

Evaluation of the State Health Information Exchange Cooperative Agreement Program

Case Study Report:

Experiences from Washington State in Enabling Health Information Exchange (HIE)



at the UNIVERSITY of CHICAGO

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“[In thinking] about the collision between tech speed and healthcare speed... if you spend four years building a big, heavy weight [technology system], by the time you’re finished with the problem you meant to solve the world has passed you by. You can already sense things happening a little faster... We are going to have to be able to respond.”—*OneHealthPort Leadership*

Report Summary	
Intervention and Setting	<p>On November 29 and 30, 2011, the NORC State HIE evaluation team conducted a formal site visit of the state of Washington’s Program (HIE Program) and met with HIE stakeholders in Seattle, Olympia, and Tacoma. The primary goals of the site visit were:</p> <ul style="list-style-type: none"> • To understand state implementation experiences with respect to governance and accountability, enabling services for HIE, and establishing trust and sustainability • To identify common enablers, barriers, and challenges to HIE • To understand provider perceptions and experiences with HIE • To generate “lessons learned” around engagement with large health systems • To learn about the use of innovative models for HIE
Data Collection and Target Population	<p>During the site visit, NORC held discussions about Washington’s HIE efforts with representatives of the following groups:</p> <ul style="list-style-type: none"> • State Health Information Technology (HIT) Coordinator and the Health Care Authority team • OneHealthPort (lead technology organization/state designated entity) • Foundation for Health Care Quality (community oversight board) • State agencies (Medicaid Office, Department of Health) • Local health plans (Group Health Cooperative, Regence Health) • Providers (MultiCare Health System, SeaMar Community Health Centers, PTSO of Washington) • Laboratories (Pathology Associates Medical Laboratory) • Washington and Idaho Regional Extension Center (WIREC) • Industry stakeholders (Epic Systems) • National Renal Administrators Association (NRAA)
Key Take-Aways	<p>Washington's success relies upon:</p> <ul style="list-style-type: none"> • Maintaining “light infrastructure” • A governance model that clearly delineates roles and responsibilities • Responsiveness to market needs • Long-standing relationships, expertise, and a collaborative environment • Private organization operating in the public interest

Introduction

Efforts to establish health information exchange (HIE) services have been underway in the United States (U.S.) for over twenty years with the goal of increasing the quality and efficiency of health care. These efforts have proven difficult in a constantly evolving market in which demand has shifted from one stakeholder group to another and one HIE solution to another. Moreover, challenges surrounding technology costs, interoperability, stakeholder engagement, and support exert pressures that many budding HIE initiatives cannot withstand. Early HIE efforts succumbed to these pressures, including the Community Health Management Information Systems (CHMIS) Program in 1990, which attempted to create a regional centralized data repository;¹ and Community Health Information Networks (CHINs) in the mid-1990s, which focused on provider-level information sharing.² Recently, a more diverse generation of HIE models has begun to emerge, in which trading is led by hospital systems developing internal exchanges, health information organizations (HIOs) gathering local partners, organizations using Direct³ to exchange point-to-point, or private software or technology companies meeting large-scale market needs.

Progress in this arena has intensified due to passage of the American Recovery and Reinvestment Act and Health Information Technology for Economic and Clinical Health (HITECH) Act in February 2009, which created unprecedented new funding and incentives for HIE and the adoption of electronic health records (EHR).⁴ In August 2009, the Office for the National Coordinator of Health IT (ONC) issued a funding opportunity announcement (FOA) for the State HIE Cooperative Agreement Program (HIE Program), announcing that the agency would distribute \$564 million to states and territories to enable HIE. By March 2010, 50 states and 6 territories (hereafter “states”) received initial awards to plan and establish their programs.⁵

The Program Information Notice (PIN)-001, issued in July 2010, further clarified the program requirements, notably emphasizing market-based approaches and engagement with key stakeholders as well as enabling trust, building sustainability, ensuring consistency with national standards, and monitoring and tracking Meaningful Use (MU) requirements as they pertain to the exchange of health information.⁶ Eager to understand the effects and implications of the State HIE Cooperative Agreement Program, ONC has contracted with NORC at the University of Chicago (NORC) to conduct a multi-year evaluation of the program, including case studies of five “innovator states.” Washington has made significant and innovative advances developing the leadership and technical infrastructure to support HIE. As such, it may provide important insights to other states engaged in or planning exchange activities. Table 1 provides a brief overview of the major players in Washington State HIE.

Key Factors That Influence HIE in Washington State

Geographical and population characteristics are among the determinants of state needs and strategy to enable HIE activities. With a population of 6,724,540, Washington is the 13th most populated state in the country, though approximately 16 percent of the population is rural.^{7,8} Washington has several urban centers with high patient volume and an average population density of 101.2 per square mile. Providers in the city often see patients at different locations and not necessarily in the same health systems. Because the state also has rural and frontier areas, providers see patients who travel long distances to access care and do not necessarily bring their medical records with them.

Washington has a mixed market of small physician practices and large health systems. According to an annual national survey of physician practices, approximately 93 percent of practices in Washington have less than 10 physicians and 47 percent of practices consist of a single physician. In contrast, large practices of 20 or more physicians make up only 2 percent of medical offices in the state.⁹ Sharing the market are large hospital and health systems, such as Group Health Cooperative (Group Health), Swedish Medical Center, and the University of Washington system, which are prevalent in the state and are major drivers of technology demand. Washington has also seen the creation of accountable care organizations (ACOs), healthcare organizations characterized by a payment and care delivery model that ties provider reimbursements to quality metrics and reductions in the total cost of care for an assigned population of patients. To develop ACOs, hospitals are planning to align with affiliated and unaffiliated doctors, and to create their own information exchange systems and data repositories. Although the magnitude of their influence is unclear at present, these organizations are likely to affect the local market for technology in the coming months and years.

Table 1. Background on Washington State HIE Activities

Washington State HIE	
Funding Amount	\$11,300,000
Population Size	6,724,540
Recipient Organization	Healthcare Authority (HCA)
State Designated Entity (Lead Organization)	OneHealthPort (OHP)
Strategic and Operational Plan Approval Date	12/10/10
ONC Strategic Model Classification¹⁰	Orchestrator/Public Utility*
Technical Model	Thin layer model consists of a hub and a translation service
HIE Vendor	Axway
Predominant EHR Vendor	Epic
Regional Extension Center (REC)	WIREC
Beacon	Inland Northwest Health Service (INHS)

*The Orchestrator/Public Utility Model, as defined by ONC, describes states wherein “statewide HIE activities are providing a wide spectrum of HIE services directly to end-users and to sub-state exchanges where they exist.”

Although EHR adoption varies depending on the local health care and health IT markets, on average, Washington providers’ rate of EHR adoption in ambulatory practices is significantly higher than the national average (57 percent). The most recent data finds 75 percent of office-based physicians use an EHR system.¹¹ EHR adoption in hospitals is 41 percent, which is higher than the national average of just under 35 percent.¹² Large health systems, like Group Health who have already invested in EHRs and HIE solutions, are looking to expand their use of electronic-based health solutions, some through state-led and others through private HIE initiatives, HIOs, or data repositories. In Washington, Epic holds a large share of the EHR market but there are other vendors for providers to choose from, including Allscripts, eClinicalWorks, eMDs, GE, Greenway, NextGen, and Pulse.¹³

HIE efforts within the state began in the 1990s with the Hartford Foundation’s Community Health Management Information System (CHMIS) Program. The program’s purpose was to set up HIE infrastructure across organizations to support quality measurement and management. HIE efforts have continued both in the public and private sectors throughout the past twenty years. Some organizations and large health systems invested in HIE solutions prior to state efforts or have built their own internal exchanges, HIOs, or data repositories. Though none of these previous efforts fully met or currently meet the HIE needs of their local communities, they have set a foundational infrastructure on which the state will enable statewide HIE, which will provide full HIE capabilities.¹⁴

In 2009, Washington passed legislation with the intent of furthering HIE activities within the state. As a part of this bill, the Health Care Authority (HCA) was charged to designate a private organization to lead the state’s HIE initiative. In October 2009, the HCA selected OneHealthPort (OHP) to serve in this lead role and also support ONC’s Cooperative Agreement as the state-designated entity (SDE). The following table provides a brief overview of HIE in Washington (Table 1).¹⁵

Washington’s Approach to HIE and the Role of Contextual Factors

In response to the initial ONC FOA and subsequent PIN, Washington submitted strategic and operational plans that outlined their approach. Here we describe the plans put forward by the states to address governance, technical, and consent, as well as the services the state went on to implement.

Leadership and Governance Models

Washington established a three-entity governance model that consists of: stakeholder engagement and community oversight; technology leadership and development; and state leadership and oversight (Table 2).

Table 2. Washington’s Three-Entity Governance Model and Organizational Roles

Governance Organization	Role
Health Care Authority/State HIT Coordinator	Coordination, Oversight, , Legal and Regulatory Requirements
Lead Technology Organization (OneHealthPort)	Leadership, Technology Solution, HIE Services, Data Use & Partner Data Sharing Agreements, Stakeholder Engagement
Oversight Board (Foundation for Healthcare Quality)	Stakeholder Community Oversight, Review and Input

Legislation in May 2009 initiated the HIE Program and the lead organization governance model in Washington, in which the HCA provides coordination and directs policy and a private entity leads the design and operation of the HIE Program. HCA issued a request for proposal (RFP) for a lead organization and selected OHP in October 2009. OHP began work immediately by consulting stakeholders on desired HIE features and functionality. Ultimately this process culminated in an RFP process for a technology partner. With the assistance of stakeholders OHP finalized its selection of a technology partner and executed a contract with Axway in December of 2010.

Between February and July 2010, HCA and OHP identified and qualified organizations to serve in the community oversight role, ultimately selecting the Foundation for Health Care Quality as the community oversight organization.

As the state's lead entity, OHP must procure and manage the technical infrastructure for the State HIE Program. OHP operates as a "for-profit in the public interest" that is owned by shareholders with a vested interest in the financial success of the corporation. Moreover, its board of directors consists of representatives from all of the major health systems in Washington, all of whom benefit from the success of OHP's efforts. As such, OHP strives to pursue business opportunities that provide value to shareholders and the public, and to maintain low operating costs and margins that ensure the longevity of the company and the State HIE Program. Washington, like many others, is experiencing severe budget cuts that might otherwise threaten the HIE Program; however, as a non-governmental lead technical organization, OHP is able to weather the current economic climate by pursuing other business lines, while providing ongoing support to the State HIE Program.

The Oversight Board (Foundation for Health Care Quality) provides an independent voice for stakeholders and ensures accountability of project leaders. Its seven members represent different stakeholders in the community and must consist of at least one HIE consumer representative, one public sector representative, and four HIE user representatives (employees or members of organizations likely to participate in the State HIE Program). The seventh seat is currently held by a fifth HIE user representative. The board provides ongoing evaluation of the State HIE Program that is critical to the program's success. For example, the Oversight Board spent a significant amount of time evaluating whether the HIE Program's patient privacy policies provide sufficient protections such that Washington residents will choose to participate in HIE. As a result, the Oversight Board has proven to be an important tool for independent oversight, securing stakeholder buy-in, and consumer engagement in Washington.

Technical Approach

Washington has taken a "thin layer" technical approach to state-led health information exchange, meaning that it primarily supports messaging and directories, and lacks a central data repository. OHP functions as a secure hub for trading, messaging, and translating between partners' otherwise incompatible systems. The hub facilitates point-to-point exchange but providers must know where their patients have received care in order to request their data. OHP and HIE vendors cannot view the data; only trading partners who have secured the appropriate consent can view health information, which minimizes privacy concerns.

OHP developed its HIE services to address the market needs of stakeholders in Washington, some of which are driven by MU requirements. In our discussions, stakeholders revealed a need for a wide range of uses for HIE services, such as the ability to exchange records (e.g., admission, discharge and transfer (ADT) data; inpatient and clinical encounters (including Continuity of Care Documents (CCDs) and immunizations)), submit and receive referrals, e-prescribe, and submit and receive quality-related and census data. In spite of these interests, many providers are ready to "push" data but are not ready to receive it. This is especially true of the large volume of unstructured information that trading partners may wish to send, which is difficult to organize and incorporate into an existing data system. OHP aims to be the broker between organizations that want to push data and organizations that want to receive data in a particular format. To respond to these market needs, Washington selected a model focused on translating and trading information, not storing information.

Sustainability Approach

Washington relies on subscription fees and minimizing operating costs to provide services. Currently, the state’s sustainability plan hinges on gathering these subscription fees from users (see Table 3) and eventually gaining adoption by a critical mass of users to ensure its longevity. OHP has attempted to attract customers to HIE by offering financial incentives to organizations that sign up early, such as waiving the initial connection costs (covered using ARRA funds) and keeping entry-level costs for HIE services to a minimum. At the same time, OHP strives to minimize its own costs in order to keep subscription costs low to ensure broader participation. This includes limiting their overhead, administrative, and technical costs in order to keep HIE service costs low. Their agreement with the state requires that their operating margins be less than 15 percent.

Table 3. OneHealthPort Subscription Fee Breakdown by Organization Size

Organization Level	Organization Description—Sample Metrics	2011 Annual Subscription
Entry	Smaller orgs: revenue <\$10M, 1-9 practitioners	\$600
Small	Revenue \$10M - \$100M, 10-50 practitioners, <50 Beds	\$6,000
Mid-Size	Revenue \$100M - \$500M, 50+ practitioners, 50 – 500 Beds	\$12,000
Large	Revenue \$500M - \$1B, <500K insured lives, 500+ Beds	\$24,000
Leadership	Largest orgs: revenue \$1B+, 500K+ insured lives, 3,000+ FTE	\$48,000

- 1. Set Up Fee:** A one-time software license charge to connect the trading partner’s system to the HIE hub. This fee is waived for early adopters, thanks to subsidies from ARRA.
- 2. Mapping Costs:** Each trading partner will map their data to the community standard transaction. This cost ranges from \$500 to \$5,000 for the most complex cases.
- 3. Annual Subscription:** The annual subscription fee includes unlimited usage with no additional transaction fees.

Implementation

OHP contracted with their technical vendor, Axway, in late December 2010 and deployed their services by June 2011. Axway is a non-traditional HIE vendor that creates software solutions for a variety of industries, including healthcare. Axway supports three connection types (Direct, Connect, and Exchange) so that information can be traded securely among partners with systems that support any of these standards, in accordance with ONC’s Nationwide Health Information Network (NwHIN) initiative. This initiative aims to create a “network of networks” through which health information can flow freely among different health care entities (e.g., integrated delivery networks (IDNs), providers, labs, and payers). Although Direct and Connect are different standards that require a translation engine to interact, Axway supports both Direct and Connect and can create bridges between them to ensure that information flows between partners regardless of their systems and standards. In Washington, market demand favors Connect and Exchange over Direct. Currently, OHP and Axway are focused on fine-tuning customer interactions, speeding workflow, and promoting the central hub concept internally and externally.

Currently, OHP offers a hub to facilitate secure messaging of HL7 and X12 and translation services. The hub supports seven services: lab results, bi-directional immunization reporting, new and refill e-prescribing, clinical care summary exchange, exchange of ADT data, radiology results reporting, and eligibility and benefits information. In the future, OHP anticipates that the hub will allow messages to be sent between HIOs, labs, and provider hubs, and will offer certain data transformation capabilities. A list of trading partners and planned transactions can be found in Table 4. As of November 2011, OHP had sent a series of test messages to trading partners and was preparing to bring their services online in 2012.

Table 4. Trading Partners, Motivations, and Data Transactions

OneHealthPort Trading Partners (November 2011)	Motivations for Exchange	Data Transactions
State Medicaid Office*	Creating integrated health records to facilitate care coordination; creating a central repository	Transaction identification and analysis underway, e.g., ADT and CCD
Group Health Cooperative*	Real time ADT information to better manage patients, to lower costs, and improve care coordination	ADT and CCD
Memorial Physicians, PLLC*	Improving patient care via information flow within its hospital/clinic network	Transaction identification and analysis underway
MultiCare IDN	Expanding clinicians' access to patient information outside its own relationships	Organization has plans for future connectivity
National Renal Administrators Association	Reporting quality data to CMS; future exchange of CCD and CCR to better care for chronic patients	Solution in progress
Northshore Medical Group*	Care coordination, efficiency	HL7 Laboratory Results Reports, Immunization Reporting
PAML*	Improve business efficiencies, build market share	HL7 Laboratory Results Reports
PTSO of Washington*	Exchanging clinical records with specialists	CCD
Virginia Mason Medical Center*	Care coordination	ADT
Yakima Valley Farm Workers Clinic*	Care coordination	CCD, Immunization Reporting

*Organizations that have service agreements with OneHealthPort as of December 2011 but not live services.

Prior to forging service agreements between trading partners, OHP has focused on bringing potential trading partners to the table to discuss their HIE needs and how to filter the information so it is useful and meaningful for both parties. They refer to the process as playing “E-Harmony for HIE” to match the needs of trading partners and ensure their satisfaction with the relationship. Given this strategy, forging a formal agreement between trading partners can require between four and, at times, nine discussions, and consequently it can be time and resource intensive. Once

partners agree to exchange information, typically they begin with a few transactions and expand gradually.

The thin layer model idea that “less is more” allows OHP to be flexible, to seize opportunities in the market, and to tailor their product to different organizations’ needs.

OHP is not prescriptive about their system. They plan to meet the market’s needs instead of investing significant capital in heavy infrastructure and then trying to force the market to conform to it. The thin layer approach and its lack of a central data repository have several advantages: 1) Low cost. Light infrastructure allows OHP to offer lower subscription fees; 2) Limited privacy concerns; 3) Quick set-up; and 4) More flexibility so that OHP can respond quickly to market changes. They anticipate frequent changes in the health care market in the near future and view light infrastructure as a way to ensure that they are positioned to meet the market’s needs and fill gaps in available HIE services.

To ensure a broader reach, OHP uses multiple connection strategies. For most users, OHP uses a “one connection” approach to facilitate exchange. This approach allows OHP to reduce the number of interfaces and formal agreements needed for exchange. Partners are bound by one common agreement and only need one interface to connect (e.g., an individual provider can connect directly to the exchange or to another HIO that connects to the exchange). OHP can connect multiple organizations through one connection via “aggregators.” Aggregator organizations connect multiple partner organizations to each other, and then connect to OHP as one collective. The standard trading partner approach involves *virtual aggregation*, where a group of organizations connect to OHP individually, and share data among the group.

Operational aggregators provide technical infrastructure and support data transaction or message management among their partner organizations, and management of the individual connections among the group. For example, PTSO of Washington is a network of multiple health centers with its own infrastructure and hub, and has connected its hub to OHP’s to expand its exchange capacity to non-PTSO organizations. Operational aggregators pay a single annual subscription fee to OHP. *Business aggregators* collect and manage partners through shared business contracts rather than technical infrastructure. For example, OHP is working with the National Renal Administration Association (NRAA), a business aggregator that assists renal dialysis centers around the country to submit data to the Centers for Medicare & Medicaid Services (CMS). For this project, NRAA will leverage the translation hub provided by OHP to submit quality data from the dialysis facilities to CMS according to NwHIN standards. Business partners connect individually to OHP and pay for individual subscriptions through the master contract with NRAA.

“This is not about getting everyone; it’s all about getting a small critical mass that changes the game. We try to find people who are motivated and help them set things up. And we recognize it takes time. Some projects are about flashes of insight... This is slogging—there’s nothing sexy or glorious about it. We’re at the phase where we have picked a technology and a partner, so now it’s sales, marketing, implementation, project management—it’s just a slog and there are no shortcuts in health care.”—OHP Management

Washington has a mixed market of providers, from small to large independent practices to large health systems, all of whom OHP would like to serve in the HIE market. As a result of this mixed market, OHP targets their approaches according to stakeholder needs. For example, because of their market penetration and EHR/HIE savvy, targeting large health systems is OHP's primary recruitment strategy. By recruiting a critical mass of users whose participation will attract other providers, OHP believes that over time smaller organizations will choose to join and its "hub and spoke" model will become the prevailing model adopted in the state.

Because of their influence, large health systems have been embraced by the HCA and OHP as collaborators, not competitors. For example, large health systems are actively engaged in planning and leadership activities and have a number of representatives on OHP's board. Although these organizations often compete in the market, in activities related to OHP, interviewees report that they are able to put aside differences and act as stewards of The Washington State HIE Program. They share a mutual sense of responsibility to ensure the HIE Program and OHP succeed for the good of the local communities they serve.

OHP is also aware of the needs and demands of independent practices and providers, and the fact that costs can deter them investing in or upgrading technology. Many providers cannot afford the initial installation and subscription costs associated with EHR and EHR/HIE enabled-technology and hence they do not invest in the technology. Those who make the initial investment must pay additional, periodic fees to upgrade their EHR systems and to enable HIE capabilities, which prevent a subset of providers from maintaining or upgrading their systems for financial reasons. In addition, companies charge subscription fees that providers fear will increase to unaffordable rates, forcing them to discontinue service and risk losing not only their initial investment but their data as well.

"The interesting thing I've discovered working on other HIE projects is that in the absence of a mandate many hospitals and doctors view HIE as an optional luxury [even though] they have a sense that it will have a business proposition for them."—*NR44 stakeholder and technical expert*

In some cases, lack of awareness among providers and lack of widespread participation inhibit the growth of exchange. Many small providers are simply unaware of their options for information exchange. Others are motivated to exchange information but are lacking information to pursue exchange. For example, the Department of Health (DOH) receives frequent calls from providers (especially mid-sized providers) who are confused about MU requirements and have limited knowledge about how to meet requirements. To overcome these issues, OHP is working with Medicaid, the Office of Rural Health Policy, and Washington Idaho Regional Extension Center (WIREC) to provide webinars and other awareness-raising activities to educate providers, particularly small practices, and health systems about the availability and use of HIE services. Other practices are simply waiting for the emergence of an industry standard or for a critical mass to adopt a particular system before making their own investment in exchange technology. These practices are generally cost conscious, and want to ensure that they have trading partners and maximize the value of their HIE services. OHP is attempting to draw these practices with lower subscription rates for early adopters and to build a critical mass of users.

Integrating external data into clinical workflow and existing computer systems is an ongoing challenge, according to stakeholders. For example, Group Health uses the Epic CareEverywhere solution to connect to other hospital systems that use Epic. However, to view patient information at a non-Group Health location, providers must navigate outside their current EHR view into a separate system to retrieve a static view of the patient encounter, which interferes with workflow. Group Health operates direct point-to-point interfaces with the three major hospitals that do not use Epic; the data is received using HL7 and integrated into the EHRs. Providers report great satisfaction with this solution.

“There’s very little wasted energy on friction... and that gives us a good opportunity to be successful. It’s not distracting us from what’s important.”

—OHP and HCA leadership

Unless data can be integrated into the EHR patient health record view, providers find that the use of health information from outside organizations interferes with their daily clinical work flow and is not particularly valuable for patient care. For this reason, providers in Washington are reluctant to use external health information, particularly when it requires logging into another system and does not allow editing. Moreover, because external data does not transfer into the patient record, providers cannot use it to trend patient information over time, which is increasingly important in providing high quality patient care. This lack of interoperability is a major concern for providers who believe technology should improve the practice of medicine, rather than add complications that detract from patient care.

Providers and health systems voice frustration over vendor availability to provide technical support and, at times, services. For certain types of EHR system upgrades, there is more demand from providers than EHR vendors can meet. Many providers are also waiting for EHR vendors to upgrade their systems to include electronic exchange capabilities, worsening the backlog and preventing providers from enabling EHR or exchange services.

For providers beginning to plan or engage in exchange as a result of federal initiatives and/or funding, competing interests among funders can create confusion. Given the widespread interest in HIE among government agencies, stakeholders interviewed in Washington are concerned about how to appropriately navigate what appear to be conflicting priorities among agencies. For example, ONC has identified priority use cases under MU requirements and emphasized large scale connections, whereas the Centers for Disease Control and Prevention (CDC) expresses interest in state repositories and point-to-point connections. Both are providing grants related to HIE with somewhat different emphases, which leads to uncertainty among grant recipients and among providers considering an investment in HIE infrastructure.

The long history of collaboration among Washington’s key leaders significantly contributes to the success of the HIE Program. The State HIT Coordinator and the CEO of OHP have worked closely on various HIE programs since the 1990s and have established a relationship. OHP leaders also helped found the Foundation for Health Care Quality, which sponsors the Oversight Board, demonstrating a commitment to the success of both the project and the state governance model. For example, the CEO of OHP used to be the executive director of the Foundation for Health Care Quality. This history has resulted in trust among the three key organizations involved in

the governance model and, by extension, trust among other HIE stakeholders as well (e.g., other federally-funded projects, providers, and other public and private sector partners involved in HIE).

Community stakeholders play a pivotal role in the Washington health care market and policy arena, in part, because of the history of HIE activities in the state. Recognizing this fact, Washington's HIE efforts involve a wide range of stakeholders, many of whom have been working on HIE-related programs over the past twenty years. For example, a CIO leadership council, composed of CIOs from key provider groups, provides input to OHP and HCA on the technical approach and future HIE service offerings. Many discussants consider stakeholder involvement in decision-making and these entities use of OHP services as vital to the success of the HIE Program. Stakeholders are supportive and complimentary of the HIE Program. When asked to name the success factors for state-led HIE efforts, each stakeholder listed the same basic elements: leadership, stakeholder involvement and collaboration, and technical approach selected by the state. They also praised the HCA, OHP, and the Oversight Board for their vision, commitment, and leadership.

Conclusion

Washington's HIE Program succeeds because of long-standing relationships, trust among collaborators, and shared commitment to creating an exchange for "the public good." The three-entity governance model in particular created well-defined roles that exploit each organization's strengths and allow them to operate effectively and efficiently. Thus far, OneHealthPort's "thin layer" approach has allowed them to control costs, limit privacy concerns, and respond adroitly to local market needs. Stakeholders at all levels emphasized the importance of responding to local market needs to ensure HIE uptake, rather than merely adopting federal priorities. Currently, Washington consumer demand is for use cases beyond MU, which OHP is committed to meeting and interprets as evidence of a healthy market.

It is also notable that Washington's demand for technology and health information exchange predates the State HIE Cooperative Agreement Program. This creates an enthusiasm for state HIE and fuels a market outside of state-sponsored HIE: several large delivery systems are interested in private exchange within their own networks; Epic maintains a large presence and offers exchange capabilities outside of the state sponsored system; and private or regional organizations are commencing their own data aggregation activities and exchange activities, for example, via ACOs. In this environment, the thin layer strategy is proving particularly advantageous. It uniquely positions OHP and HCA to provide exchange services that meet market needs without the investment and maintenance costs of heavy infrastructure. This may be an attractive option for states that are interested in pursuing HIE activities by leveraging the market and who worry about incurring high costs in establishing state-level services.

Public and private sector entities caution other states against investing in "perpetual" or "heavy" infrastructure. OHP believes that building "a perpetual infrastructure," whether in the form of a record locator service or a repository, is unwise in the long term and a barrier to successful HIE. This is because heavy technical infrastructure and the monetary investment associated with it limit states' capacity and willingness to respond to changing market needs. One vision of the future is that exchange occurs using a telecom-type infrastructure or "dial-tone service" that renders state-by-state infrastructure obsolete. States and regions should consider how to enable connectivity temporarily (e.g., provider directories, translation services, a statewide master patient/provider index (MPI) or

record locator service), assuming that it may need to be dismantled in the mid- to long-term due to shifts in the market.

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