
Exploring Business Strategy in Health Information Exchange Organizations

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EXECUTIVE SUMMARY

Unlike consumer goods industries, healthcare has been slow to implement technologies that support exchange of data in patients' health records. This results in avoidable medication errors, avoidable hospital readmissions, unnecessary duplicate testing, and other inefficient or wasteful practices. Community-based regional health information exchange (HIE) organizations have evolved in response to federal aims to encourage interoperability, yet little is known about their strategic approach. We use the lens of institutional and strategic management theories to empirically explore the differences in business strategies deployed in HIEs that are, to date, financially sustainable versus those that are not.

We developed a 20-question survey targeted to CEOs to assess HIE business strategies. Our sample consisted of 60 community-based exchanges distributed throughout the United States, and we achieved a 58% response rate. Questions centered on competitive strategy and financial sustainability. We relied on logistic regression methods to explore relationships between variables.

Our regression identified characteristics common to sustainable organizations. We defined sustainability as revenues exceeding operational costs. Seventeen of the 35 organizations (49%) defined themselves as currently sustainable. Focus and cost leadership strategies were significantly associated with sustainability. Growth strategies, which were much more common than other strategies, were not associated with sustainability. We saw little evidence of a differentiation strategy (i.e., the basis of competition whereby the attributes of a product or service are unmatched by rivals). Most CEOs had a relatively optimistic outlook, with 60% stating they were confident of surviving over the next 5 years; however, nearly 9% of the organizations were in some phase of divestiture or exit from the market.

HIEs are evolving differently based on local leadership decisions, yet their strategic approach is isomorphic (or similar). Further insight into successful business strategies could help ensure the long-term survival of HIEs.

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INTRODUCTION

Health information exchanges (HIEs) are organizations devoted to electronically transferring patients' medical data (such as records, images, test results) between providers to improve the delivery of care. HIEs evolve in one of two ways: (1) as private extensions of the electronic health record (EHR) systems of hospitals and integrated delivery networks (IDNs) and (2) as independent, regional, community-based organizations. Given the financial difficulty of being a stand-alone organization, this latter type is of particular interest.

Costs, medical errors, and a lack of care coordination between facilities have risen to dangerous levels in the U.S. healthcare economy (Institute of Medicine, 2001; Patel, Kaufman, & Arocha, 2002). Multiple health policy initiatives have been designed to improve the overall delivery of healthcare, but few have garnered as much momentum as policies surrounding health information technology. Technology and system interoperability are seen as a solution to these issues. In fact, the U.S. Department of Health & Human Services (whitehouse.gov, 2014) estimates nearly \$9.6 billion in projected expenditures for information technology.

To improve the quality of care, providers could share patients' clinical data, which would enable them to access historical records of treatments, tests, and diagnoses. However, on their own, hospitals and physicians' offices have been slow to adopt such interoperable technology. A series of federal initiatives has aimed to improve interoperability. In April 2004, President Bush issued Executive Order 13335

establishing the position of National Coordinator for Healthcare Information Technology (HIT) to facilitate widespread adoption of EHRs and to exploit resultant gains in population health. In a letter to the Secretary of Health & Human Services, then-coordinator for HIT David Brailer (2004) translated the president's vision into strategic goals that serve as the impetus for technological implementation today.

The HIT vernacular has grown and evolved, but the concepts remain unchanged. These concepts include bringing electronic tools to physicians, connecting physicians by means of HIEs, and creating tools for the advancement of public health surveillance (Blumenthal & Glaser, 2007; Brailer, 2004). The American Recovery and Reinvestment Act and the Affordable Care Act provided historical funding for HIT to stimulate technology and interoperability. However, little is known about whether these efforts are materializing as planned.

The potential benefits of electronically sharing patient health information have been well documented (Walker et al., 2005). Some of these benefits are improved care coordination, reduced duplication of tests and scans, and improved efficiencies. Yet barriers and inconsistencies continue to plague the path toward interoperability. According to Burt and Sisk (2005), recurring attempts to implement an electronic network of patient health records have not dramatically altered the use of information tools such as electronic records and exchanges.

Because hospitals and physicians' practices have been slow to adopt

collaborative and interoperable technologies, private HIEs have developed as stand-alone community-based organizations. While some hospital IDNs have developed their own internal private exchanges, the community-based exchanges are of importance with respect to extending care to the entire community. Our research is concerned with these HIE organizations, defined as independent (not hospital-based) organizations that both mobilize and share patient information between providers, clinics, and hospitals. When HIEs are established, many strategic choices must be made. In particular, decisions need to be made about services to offer, prices to set, markets on which to focus, and ways to achieve a superior competitive position in each community. The aim of this research is to explore the types of business strategies in use by HIEs nationally, and to explore differences in strategies used by sustainable versus unsustainable organizations.

BACKGROUND

Adler-Milstein, Bates, and Jha (2013) conducted a large national survey to gather information about operational characteristics of HIEs; they concluded that while rapid growth in exchanges is occurring, the long-term sustainability of these organizations is doubtful. Other research has shown that the barriers and challenges to information exchange persist, and without new approaches and strategies, the viability of HIEs is doubtful (Langabeer & Champagne, 2013; Vest & Gamm, 2010). However, a dearth of research exists regarding the strategies and sustainability models for HIEs.

Theories about organizational development help explain how organizations are conceived, grow, and mature through their life cycles. One specific set of theories contends that forces called institutions (such as laws, government, and even culture and norms) exert a powerful influence on organizations that have a similar intent and environment; consequently, organizations are similarly shaped by these forces and tend to develop homogeneous strategies (Scott, Ruef, Mendel, & Caronna, 2000). This process is referred to as isomorphism in institutional theoretical terms (DiMaggio & Powell, 1983). Younger organizations tend to exhibit some diversity in approach and novelty in their strategies, but external forces tend to cause homogeneity by the time these organizations reach maturity. As a result, most products and services (and the organizations themselves) are relatively indistinguishable from one another. For example, in many respects, one community hospital in a rural community looks remarkably similar to another; they offer similar patient services, similar parking arrangements, and similar facilities and equipment.

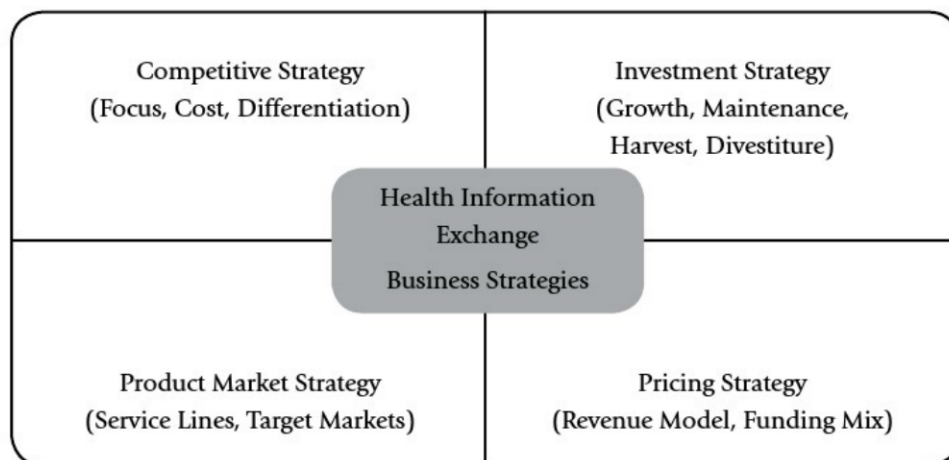
Strategic management theory also provides perspective on our research (Aaker, 1998; Porter, 1980). Issues of strategy are largely the domain of the organizations' CEO. Key strategic decisions include those pertaining to markets on which to focus, products and services to offer, types of revenue models to implement, and other areas of strategic focus. Business strategy consists of four key subtypes: competitive, investment, market, and pricing (Aaker, 1998). The most commonly

discussed in the literature are competitive strategies. Porter (1980) defined three generic competitive strategies that executives adopt to achieve competitive, defensible positions in the market: cost leadership (i.e., being the most efficient relative to competitors), focus (i.e., targeted concentration on a specific niche), and differentiation (offering unique services to customers). Investment strategies define whether an organization is growing or shrinking its portfolio and organizational reach. Market strategies include a focus on service lines offered and target markets. Finally, pricing strategy concerns itself with how revenue will be generated (based on payer mix and type), the level of pricing for services, and how to charge (e.g., monthly subscription, transactions, annual membership). Figure 1 shows the strategic framework for our research.

Using these theoretical perspectives of institutional and strategic manage-

ment theory, we centered our research question on the extent of isomorphism (or similarity) existing in HIEs from a strategic perspective. Because institutional theory of organizations suggests that external forces and similarities of purpose drive organizations toward isomorphism, we hypothesize a high level of similarity in strategies overall. Yet, anecdotal evidence suggests that HIEs are evolving heterogeneously. Billions of dollars have been infused into community HIEs for a common purpose and intent; however, few studies have examined the extent to which they share similar strategies or approaches. Establishing a better understanding of success in HIEs is essential to improve the odds of achieving interoperability. To address these gaps and improve our understanding of the strategies being deployed by HIEs, we conducted a nationwide survey of the largest organizations in the United States.

FIGURE 1
Environmental Market Conditions: Degree of Competition, Engagement by Stakeholders



METHODS

Our target respondent was the organization's CEO because he or she is in the best position to assess the organization's strategic direction and performance. We chose survey research methods to ensure that the primary data collected would accurately reflect the strategies being deployed by the CEO, along with the relevant assumptions used to make these decisions. These assumptions include the perceived level of competition that an organization faces and customers' (stakeholders') engagement or interest levels.

We developed a 20-question survey regarding the strategic models defined above. We explored each model by asking specific questions about the strategies deployed. In addition, we collected demographic data, such as organizational age and CEO tenure. We piloted the survey with two CEOs from HIEs to ensure accurate wording and understanding of questions. We revised the survey accordingly.

Sample and Inclusion Criteria

We systematically selected a sample of 60 exchanges with a high number of records in their master patient index (MPI) (most containing more than 500,000 records) from a master list of all 200 operating HIEs in the country. This list was assembled by means of a web search of the U.S. Department of Health & Human Services Office of the National Coordinator for Health Information Technology (ONC) (2015). ONC's state cooperative grant program website records all HIEs that applied for and received funding from this well-funded mechanism. We used this listing

as an important gauge of the organization's legitimacy. Nearly all community-based HIEs serving regions rely on this funding to launch their organizations because they cannot depend on internal funding from a private, IDN-based exchange. We entered the names of these organizations in alphabetical order in a spreadsheet, and we recorded basic demographic information about location and approximate size using a web archival analysis. Of the approximately 200 operating exchanges, we focused on the largest because they tended to have full-time (nonvolunteer) staff and a CEO, and we chose 60 organizations for our sample. All members of the sample met the following criteria: large regional area, community-based, full-time staff, and nonprofit.

We developed the survey using a web-based survey tool and sent it via e-mail to the CEOs of record. E-mails for 20 of the organizations were rejected, and phone calls were made to identify the appropriate respondent and obtain his or her contact information. The final response rate was 58% (i.e., 35 CEOs completed the survey).

Primary Dependent Variable

For our primary dependent variable, we wanted to use a measure of financial performance. In our archival analysis and initial assessments, we discovered that most HIEs did not track profitability in any common way because many existed only as a result of grant funding; therefore, any excess revenue over expenses was not the result of operating revenue. We decided to use the CEO's perception of the organization's current sustainability as our dependent variable.

Specifically, our survey asked CEOs whether their organization was currently financially sustainable (defined as revenue exceeding operating costs). We also asked if they felt their organization would be sustainable in 5 years.

Independent Variables

Independent variables included the CEO’s perception of the generic strategy (i.e., focus, cost leadership, and differentiation) used by the organization. Respondents selected the strategy used most often by their organization. For market investment strategy (i.e., growth, maintenance, harvest, divestiture), respondents had to select the strategy that best represented their organization’s strategy. We further examined focus and differentiation by including variables that assessed the number of services offered (such as laboratory reporting, query-based tools, direct messaging). The regression included variables for degree of competition (based on the responding CEOs’ average score) and

perceived engagement by customer stakeholders. We computed descriptive statistics on all key variables. Table 1 shows the variables, survey questions and statements, and coding used for each variable in the regression model.

RESULTS

The survey yielded important findings about HIE organizations. Thirty-five CEOs responded to the national survey. The average age of the organization was 4.8 years, with a standard deviation of 1.93 years and a range from 1.5 years to 10.6 years. The average tenure of the respondent was 4.2 years, with a standard deviation of 3.8 years. Most of the HIEs were fairly large, with an average patient population in the market of 4 million people (range, 20,000 to 7 million). We found no significant differences in size or geography between HIEs that responded and nonrespondents.

We found that, overall, CEOs believed that the 5-year outlook for their organization’s sustainability was quite high (4.66

TABLE 1
Survey Variables and Questions

| Variable | Survey Question or Statement | Coding |
|--|--|--|
| Sustainability | Is your organization currently financially sustainable (i.e., does revenue generated cover operational costs)? | 1 = yes, 0 = no |
| Competition (Environmental Market Condition) | Rate your level of competition (from hospital services or other HIEs) | 5-point Likert scale: 1 = none, 5 = extreme |
| Engagement | Rate your level of interest by and engagement with customers and stakeholders | 5-point Likert scale: 1 = none, 5 = extreme |

| Variable | Survey Question or Statement | Coding |
|----------------------|---|---|
| Investment Strategy | <p>Which of these strategies best represents your organization's strategy?</p> <ul style="list-style-type: none"> • Growth strategy: increase sales and market share • Maintenance strategy: maintain existing market share • Divestiture strategy: preparing for an exit or shutdown of organization • Harvest strategy: focus on increasing prices and profits in the short-term • Unsure which strategy we are pursuing | <p>Forced single response from five choices provided: 1 = yes, 0 = no</p> |
| Competitive Strategy | <p>Which one of the following generic business strategies do you feel your organization utilizes?</p> <ul style="list-style-type: none"> • Cost leadership: providing low-cost HIE services • Focus: providing HIE services targeted to specific diseases or providers • Differentiation: providing unique services to customers • None of these | <p>Forced single response from four choices: 1 = yes, 0 = no</p> |
| No. of Patients | <p>What is the total number of patients in your master patient index?</p> | <p>Actual number</p> |
| No. of Services | <p>Which of the following service offerings do you provide? Select all that apply.</p> <ul style="list-style-type: none"> • Directed exchange • Query-based exchange • Population health analytics • Routing of clinical summary data • Continuity of care exchange • Quality reporting • Disease and laboratory reporting • Other services | <p>Number of selections (maximum = 8, minimum = 0)</p> |

on a scale from 1 ["definitely not likely"] to 7 ["definitely sustainable"], despite the fact that 51.5% responded that they were not currently financially sustainable. Few CEOs stated that they were likely to be replaced by another HIE or a hospital-based system (mean score, 2.5 on 1–7 scale). This finding is slightly lower than the relatively low level of perceived competition in the market (2.77 on a 1–5 scale). These results suggest some degree of confidence in the future outlook of their organizations and limited concern about competition from IDNs or other competitive exchanges.

We found some notable differences between the sustainable and nonsustainable groups. Sustainable organizations offered statistically significantly fewer services than nonsustainable organizations (mean, 4.5 versus 5.2) and were significantly larger (mean, 6.2 million patients in the MPI versus 2.8 million patients). Perceived engagement by stakeholders was also higher in sustainable organizations, and perceived competition in the market was lower. Table 2 presents the descriptive characteristics of the two groups.

When asked about market investment strategy, 29 CEOs (83%) indicated

they were pursuing a "growth" strategy (defined as expanding sales and customers). Only 3 CEOs (8.6%) in the sample said they were in a "maintenance" phase (i.e., keeping current clients satisfied). Interestingly, 3 of the 35 CEOs (8.6%) stated they were following a "divestiture" strategy (preparing for shutdown or closure). If we were to extrapolate this result to the entire population of approximately 200 HIE organizations, 17 could be in the shutdown phase at the national level.

Generic business strategies focused on attempting to show differentiation in services between those of their organization and those of others in the market ($n = 19, 54.3\%$). Eleven respondents (31.4%) indicated they used a "focused" strategy, tailoring their services to specific markets, and five respondents (14.3%) indicated they followed a strategy of cost leadership or efficiency.

When given choices of eight potential service offerings, the CEOs responded that they provided an average of 5.2 service lines in nonsustainable organizations and 4.5 in sustainable HIEs. Only four respondents (11%) stated they were targeting or tailoring their services to specific markets (three of these were to

TABLE 2
Descriptive Characteristics of Sustainable and Nonsustainable Health Information Exchanges (HIEs)

| Group | <i>n</i> | Mean No. of Services (Maximum = 8) | Mean No. of Patients in HIE | Mean Age of HIE, Years | Mean Competition (1 = None, 5 = Extreme) | Mean Engagement (1 = None, 5 = Excessive) |
|----------------|----------|------------------------------------|-----------------------------|------------------------|--|---|
| Sustainable | 17 | 4.5 | 6,268,824 | 4.7 | 2.7 | 3.1 |
| Nonsustainable | 18 | 5.2 | 2,334,502 | 4.9 | 2.8 | 2.9 |

the “safety net” providers and one was to “emergency care” providers).

Most organizations in our sample are attempting to achieve critical mass and sufficient scale to maintain momentum and ensure survivability. Twenty-four HIEs (69%) have adopted a participation or subscription fee structure generated from a wide variety of stakeholders (providers, payers, health-care systems). Only one organization (2.9%) indicated that its primary revenue from customers was generated from pay for performance. Unlike a federated model in which HIEs do not store patient medical records, but respond to on-demand queries, most HIEs (72%) adopted a centralized data repository for patient records or a hybrid of the two approaches. In addition, most HIEs (64%) adopted a patient opt-out approach.

The logistic regression model included 11 independent variables, with the binary dependent variable of current sustainability. The final model indicated that three variables were statistically significant: a focused competitive strategy, cost leadership, and community engagement. The final regression model had $\chi^2 = 19.729$, $df = 10$, and $p = .032$. The Cox and Snell $R^2 = .431$, suggesting a strong fit in the final model. Table 3 shows the summary regression results.

DISCUSSION

The results of our survey show similarity in most aspects of the overall business strategy of HIEs, such as a common focus on growth and on serving all market segments. The environmental market conditions for community engagement were statistically significant,

TABLE 3
Logistic Regression Results

| Variable | β | Standard Error | Wald χ^2 | p Value ^a |
|--------------------------|---------|----------------|---------------|------------------------|
| Competition | .325 | .607 | .286 | .593 |
| Engagement | 2.276 | 1.207 | 3.558 | .049 |
| Growth Strategy | -7.403 | 6.328 | 1.369 | .242 |
| Maintenance Strategy | -10.889 | 6.832 | 2.531 | .112 |
| Divestiture Strategy | -9.189 | 6.932 | 1.757 | .185 |
| Harvest Strategy | .000 | .000 | .000 | .913 |
| Cost Leadership Strategy | 3.980 | 2.087 | 3.636 | .047 |
| Focus Strategy | 4.424 | 1.791 | 6.098 | .014 |
| Differentiation Strategy | .000 | .000 | .000 | .814 |
| Number of Patients | .000 | .000 | .015 | .903 |
| Number of Services | -.563 | .378 | 2.215 | .137 |

Note. $N = 35$.

^aBoldface = statistically significant at 95%.

but perceived level of competition did not have a noticeable impact on sustainability. A common saying is that organizations cannot be “all things to all people.” Yet, our survey findings showed that most HIEs tried to serve all types of providers, and they offered many types of services in their defined geographic regions. Few organizations defined only a small subset of services as their primary offerings, and we found little evidence of a specific target market (such as emergency medicine, chronic care, safety nets). Although HIEs will likely have to offer services to all market segments in the long run, a more targeted strategic focus could improve initial sustainability and outcomes.

The isomorphism we observed is problematic because it is contrary to strategic management theory that requires leaders to make difficult choices for competitive success. Lafley and Martin (2013) identify two key factors for any organization’s success: knowing which markets to serve and knowing how to win. In our review of the strategic components outlined in formal documents (operating budgets, organization charts, and business plans), HIEs generally appear to be avoiding the difficult decisions necessary for success and, in this regard, their strategic models are highly isomorphic.

CONCLUSIONS

This research is one of the first to explore the business strategies used by HIEs. Through a national survey of CEOs, we found that deployment of a cost leadership strategy or a tightly focused competitive strategy was positively associated with financial sustainability, whereas

differentiation of service offerings was not. We also found that a growth-oriented investment strategy was not related to sustainability, despite the fact that most organizations are pursuing growth as a primary objective. A large number of community HIE organizations are attempting to strategically identify and navigate a path toward long-term sustainability. The percentage of organizations that will exist and thrive in the next decade is difficult to determine, although we found that 9% of the sample were exploring divestiture or shutdown in the foreseeable future. The exact characteristics of the most competitive, value-based organizational and technical models are equally difficult to ascertain. With little federal direction, and each resource-constrained organization attempting to create its own infrastructure and direction, it is highly likely that some organizations will thrive while many (or even most) might fail.

Practitioners (i.e., executives and board members) in HIEs can use this research to better understand successful strategies. In making their own strategic choices, they should consider using balanced scorecards or other strategy-setting tools (Inamdar & Kaplan, 2002). Improved performance could lead to long-term sustainability, better community outcomes, more coordination of care, more efficient interorganizational collaboration, and overall higher-quality outcomes for the community at large.

The implications for future research are clear. Few studies have been conducted on the use of information technology in healthcare and specifically collaboration technology that facilitates exchange between healthcare providers.

Academic studies can help to define and measure the value these organizations are creating, and offer ways of improving components of the organizational model. Little research exists today, and the literature that does exist is largely anecdotal and limited to a single site. A longitudinal assessment of HIE performance is one possible future study. We hope that future research on strategy and outcomes of interoperability focuses on the organizational level and how HIEs can evolve more effectively in their local markets.

On the basis of these results, we surmise that greater emphasis should be placed on strategies (such as focusing on growth and adding to the products and services offered) and enhanced sharing of best practices between successful exchanges. The variation in models represents local adaptation, but it also poses a significant threat to the overall path toward interoperability. Organizational theory suggests that the “planned change” of what was intended as outcomes of HIE investments has been morphed by the “adaptive change” to the reality of sustainability and local market barriers. Absent stronger direction from policymakers at the time of the large stimulus investments from the Health Information Technology for Economic and Clinical Health (HITECH) Act, and with little prescriptive assistance, compressed timelines, and lack of known best practices, HIEs evolved in many ways with a myriad of outcomes. The policy implications of this research suggest a need for additional funding or other policies to ensure community HIE survival. Consideration also should be given to other structural mechanisms to

support interoperability if HIEs become unsustainable. If regional HIEs do not survive, the significant healthcare system-wide implications of their failure will have to be addressed at the federal level.

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PRACTITIONER APPLICATION

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As the delivery of healthcare continues to move from disjointed episodic care toward coordinated accountable care, the ability of healthcare providers to share patient health information is becoming increasingly important. Improved care coordination, reduced duplication of tests, and improved patient safety are a few of the potential benefits of shared electronic health records (EHRs). Nonetheless, healthcare providers have struggled to achieve the interoperability between EHR systems needed to deliver this promise.

Langabeer et al. identified focused competitive strategy, cost leadership, and community engagement as significant variables associated with the financial sustainability of community health information exchanges (HIEs). The importance of community engagement is clear. One challenge consistently noted in studies of community-based HIEs (Health Information and Management Systems Society [HIMSS], 2013a, 2013b; Morrissey, 2013) is the difficulty convincing fierce competitors to share information for the benefit of the community. In this light, the authors' discovery that lower market competition is associated with higher stakeholder engagement and financial sustainability is not surprising.

While a focused competitive strategy and cost leadership make practical sense, crisp execution is critical. Community HIEs, like any other business, can only survive if they provide value that their members are willing to pay for. All else being equal, an HIE organization that focuses on the needs of its members and meets its

commitments to deliver a cost-effective technical solution is more likely to build the trust and commitment required for long-term success than is an organization that fails to meet these objectives.

Private HIEs do not face the same challenge as community HIEs with respect to community engagement. In the face of shifting reimbursement models, integrated delivery networks have the necessary incentives to share patient information to support the efficient coordination of care. This is a key reason why private HIEs are growing faster than community HIEs (HIMSS, 2014).

The Baylor Scott & White Quality Alliance (BSWQA) is actively developing a clinically integrated organization of employed physicians, independent physicians, hospitals, and other providers to improve quality and reduce the overall cost of care for the patients and communities served. The deployment of an HIE solution that enables sharing of patient information across the many disparate EHR systems in use across BSWQA has been a substantial investment priority for Baylor Scott & White Health. The financial budgeting and control processes within the organization have been effective in ensuring the focus and cost-effectiveness needed for success.

Selecting and deploying the right technology are a critical part of the value proposition for any HIE. A key lesson from our initial HIE efforts at Baylor Scott & White Health was the importance of integrating the solution into the clinical workflow. We found that the need to open a separate application in a new window outside the resident EHR to search for patient records was a significant barrier to use of the HIE. The technology eventually selected for deployment across the BSWQA included a solution for this problem.

Even with full financial support, membership commitment, and the right technology, full implementation of an HIE is a multiyear journey because it requires integration of every EHR system used in the network. Connection with community-based HIEs will also be necessary to gain full access to the patient's health records for population health management.

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