and chronic disease management</li> </ul> <p><b>Comments</b></p> <ul style="list-style-type: none"> <li>• Exchange of clinical data in Indiana dates back to the launch of the Indiana Network for Patient Care in 1994, which initially provided health information from one hospital to emergency departments at three other hospitals. The IHIE was formed in 2004 as a separate non-profit entity to support the Indiana Network for Patient Care (INPC) infrastructure. IHIE services are all based upon tools and technology developed at Regenstrief Institute</li> </ul> <p>(Indiana Health Information Exchange Overview, Presentation to the Indiana Rural Health Association, November 30, 2007)</p>

Initiative	Details
Utah Health Information Network (UHIN)	<p><b>Years</b></p> <ul style="list-style-type: none"> <li>• 1993 – present</li> </ul> <p><b>Key Services Offered</b></p> <p>Administrative data exchange:</p> <ul style="list-style-type: none"> <li>• Claims</li> <li>• Remittance advice</li> <li>• Eligibility</li> <li>• Claims status</li> <li>• Enrollment</li> <li>• Credentialing/Enrollment</li> </ul> <p>(Health Policy Institute of Ohio, Ohio Hospital Association, June 12 – 13, 2006)</p> <p><b>Comments</b></p> <p>Exchange of administrative data in Utah began in an effort to reduce the cost of healthcare in the state. Now UHIN is working on rolling out a community clinical message exchange system.</p>
Santa Barbara County Care Data Exchange (SBCCDE)	<p><b>Years</b></p> <ul style="list-style-type: none"> <li>• 1999 – 2006</li> </ul> <p><b>Key Services Offered</b></p> <p>Intended to be a way for providers to electronically access patient data, across organizations. However, shortly before closing in 2006, only two organizations were providing data to end users. Data provided from the two sources included:</p> <ul style="list-style-type: none"> <li>• Lab results, clinical reports, radiology images and reports, and demographic data for hospital patients</li> <li>• Pharmacy claims eligibility information, referrals, authorizations, and Medicaid HMO enrollee demographic information</li> </ul> <p>(Santa Barbara County Care Data Exchange: Lessons Learned, California HealthCare Foundation, August 2007)</p> <p><b>Comments</b></p> <ul style="list-style-type: none"> <li>• The SBCCDE closed in late 2006, shortly after primary funding source was rescinded due to “slow progress.”</li> </ul> <p>(Santa Barbara County Care Data Exchange: Lessons Learned, California HealthCare Foundation, August 2007)</p>
MedsInfo-ED project (sponsored by MA-SHARE)	<p><b>Years</b></p> <ul style="list-style-type: none"> <li>• 2004 – 2005</li> </ul> <p><b>Key Services Offered</b></p> <ul style="list-style-type: none"> <li>• Information on patients’ medications, available as a stand-alone web inquiry or interfaced to the clinical information system in the ED</li> </ul> <p><b>Comments</b></p> <ul style="list-style-type: none"> <li>• The goal of MedsInfo-ED was to provide information on patients’ medications by connecting hospital EDs with information on medications that were paid for through insurance coverage. Since many medications are covered through insurance, the concept was to access the payer information as a supplemental source of medication information.</li> <li>• Three hospitals were included in an initial one year pilot in 2004, which was shut down in December 2005. The major reason for the lack of success was that the information on patient medications was incomplete.</li> </ul>

# Critical Success Factors for Successful Health Information Exchanges

## 1. Initiatives need to provide a clear benefit to multiple stakeholders around an existing business problem.

Simply put, participants must use the data available and the exchange must ultimately result in higher revenue or reduced costs for major stakeholders. The business plan must clearly define the problem, explain how each stakeholder will benefit, and provide specific metrics for success.

Many efforts underway today are mainly focused on clinical data exchange where financial benefits are difficult to quantify. According to the 2007 eHealth Initiative HIE survey, the top drivers for health information exchange are “improving quality of healthcare” (cited by 94 percent of respondents) and “improving patient safety” (80 percent of respondents), followed by financial and administrative drivers such as “inefficiencies experienced by providers” (61 percent) and “rising healthcare costs” (59 percent).<sup>9</sup> While patient safety and quality will always be the top priorities for health delivery organizations, addressing a specific administrative or financial problem directly tied to the bottom line can often result in more tangible benefits initially, and more organizational attention and funding.

The MedsInfo-ED project, sponsored by MA-SHARE, was one example of an effort that did not go beyond the pilot phase because of a lack of a clinical business case. The goal of MedsInfo-ED was to provide information on patients’ medications by connecting hospital EDs with information on medications that were paid for through insurance coverage. However, while medication history was available for about two-thirds of the patients queried, the insurance-sourced data did not provide a complete history since it was based on paid claims.<sup>10</sup>

Significant Driver	% of Respondents Citing
Improving quality of healthcare	94%
Improving patient safety	80%
Inefficiencies experienced by providers	61%
Rising healthcare costs	59%
Availability of grant funding	32%

(Source: 2007 Survey on Health Information Exchange, eHealth Initiative, December 19, 2007)

## 2. Grant money should be used to develop the business case and possibly initial capital outlay, not for funding operations.

Many efforts are still largely reliant on grant money. In some cases, organizations are forming simply because grant money exists. While outside funding can help to alleviate some of the upfront costs of getting started, too much reliance can lead to a situation where stakeholders actually have little invested and little incentive to focus on business value.

Even though up-front funding is widely cited as the top barrier to forming an HIE<sup>11</sup>, grant money is not a requirement for beginning to actually exchange health information between stakeholders. According to a 2008 report published in Health Affairs, 9 of the 20 operational HIEs identified for the study had “never received grant funding in any of their phases of development.”<sup>12</sup>

## 3. A critical mass of participants (payers, providers, pharmacies, etc.) is required.

Healthcare processes involve multiple providers, payers, pharmacies, and other organizations. Health information exchange is no different.

Involving more participants with initial funding of the HIE minimizes issues later on with misaligned incentives which arise when one stakeholder makes the investment while another reaps the rewards. Costs and benefits are more efficiently distributed with a wider scope of organizations providing data, financial support, and resources.

Data suggests that initiatives today are often focused on provider-centric exchanges. According to Health Affairs, the primary participants of the 20 operational HIEs identified in the study were hospitals (viewing and providing data in all but three efforts) and physician practices (viewing data in all but one and providing data in all but five). Payers on the other hand were “noticeably absent,” providing and viewing data in less than half of the HIEs identified.<sup>13</sup>

Some HIEs begin as provider-only initiatives and try to bring in additional stakeholders over time — with mixed results. In the case of the Santa Barbara County Care Data Exchange, the leaders of the initiative realized the need for a diverse group of stakeholders after the project was underway but found that shifting the governance structure midway was too disruptive.<sup>14</sup>

In Indiana, the initial data exchange began in 1994 between four hospitals, but has slowly expanded to include a wide range of stakeholders and a number of services. By 2002, the Indiana Network for Patient Care was receiving data from hospital systems, Medicare, Medicaid, private health plans, pharmacy benefit managers, and the State Department of Health.<sup>15</sup> The IHIE’s Quality Health First project, launched in 2005, included an estimated 60 percent of the primary care providers in the market, and payers accounting for over 50 percent of the covered lives in the regional market had joined by the end of 2006.<sup>16</sup>

#### **4. Focus first, then expand**

Successful health information exchange involves complex business processes, multiple stakeholders, and a number of variables. Regardless of the end goal, the initial effort should focus on a single process or related set of transactions. Demonstrating tangible benefits from even a simple service such as eligibility checking can build momentum in the community and lay the foundation for expanded capabilities in the future.

A recent study reinforces this idea. Looking at two “mature” HIEs (HealthBridge in Cincinnati and the IHIE), the authors found that in both cases, the efforts started with a narrow, transaction-based approach to health information exchange. From the outset, the focus was on identifying a service in which providers would participate and invest.<sup>17</sup>

Leaders from the California HealthCare Foundation, which provided a majority of the funding to the Santa Barbara County Care Data Exchange, noted in a Health Affairs article that one of the biggest mistakes was the decision to build and roll out the initiatives functionality “all at once.” Looking back, the authors believe that buy-in would have been better achieved through a series of smaller, successful rollouts of functionality. For example, starting simply with the exchange of lab results would have been a manageable effort — which also would have met an existing need.<sup>18</sup>

#### **5. While the HIE does not have to include EVERY transaction, it must have a critical mass of data for the transactions related to the business problem being solved.**

In order to add value for a specific transaction, a critical mass of data is essential. Coordinating the exchange of only 10 percent of the test results in a community does not add value or drive adoption; in some cases it creates an additional step. In fact, for clinical data exchange, a partial medical record can actually be more problematic than no record at all.

The major reason for MedsInfo-ED's lack of success (a project sponsored by MA-SHARE), was that the information on patient medications was incomplete. The pilot secured participation from plans representing over 65 percent of Massachusetts citizens but there were several gaps in the data. For example, information was still missing on Medicare patients who paid for their own medication (at the time of the pilot Medicare did not provide a pharmacy benefit). Massachusetts law also did not allow the sharing of information on medications to treat mental health issues, substance abuse, or HIV/AIDS.

Additionally, two of the three initial pilot sites had access to a medication profile on an electronic medical record (EMR) for patients from their outpatient practices; for some patients this was another source of medication information. Using MedsInfo-ED involved an additional step either to click an icon on the ED system screen or to access the stand-alone tool, creating an additional barrier to use.<sup>19</sup>

**6. Data should not be limited to purely “clinical” information; revenue cycle transactions such as adjudication, eligibility, and payment can provide huge value.**

Many HIEs today would be more accurately characterized as clinical health information exchanges than health information exchanges. Studies suggest that much of the focus of operational initiatives has been on exchanging clinical data such as test results and inpatient documentation with less consideration given to financial or revenue cycle transaction.<sup>20</sup>

Yet enrollment/eligibility data and claims information should still warrant consideration. These data are used in transactions required for virtually every patient and are directly tied to reimbursement. The opportunity for rapid, tangible benefits is significant.

Data Types Exchanging	% of “Operational” Initiatives
Outpatient episodes	84%
Outpatient laboratory results	76%
Laboratory	73%
Inpatient episodes (diagnoses, procedures, discharge summaries)	64%
Enrollment/eligibility	62%
Dictation/transcription	58%
Pathology	58%
ED Episodes	58%

(Source: 2007 Survey on Health Information Exchange, eHealth Initiative, December 19, 2007)

The Utah Health Information Network (UHIN) started with claims transactions in 1993 in an effort to reduce the costs of healthcare. The success of the administrative data exchange, which carries about 80 percent of the administrative claims in Utah,<sup>21</sup> has paved the way for clinical data sharing, using the existing infrastructure and a proven model for exchange in the community.

**7. The HIE should have local focus that reflects the unique makeup of payers and providers in the community.**

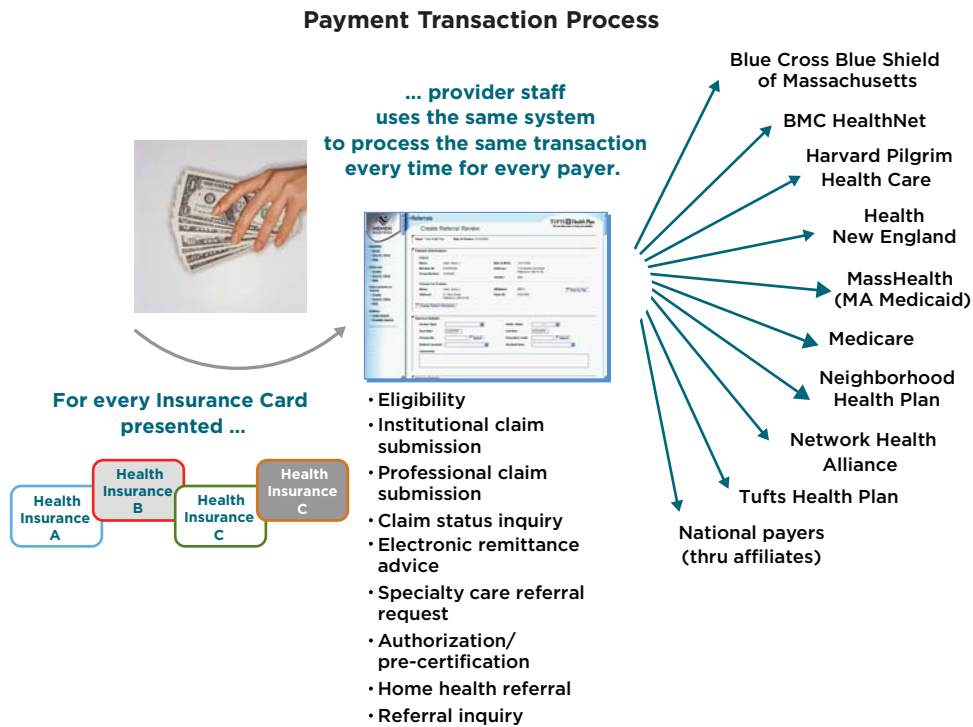
A successful HIE does not occur in a vacuum. Project leaders must not only understand the unique makeup of stakeholders in the community, but consider carefully the implications for an HIE.

In Indiana, participants have suggested that a number of unique factors about the community contributed to the IHIE's success. The Regenstrief Institute had extensive experience with electronic medical records that could be leveraged

and actually developed the clinical messaging application that was ultimately offered to the community through the HIE. According to Mark Overhage, Director of Medical Informatics at Regenstrief, Indiana's medium size also had an effect. The state has only one medical school and a few large medical communities in the immediate area, which according to Overhage, helped to limit "bickering and competition."<sup>22</sup>

**8. The HIE should have a single, open infrastructure that is sufficiently scalable to support additional transactions.**

Specific approaches to the architecture of HIEs vary. Some initiatives, such as the clinical messaging service provided by the IHIE, rely on a centralized data model where information is uploaded and stored in a single location. Others, such as the approach taken in Santa Barbara, use a federated model which allows patient data from a hospital, clinic, or lab to be maintained at the originating site



Regardless of the approach taken, the underlying infrastructure should be scalable to support future capabilities, new stakeholders, and eventually, other HIEs. This is achieved by understanding and adhering to recognized standards, such as the Healthcare Information Technology Standards Panel (HITSP) interoperability standards, both for various data types and data exchange. Initiatives that purchase commercial software for data exchange should ensure that the vendor has been certified by recognized industry bodies and commits to compliance in the future. For example, the Certification Commission for Healthcare Information Technology (CCHIT) will increasingly be incorporating interoperability in certification for ambulatory and inpatient EHR products in 2008 and 2009.

**Two Case Studies: The New England Health Exchange Network and MA-SHARE**

Two case studies from successful health information exchanges in Massachusetts illustrate some of the challenges and best practices for sustainable programs. Massachusetts has several unique features that have enhanced the success of HIEs. As noted previously, one critical factor in exchange efforts is securing the collaboration of payers as well as providers. Healthcare represents 25 percent of the Massachusetts economy, and costs of

care are about 25 percent above the national average. This creates an incentive for collaboration between employers, the state, and providers to make investments that will increase the value from healthcare. The state also has several, large, not-for-profit regional health plans that focus on local issues and can be more flexible in supporting local initiatives. In addition, the four medical schools provide a mechanism for collaboration among teaching affiliates that are also competitors in the marketplace.

## **New England Healthcare EDI Network (NEHEN)**

While most current HIEs began with the exchange of clinical data, the New England Healthcare EDI Network (NEHEN) had its origins in the more effective exchange of eligibility and payment transactions. The goal was “all-payer EDI”. The initiative began in 1998 with three health systems and two payers exchanging eligibility verification transactions. NEHEN exemplifies the principle of “focus then expand.” Capabilities were piloted and then added and by 2003 the exchange had added 14 more health systems, four more payers, four new transactions, and was interfaced with eight additional information systems. In 2007, NEHENNet, a Web-based version of the product was added so that smaller facilities without access to technical staff could take advantage of the exchange. Currently 55 hospitals, eight health plans and over 5,000 physicians use NEHEN. NEHEN also provides connectivity to Medicare, Medicaid, and national payers. The current volume is six million transactions per month. Certainly NEHEN has achieved a critical mass of participants. Today, the exchange allows participants to use one system for every payment transaction with any health plan.<sup>23</sup>

NEHEN is a member-owned, non-profit organization. NEHEN tiers the fees based on the organization’s size to keep the billing process efficient and to equitably tie contributions to value received from the exchange. There are no transaction fees, just a flat monthly participation fee. The flat monthly fee encourages the participating organizations to use all of the available features and functions for administrative transaction exchange. The organization has been self-sustaining for a decade and has continually invested in developing new capabilities. With the use of the NEHEN exchange, organizations are able to reduce their administrative transaction fees to pennies.

The business case for NEHEN members is clear. The administrative transactions are a business necessity, and electronic transactions are more accurate, timely, and efficient for both the provider and the payer. Partners HealthCare, one of the founders of the NEHEN, saw their e-commerce transactions increase tenfold between 2001 and 2007. At their two largest hospitals, the write-off rates as a percentage of revenue dropped from about 4 percent in 2001 to a little over 1 percent in 2008. Accounts Receivables (AR) days dropped to 55 days from 70 - 100 days.<sup>24</sup> At Children’s Hospital Boston, efficiency improved from three collection representatives working on only high outstanding balances before NEHEN to two people following up on all outstanding accounts. In addition, days in AR decreased.<sup>25</sup> Community hospitals have seen a savings as well. Newton-Wellesley Hospital found that using NEHEN for claims processing saved one hour per payer per day.<sup>26</sup>

## **MA-SHARE**

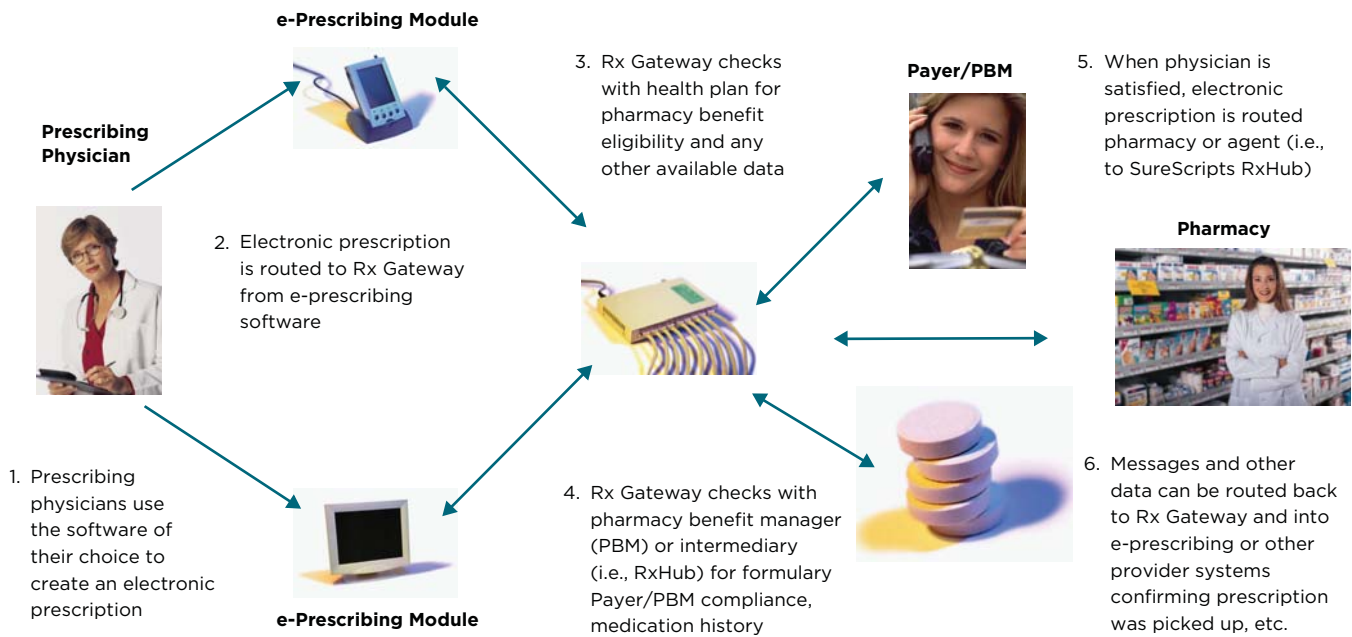
Another HIE in Massachusetts, MA-SHARE, was developed by the Massachusetts Health Data Consortium starting in 2003. The mission of MA-SHARE is to create a community utility that offers a portfolio of services to efficiently share clinical data across stakeholders.

The MedsInfo-ED effort described earlier was the first project run by MA-SHARE. Though the pilot was shut down in December 2005 due to insufficient data being available from claims-based sources, the lessons learned from the project provided the foundation for the initiatives underway today.

Currently, MA-SHARE is sponsoring the Rx Gateway that leverages the NEHEN infrastructure to provide a single point for eligibility and benefits checking,

formulary, prescription history, and connection with pharmacies and PBMs. Massachusetts already has a high rate of adoption of e-prescribing. In fact, it is now reported to have the highest percentage use of e-prescribing in the country. With Medicare headed toward e-prescribing, the volume will definitely increase. The value of the Rx Gateway is simplification of the connection between the prescriber's system and the payers, pharmacies and PBMs providing a wide range of e-prescribing data and services. It was launched in November 2006 and currently serves more than 800 active prescribers, delivering 40,000 electronic prescriptions per month using the workflow illustrated below.

### E-Prescribing Workflow through Rx Gateway<sup>27</sup>



The Rx Gateway has taken the “focus first, then expand” approach. The initiative began with new electronic prescriptions for one large health system. Since then, the scope and participation have grown to include another large health system, plus eligibility and benefits checking, formulary, and medication history. Planning for prescription renewals and expanded medication history are in the works.

Use of e-prescribing has many benefits, including avoiding errors due to misinterpretation of handwritten prescriptions, more timely communication of prescriptions (so that the medicine can be waiting for the patient at the pharmacy), and easier compliance with formulary — saving money for both patients and payers. E-prescribing also provides time savings within the practice. At one large primary care facility, use of the Rx Gateway reduced the number of “call-in prescriptions” from 350 per day to 80. They found that the prescriptions were delivered rapidly, and they could easily track the status of a prescription. They estimate that because of the increased efficiency they save the equivalent of three FTEs.<sup>28</sup>

MA-SHARE is also piloting a solution for timely delivery of clinical documents among payers, providers, and quality organizations. They began with a pilot to communicate hospital discharges and ED discharge summaries from two academic medical centers to three physician groups. The pilot proved what it set out to prove — that it is feasible to use a NEHEN-like infrastructure to deliver clinical documents from any healthcare entity to any other healthcare entity. After a successful pilot, the next steps under consideration are EMR integration where messages are received directly into EMRs and delivery of clinical information to payers.

## **The Bottom Line**

Many lessons can be gleaned from the experience of other initiatives across the country, but these lessons must be understood in the context of the local market conditions. The unique characteristics of the community ultimately dictate what will be optimal. Based on our experience and review of successful health information exchange, we believe the following considerations lead to success:

- Start health information exchange with a focused initiative that has a clear business case and the infrastructure to expand
- A critical mass of data sources and stakeholders required for the specific problem being solved is essential
- While many efforts focus on clinical issues, administrative or financial data exchange can often provide faster, more quantifiable benefits initially
- Success with a targeted health information exchange can build momentum in the community and pave the way for new services and additional participants
- An open, scalable architecture enables efficient expansion of functionality and services

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