FINAL REPORT

Provider Experiences with HIE: Key Findings from a Six-State Review

NORC
at the UNIVERSITY of CHICAGO

Table of Contents

Executive Summary

Introduction

The Health Information Technology for Economic and Clinical Health Act (HITECH), as part of the American Recovery and Reinvestment Act (ARRA) of 2009 created the State Health Information Exchange (HIE) Program. Under the program, the Office of the National Coordinator for Health Information Technology (ONC) provided guidance and $564 million dollars of financial support for states to enable the secure electronic exchange of information.

To understand the effects of the State HIE Program on HIE progress, ONC contracted with NORC at the University of Chicago (NORC) to conduct a multi-year mixed-methods evaluation of the program. As part of this evaluation, NORC conducted a summative round of case studies of six states. In this report, we discuss key findings from our discussions with providers in these six states, including provider priorities and information needs, compelling use cases for HIE, significant challenges and lessons learned encountered with electronic exchange.

Methods

Between March and May 2014, we conducted a qualitative, in-depth examination consisting of site visits and 37 semi-structured discussions in six states (Iowa, Mississippi, New Hampshire, Utah, Vermont, and Wyoming) to understand provider perspectives on the State HIE Program and their experiences with electronic exchange. We spoke to representatives from hospitals and integrated delivery networks, hospital associations, health centers, physician associations, critical access hospitals, and long-term care and home health (referred to collectively as "providers" or "provider representatives," as well as health IT vendors, developers and Health Information Service Providers (HISPs) (referred to collectively as "vendors") who serve these providers and are therefore well acquainted with their goals and priorities.

Findings

From our discussions with informants, we abstracted several important themes: priority use cases for HIE, strategies to meet meaningful use requirements, challenges, and lessons learned.

- Providers' HIE needs have evolved beyond connecting disparate systems and meeting meaningful use exchange requirements. Providers highlight the potential for HIE to ease access to "actionable" data that integrates data from across the care continuum and provides clinicians with

information at the point of care to improve care delivery and care coordination. Providers highlighted several exchange priorities: admission, discharge, transfer (ADT) alerts, services that facilitate care coordination, and interstate exchange.

- Meaningful use and payment reform are creating new requirements for health IT-enabled information sharing related to care coordination and management as well as new models for patient care. Providers anticipate a growing need for vendor provided HIE services and infrastructure as expectations for electronic exchange of health information increase under this shift.

- Providers also encountered various challenges, specifically competing priorities, issues managing multiple funding streams, lack of qualified staff on the provider side, and difficulty obtaining adequate support from EHR and HIE vendors. They also noted a need for interoperable systems to meet exchange and health system reform goals.

- Providers in most states believed that the State HIE Program contributed to building awareness around HIE and the benefits of exchanging information. Providers conveyed a general sentiment that a state-based HIE effort is important, due to their stature as neutral entity, capable of bringing stakeholders together. Even though the meaningful use program did not provide incentive payments to long-term care and behavioral health providers, the State HIE Program was instrumental in engaging these providers, identifying their specific needs and the gaps that grantees needed to fill, particularly around care continuity.

Conclusion

Throughout the life of the program, HIE has become more visible and better established, meaning that provider priorities and challenges have likewise evolved. In addition to highlighting providers' current needs and perspectives on HIE, findings from these conversations emphasize certain areas:

- Provider experiences meeting meaningful use requirements and payment reform goals suggest these will continue to be important drivers of exchange, but providers have additional use cases they are or would like to pursue to meet their specific exchange needs;

- New health care system priorities, such as care coordination suggest expanding interoperable health IT systems and services to providers ineligible for meaningful use to ensure that the information needed to manage care is available electronically; and

- There is a need to push for interoperability at the vendor level so that health system goals for improved patient care supported by HIE are achievable.

Introduction

The passage of the Health Information Technology for Economic and Clinical Health Act (HITECH), as part of the American Recovery and Reinvestment Act (ARRA) of 2009, established new priorities and support for the widespread adoption of electronic health records (EHRs) and health information exchange (HIE). As part of this effort, HITECH created the State HIE Program to "facilitate and expand the secure, electronic movement and use of health information among organizations according to nationally recognized standards."[1] Under the program, the Office of the National Coordinator for Health Information Technology (ONC) provided guidance and $564 million dollars of financial support for states to enable the secure electronic exchange of information.[2]

Since the launch of the State HIE Program, the Centers for Medicare & Medicaid Services (CMS) implemented the Medicare and Medicaid EHR Incentive Programs in support of EHR and HIE adoption. The EHR Incentive Programs offer incentive payments to eligible professionals, hospitals, and critical access hospitals as they adopt, implement, upgrade, or demonstrate meaningful use of certified EHR technology. In September 2012, CMS released its final rule specifying Stage 2 meaningful use criteria to take effect in 2014.[3] The Stage 2 criteria expand upon requirements related to HIE, such as electronic exchange of lab results, care summary exchange, electronic prescribing (e-prescribing), and public health related measures–all of which make HIE even more relevant for eligible hospitals and professionals.[4]
In the years since these programs commenced, HIE use has increased among providers. A 2013 survey found that 77 percent of office-based physicians can view electronic lab results; 53 percent can send electronic lab orders; 49 percent can exchange secure messages with patients; and 68 percent can provide patients with clinical summaries electronically.[5] An estimated 62 percent of hospitals electronically exchanged key clinical information with external providers; 57 percent exchanged lab results, 42 percent exchanged care summaries; and 37 percent exchanged medication histories in 2013.[6] As of June 2014, 75 percent of the 403,000 eligible providers and 92 percent of the 4,500 eligible hospitals had attested to meaningful use.[7]

To understand the effects of the State HIE Program on HIE progress, ONC contracted with NORC at the University of Chicago (NORC) to conduct a multi-year evaluation of the program. This brief summarizes the findings of one data collection activity under the larger evaluation effort. From January to May 2014, NORC conducted a summative round of in-depth case studies of six states. These states were Iowa, Mississippi, New Hampshire, Utah, Vermont, and Wyoming. The purpose of the case studies was to identify key enablers, challenges, and lessons throughout the trajectory of the State HIE Program.

In this report, we present findings from our discussions with providers and provider associations in these six states, including provider priorities and information needs, compelling use cases for HIE, significant challenges and lessons learned with respect to electronic exchange. This is a provider-focused brief; however, where applicable, we add the perspectives of vendors serving these providers and their perspectives on provider needs/demands for HIE. The experiences of state grantees are detailed in a separate report entitled, "The State HIE Program Four Years Later: Key Findings on Grantees' Experiences from a Six-State Review."[8]

Methods

The primary objectives of the provider discussions were to understand:

- What were provider priorities for HIE?
- What were provider perceptions of meaningful use and the role of the State HIE Program in helping providers meet meaningful use exchange requirements?
- What were key challenges facing providers in their efforts to electronically exchange information?
- What has been the impact of the State HIE Program on providers?

We selected states using findings from previous qualitative activities, hypotheses testing, and state progress on key HIE outcome measures. Selection criteria included program factors (e.g., legal and policy-related activities, governance structure), state contextual factors (e.g., EHR adoption rates, HIE capability and activity, presence of large hospital systems), and state progress on key HIE outcome measures (i.e., e-prescribing, clinical care summary exchange, and lab exchange). We excluded states we had covered in-depth with previous evaluation activities.

Between January and May 2014, we conducted a qualitative, in-depth examination consisting of site visits and semi-structured discussions with providers in six states to understand their perspectives and experiences with the State HIE Program and electronic exchange. We spoke to representatives from hospitals and integrated delivery networks, hospital associations, health centers, physician associations, critical access hospitals, and long-term care and home health. Because they are central to provider experience with health IT, we also met with EHR and HIE vendors and developers, as well as Health Information Service Providers (HISPs) (referred to collectively as "vendors"), totaling 37 separate discussions (Table 1).

Table 1: Provider and Provider Representatives across Six States

Provider Type	Total
Hospital/integrated delivery network, hospital association representatives	7
Physician, physician association representatives	5
Critical access hospital representatives	5
Long-term care and/or home health representatives	4
Health center representatives	3
Other providers (e.g., pharmacy, nurses association, accountable care organizations)	4
EHR/HIE vendors and developers, HISPs	9
Total	**37**

Provider Priorities for HIE

Shifting paradigms in health care delivery emphasize the need for integrated, patient-centered care. Our previous findings[9] from provider focus groups revealed HIE needs related to connecting disparate systems and meeting meaningful use exchange requirements—primarily e-prescribing, lab exchange, clinical care summary exchange, and public health reporting. This round of case studies suggests providers' HIE needs have evolved. Providers highlight the potential for HIE to improve access to "actionable" data, integrated from across the care continuum and available at point of care to improve care delivery and care coordination. Table 2 lays out the use cases and priorities for HIE described by multiple providers in each state, reported by provider type.

Table 2: Use Cases for HIE by Provider Type

Provider Type	Use Cases							
	Meet MU	ADT Alerts	Care Summaries	Radiology Results	Medication History & Reconciliation	Access to State Registries	Population Health Management	Interstate Exchange
Hospitals/ large health systems	●	●	●		●	●		●
Ambulatory Care Providers/ Health Centers	●	●	●	●	●	●	●	●
Critical Access Hospitals	●	●	●	●	●		●	
Home health & Long-Term Care Providers		●	●	●	●			
ACOs		●	●				●	●

As evidenced by Table 2, providers identified a variety of use cases for HIE. Some notable priorities included:

Admission, Discharge, Transfer (ADT) Alerts. ADT data and notifications allow providers to identify patients hospitalized or cared for in other settings. ADT notifications trigger alerts to primary care providers, care managers, or other designated individuals, providing personal and/or demographic information and change in status (admission, discharge from or transfer to a facility). Many providers cited CMS' 30-day readmissions penalties as a motivator for wanting ADT alerts added to their HIE services,[i] noting that ADT data can help them identify, track, and follow-up with patients to avoid readmissions. In Iowa, providers want access to ADT data to reduce readmissions and to identify patients receiving care at multiple hospitals. Furthermore state Medicaid is requiring that organizations that participate in ACO's sign up with IHIN so they can share ADT data. In Vermont, ADT data is a top priority among hospitals, federally qualified health centers, and critical access hospitals. Almost every hospital connected to the Vermont Health Information Exchange (VHIE), Vermont's statewide HIE system, has this functionality available. Likewise, The Utah Health Information Network (UHIN) is using the clinical Health Information Exchange (cHIE), Utah's state HIE system, to enable this capability for their providers.

Care Coordination across Care Continuum. Facilitating communication and transitions between primary care and other providers, including long-term care, home health, and behavioral health, is a top priority for many providers. Hospitals are developing accountable care organizations (ACOs)[ii] and patient-centered medical homes (PCMHs),[iii] increasing the need for open communication channels between all care settings to provide high-quality, coordinated patient care. Primary care providers can use HIE to track their patients across care settings and communicate with other providers

> *"The biggest [provider] need, and thus where we have devoted most development efforts, is making sure the clinical team has the patient record at the site of care that follows the patient wherever they go. All of the other things that people have turned to HIE or interoperability for—for example syndromic surveillance or reporting—those are secondary to our customers."*
> *– EHR Vendor*

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[i] Section 3025 of the Affordable Care Act requires CMS to reduce payments to hospitals with excess readmissions, effective for discharges beginning on October 1, 2012. For more information see: http://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/AcuteInpatientPPS/Readmissions-Reduction-Program.html

[ii] Doctors, hospitals, and other health care providers who voluntarily form groups to give coordinated high quality care to their Medicare patients. For more information see: http://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/ACO/

[iii] A model for transforming the organization and delivery of patient care that provides comprehensive, patient-centered and coordinated care, and focuses on providing accessible services, and quality and safety. For more information see: http://pcmh.ahrq.gov/page/defining-pcmh

caring for their patients. Long-term care providers noted increasing numbers of patients requiring post-acute care, augmenting their need for data to effectively care for their patients.

To allow providers to use New Hampshire Health Information Organization (NHHIO) for care coordination, New Hampshire used legislation to expand the definition of "provider" to better align with the Health Insurance Portability and Accountability Act (HIPAA) definition.[10] The original legislation limited electronic exchange to "between providers for the purposes of treatment only," with the term "provider" narrowly defined as only those individuals or entities who are directly providing health care. This definition excluded third parties such as the state public health department, payers, and anyone else who might otherwise have access to and the ability to share health information under HIPAA rules from exchange. The state has since changed the law to allow the public health department access to data and there are efforts to ensure other third parties can participate.

Interstate and Regional Exchange. In five of the six states, providers noted the importance of exchanging data with neighboring states because patients often cross state lines to access care. Interstate exchange can be complicated by differing state laws related to privacy and disclosure of health information, different consent models, and interoperability issues between systems; however, stakeholders felt cross-state communication would benefit patients. Wyoming's geography and location of major health systems cause significant volumes of patients to seek health care services in Nebraska, Colorado, and Utah. As such, Wyoming providers find HIE more necessary for cross-state communication than for communication between large health systems. Likewise, UHIN providers in Utah hope to use state services to share immunization data with neighboring Idaho. In Vermont, providers' ability to exchange data with Florida health systems is important given that many residents often travel to Florida in the colder months. Iowa providers who practice near state borders express a need for access to patient data from systems outside of Iowa.

Provider Strategies for Meeting Meaningful Use

In this section, we describe provider perceptions on Stages 1 and 2 meaningful use, and their strategies for meeting requirements. Stage 1 requirements related to HIE include the electronic transmission of prescriptions and care summary exchange (both core requirements), lab results exchange and public health measures (i.e., immunizations, electronic lab reporting, and syndromic surveillance data).[11] Stage 2 requirements expanded Stage 1 requirements and added additional core requirements. For example, in Stage 2 providers must demonstrate incorporation of structured laboratory results into the

EHR, transmission of patient care summaries with unaffiliated providers, and transmission of data for public health reporting (see Appendix 1 for more information on HIE measures under Stages 1 and 2 meaningful use). At the time of study, providers ranged in their reported readiness to meet Stage 2 requirements; however, most anticipated heavier reliance on private and State HIE infrastructure in the near future, given the expanded requirements.

Larger health care providers considered the Stage 1 meaningful use requirements for HIE to be minimal; however, smaller providers with fewer resources considered these challenging and relied on RECs to help meet those requirements. Hospital and large ambulatory providers reported exchanging electronic lab results and e-prescribing prior to HITECH. Therefore, they found meeting Stage 1 meaningful use requirements required minimal extra effort on their part. However, smaller ambulatory care providers, critical access hospitals, and health centers with limited resources noted setting up systems and processes to meet meaningful use requirements was challenging. They relied heavily upon the Regional Extension Centers (RECs)[iv] and state Medicaid staff to provide support and resources to maneuver meaningful use requirements. Especially in states where the REC and Medicaid staff collaborated directly with the State HIE Program, primary care providers reported that these programs were instrumental in helping them meet meaningful use.

Providers used market-based approaches to meet Stage 1 meaningful use requirements related to e-prescribing, lab exchange, and public health; and used the State HIE Program to demonstrate the capability to exchange test messages. Providers reported they primarily use the Surescripts network to meet e-prescribing requirements, set up point-to-point interfaces with labs for electronic lab reporting and exchange of lab results or log into portals, and established direct connections to immunization registries to send immunization data to the state (see Table 3). Providers reported leveraging services offered through the State HIE Program primarily related to Stage 1 requirements to send test messages. For example, Mississippi providers use Direct services offered by Mississippi Health Information Network (MS-HIN), the statewide HIE system, to conduct one-time tests and demonstrate their ability to exchange immunization data, while in Utah the cHIE supports providers' performing test messages for exchanging care summaries.

[iv] Under HITECH, ONC provided all states and territories funding for Regional Extension Centers, to serve as a resource center and support primary care providers in EHR implementation, meeting meaningful use requirements, and health IT needs. For more information see http://www.healthit.gov/providers-professionals/regional-extension-centers-recs

Table 3: Mechanisms for Meeting Meaningful Use Exchange Requirements by State

| State | e-Rx | Care Summary Exchange | Exchange of Lab Results | Public Health Reporting | | |
				Immunizations	Syndromic Surveillance	Electronic Lab Reporting
Iowa	Surescripts network	Nebraska Health Information Initiative (NeHII); EHR systems	NeHII; point-to-point connections with labs	Point-to-point connections to state immunization registries	Point-to-point connections to state; test messages through Iowa Health Information Network (IHIN)	Test messages through IHIN
Mississippi	Surescripts network	Mississippi Health Information Network (MS-HIN); EHR systems	MS-HIN; point-to-point connections with labs	Point-to-point connections between EHRs and state immunization registries; MS-HIN (for providers onboarded in 2014)	CDC's BioSense;[v] MS-HIN (for providers onboarded in 2014)	Point-to-point connections between labs and state public health department; MS-HIN (for providers onboarded in 2014)
New Hampshire	Surescripts network	Internal networks; EHR systems; other secure messaging systems	Point-to-point connections with labs	Point-to-point connections between EHRs and state immunization registries	New Hampshire HIO (NHHIO); point-to-point connections to state	Point-to-point connections between labs and state public health department
Utah	Surescripts network	Internal networks	Clinical HIE (cHIE); Point-to-point connections with labs	Portals; point-to-point connections between EHRs and state immunization registries; EHR vendor hub	CDC's BioSense	Point-to-point connections between labs and state public health department

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[v] BioSense is CDC's national syndromic surveillance program. It provides public health officials a common electronic health information system. For more information see http://www.cdc.gov/biosense/

State	e-Rx	Care Summary Exchange	Exchange of Lab Results	Public Health Reporting		
				Immunizations	Syndromic Surveillance	Electronic Lab Reporting
Vermont	Surescripts network	Vermont HIE (VHIE); point-to-point connections	VHIE; point-to-point connections with labs	Point-to-point connections between EHRs and state immunization registries; VHIE	Early Aberration Reporting. System (EARS); CDC's BioSense	Point-to-point connections between labs and state public health department
Wyoming	Surescripts network; Medicaid EHR system (total health record, THR)	EHR systems; Medicaid EHR system (THR)	eHealthWyo; Point-to-point connections with labs	Point-to-point connections to state	Point-to-point connections to state	Point-to-point connections between labs and state public health department state

Stage 2 meaningful use significantly expands information exchange requirements. For some of these requirements, providers must move beyond sending test messages and demonstrate more robust exchange capabilities. State HIE grantees were preparing to support providers in meeting Stage 2 meaningful use requirements, particularly around public health reporting (i.e., immunizations, electronic lab reporting, syndromic surveillance). For example, MS-HIN plans to use both directed-messaging and query-based interfaces to help hospitals and providers meet Stage 2 meaningful use.

Small providers and critical access hospitals face unique challenges related to HIE and meaningful use, and may benefit from support from State HIE infrastructure and services. Many small providers and critical access hospital representatives raised concerns about requirements around patient engagement,[vi] particularly patients' use of portals to request electronic data (e.g., the Stage 2 requirement that patients view, download, and transmit their data). They reported

> *"Providers should be able to be excluded from [the patient engagement] core measure if the patients don't request it... A younger patient might but [our state] is 85% Medicare. Many critical access hospitals have a high percentage of Medicare utilization and these are not exactly "google me" folks. It is odd that this is not something we could be excluded from if it's not applicable to us."*
>
> *–Critical Access Hospital Representative*

[vi] As part of Stage 2 meaningful use, eligible providers, hospitals, and critical access hospitals must provide patients the ability to view online, download, and transmit their health information or information about a hospital admission. See more information at http://www.himss.org/files/HIMSSorg/content/files/MU2_HIE_Matrix_FINAL.pdf

struggling to understand the specific measures and felt that CMS should not hold them accountable for patient choices and behaviors beyond provider control. In addition, some respondents predicted that hospitals with high Medicare populations would have a difficult time meeting this requirement, as older patients are less likely to request their records electronically. Some providers, particularly smaller hospitals, noted concerns about meeting requirements related to transitions of care, given that they are resource-intensive, complex, and force providers to rely heavily on EHR vendors. Helping providers and hospitals navigate Stage 2 meaningful use requirements, and providing them with the services to do so, is a role grantees and/or their SDEs are well suited for and that would provide value to their local stakeholders.

Multiple providers reported meaningful use was a significant impetus to increase HIE, raise awareness, and establish the necessary infrastructure to support HIE. Providers reported the EHR Incentives Program was instrumental in promoting EHR adoption and see meaningful use as promoting the basic infrastructure needed for exchange to occur. For instance, one state health IT coordinator noted, "Providers saw benefits from EHRs but there were not enough to tip the scale and cause them to jump on and buy them. However, the meaningful use incentives (which helped cover some of the expense) and the concept of HIE made EHR [investment] more palatable. It is not just what an EHR can do alone, but it becomes a tool that is extended much more. It might not have made it attractive, but it made it more palatable for providers." Having overcome the barriers to EHR adoption and implementation, providers are poised to expand their HIE capabilities and meet Stage 2 meaningful use requirements.

Exchange requirements for meaningful use created an opportunity for grantees to leverage RECs and state Medicaid to prompt providers and hospitals to seriously think about EHRs, exchange, and how they can move toward adopting systems within their organizations. In Utah, providers believe the need to meet meaningful use requirements propelled more providers to acquire EHRs. In Iowa, meaningful use incentives propelled hospitals to work with the Iowa Department of Public Health (IDPH) to meet ELR and immunization reporting requirements. A high degree of variability of information makes ELR more complex than immunization data sharing, so the Iowa Health Information Network (IHIN), the state designated entity, made it possible to automatically map ELRs to their code sets. Providers reported meaningful use requirements also motivated EHR vendors to respond to market (i.e., provider) needs at the risk of losing market share.

A few providers expressed mixed views on the impact of meaningful use in enabling exchange. A few providers view the requirements around exchange to be so minimal that it acted as a hindrance to

exchange rather than as an enabler. They note that meaningful use has detracted attention from HIE efforts and the requirements for meaningful use certification of EHR developers did not build in a common connection for HIE and EHR systems to be interoperable; at present, data flows between systems are not seamless, exportable, or importable. Providers expressed the belief that if there had been stronger alignment between the EHR Incentive Programs and the State HIE Program, progress would have occurred much faster.

Exchange Challenges and Lessons Learned

Overall, providers and provider representatives note that their participation in the State HIE Program has been slow, often due to technical limitations, competing interests, and other available channels for exchange. In spite of the challenges, providers note EHR adoption and HIE is increasing steadily. Currently, private and state-led entities and point-to-point connections meet the need for infrastructure and services. However, the combination of expanded meaningful use requirements for HIE in 2014 and payment reform increases the need for more sophisticated exchange that cannot be met by point-to-point exchange. Providers will look to services offered by states that have established the necessary infrastructure, and to market-based solutions (i.e., local and regional HIOs, EHR vendors, and national providers like Surescripts and CommonWell), both of whom are likely to expand offerings to meet growing demand.

Demand for Sophisticated Infrastructure and Services

At the time of these case studies, providers are predominantly exchanging through non-state-led means. For example, many large health systems have developed their own internal HIE systems and provide affiliated providers access to the system, while providers use direct connections to state public health departments for reporting. In New Hampshire, large hospital systems have already been exchanging data and had connections to the public health department. However, both state-led and private solutions are being adapted to the environment created by Stage 2 meaningful use and payment reform, which are creating new demand for services and partnerships for information exchange. These developments, in turn, are likely to increase the value of state-led infrastructure that is already available to meet exchange demand.

Providers have positive views of the future role of meaningful use in increasing demand for exchange. Despite the current proliferation of private exchange, providers see potential value in a

community and statewide HIE systems, especially for future stages of meaningful use. They also noted the benefit of being able to establish a single connection (e.g., to a statewide exchange or via a hub-and-spoke model) to access a wealth of data versus maintaining multiple point-to-point connections. For example, meaningful use criteria require that information be exchanged between providers and labs, public health departments, immunization registries, and the various providers involved in care transitions may prompt providers to shift away from point-to-point and/or to expand their approaches to exchange. In some markets, public-private partnerships may offer the best solution for connecting diverse entities, such as large hospital systems, unaffiliated providers, public health, and payers. Providers and grantees recognize there is no one-size fits all approach and they will have to determine what best suits local needs.

Payment reform will require HIE expansion. Payment reform created new requirements for information sharing related to care coordination and management, as well as new models for patient care, that will necessitate HIE expansion.[12,13] For example, providers in Iowa noted that ACOs will need real-time information from physicians and hospitals regarding ADTs. Iowa is requiring organizations to connect to state-led exchange and exchange ADTs in order to form an ACO.[14] Similarly, community care models supported by State Innovation Model (SIM) grants will create new partnerships. Under SIM, Iowa is currently creating seven ACO regions linking Medicaid, home health, and community providers. Utah also anticipates health reform efforts promoting ACOs, pay for performance, and payment model shifts will dramatically increase the value of their community HIE. Although the EHR Incentive Programs did not provide incentive payments to home health and long-term care providers, hospitals will likely draw these providers into exchange to reduce readmissions and duplication of services under payment reform, through public, private, or a hybrid approach to exchange.

> *"Shifting reimbursement models towards more efficient and aligned reimbursement models requires the trustable exchange of information among those that share in that accountability and broadly."*
>
> *–Large Health System*

Mitigating the High Cost of HIE Participation

The cost of establishing HIE connections was a recurrent challenge for hospitals and providers in five of the six states. EHR vendors typically charge a fee to set up the interfaces, monthly service fees for using the system, and additional fees for product upgrades. These costs have become a key impediment to connectivity. When EHR vendors charge between $15,000 and $70,000 for provider interfaces[15] (some

estimate between $13,000 and $22,000 for smaller provider practices)[16] organizations have to evaluate competing projects (e.g., EHR upgrades, HIE functionalities, and non-health IT priorities) to determine their capacity to allocate resources.

Representatives from several critical access hospitals reported having narrow profit margins and available resources further constrain their ability improve their EHRs and install new interfaces to establish connectivity with the HIE system. These fees are burdensome and serve as a disincentive to participate in community-based exchange. Smaller practices also experience this cost burden disproportionately. To address the cost barrier, larger hospital systems with affiliated providers have found it worthwhile to subsidize the fee for practices who cannot afford it on their own to connect with state offered HIE services.

> *"When you are looking at a 25-bed hospital that also operates a nursing home with very marginal income, a 'feel good' technology is a challenging sales pitch."*
>
> *–Critical Access Hospital Representative*

Managing Competing Priorities, Multiple Sources of Funding

Competing priorities often posed challenges for providers, detracting from their ability to engage in HIE. During NORC's first round of case studies in 2012, providers expressed concern over the lack of clarity around the myriad of federal initiatives, which to prioritize, and from which agencies to take direction.[17] In this round of case studies, providers in five of the six states reported that while there is greater specificity around these initiatives, such as ICD-10, meaningful use requirements, and payment reform efforts, the competing priorities and availability of multiple funding streams pose a challenge to prioritizing information exchange.

Providers sometimes viewed HIE services as "nice to have." In Wyoming, many hospitals were in the midst of upgrading their EHRs to meet Stage 2 meaningful use requirements when they needed to shift focus to ICD-10. These hospitals simply did not have the capacity (organizational or financial) to focus on HIE during ICD-10 implementation. Similarly, several providers in Iowa felt other priorities, including ICD-10, PCMHs, and the Medicaid SIM grant, temporarily overshadowed efforts of the State HIE Program. Now that Stage 2 meaningful use requirements are of more immediate importance, the infrastructure and services made available by State HIE Program efforts may garner renewed interest.

> *"Given the ACA, ICD-10, and other stresses that are on hospital leadership, HIE services may stay in the nice-to-have category of priority."*
>
> *–Provider Representative*

Lack of Tech-Savvy Staff

Implementation requires sufficient number of staff with appropriate training. Several providers in Iowa identified the lack of trained health IT experts as a key challenge, particularly in rural areas. Hospitals and small clinics in rural areas typically have only one staff person with any IT skills. Consequently, this staff would be overwhelmed with a variety of IT priorities, and if he or she leaves, the facility cannot continue any IT-related projects until they find a replacement. In Wyoming, providers reported that the IT workforce was not prepared for HIE system implementation. The IT manager at many hospitals are often not trained specifically in the field and do not have a comprehensive understanding of health IT interoperability, meaning they must rely heavily on vendors.

Providers encountered limited EHR and HIE vendor readiness for enabling HIE services. Providers and provider representatives noted EHR vendors worked on their own timelines and priorities, remained mostly focused on EHR installation and upgrades, and did not prioritize HIE. As a result, they offered varying levels of services and capabilities to providers, impeding the progress of establishing interfaces to grantees' systems. Providers also reported issues with vendors who over promised and under delivered services. In one state, the HIE vendor failed to deliver a functioning federated architecture. Consequently, the state was unable to meet expectations of HIE participants, notably some of the large hospital systems who wanted to host their own data and make it available to providers via a distributed query system. To meet provider needs, the state subsequently revised its technical architecture and decided to pursue a "best of breed" approach where they sought HIE services from multiple vendors instead of just one.

Data Availability Determines Provider Participation in HIE

Data availability is key to provider participation. Providers across states noted HIE systems need to ensure providers are able to find patient information easily and readily when they initiate a query. If query functionality is enabled before there is enough data available, providers may search several times without finding what they are looking for, creating a perception of limited value of HIE. For example, in Utah the lack of and gaps in data in the state provided HIE system led providers to question the value of the system. Providers reported it was very damaging to the reputation of state efforts to convince providers to use the cHIE when they were unable to find the needed data, leading to fear that use of the system would remain limited once data is available. In Iowa, the first health system ready to go live with query trained approximately 1,000 providers on how to use the system. However, given other systems were years away from being ready to join, it seemed unlikely hospital providers would see immediate value in HIE.

Providers in Vermont reported there is a tipping point in the amount of information necessary before rolling out the HIE's query capabilities to providers since it takes time to build the information base.

Limited Vendor Support for Providers and Hospitals Ineligible for Meaningful Use

Vendors de-prioritize providers outside of meaningful use. Providers who are not currently included under the EHR Incentive Programs (e.g., home health agencies and long-term care providers) received limited, if any, support from large commercial EHR vendors. They attributed this lack of support to the fact that EHR vendors prioritize getting their products purchased and implemented by providers eligible under meaningful use. In addition, home health agencies and long-term care providers tend to have their own unique systems and vendors. To enable exchange between home health and long-term care providers and the EHR or HIE systems they connect to will require the cooperation of vendors on both sides.

In addition, home health and long-term care representatives reported being a low priority for HIE vendors and expressed frustration with vendors' lack of motivation to complete the systems integration necessary to link their EHRs to state-led HIE systems. For example, providers in Utah must use a third-party intermediary in order to exchange information between their EHRs and the cHIE. They described this connection as tenuous and unstable; whenever there was a software update or other changes, the connection would break. Several provider representatives across other states discussed the value of HIE services for long-term care providers and home health agencies in improving care coordination and quality of care.

Overcoming the Lack of Interoperable Systems

EHR vendors are reluctant to embrace standards. Many providers in different states noted the difficulty of exchanging clinical care summary documents between different provider EHRs. EHR vendors use varied interpretation and implementation of standards, which results in products and services that are all slightly different. The result is sending and receiving systems are unable to integrate information effectively into their EHR systems, which some providers noted makes care coordination difficult. Such variation remains a barrier to achieving interoperability and thus care continuity.

> *"[The C-CDAs] are inconsistent. They meet the specifications, they are certified, but they don't give information that is meaningful in the context of an exchange network."*
>
> *−Provider Representative*

Even though certified EHR vendors support the consolidated-clinical document architecture (C-CDA) standard, the implementation of the

standard varies between different vendors. Consequently, providers exchange C-CDAs as PDFs or text and not as structured data, complicating integration into EHRs, which hinders access to complete patient information at the point of care. In addition, providers from a few states reported challenges with the lack of sufficient data elements included in the C-CDAs. For example, providers in Vermont reported that the structured fields in the current version of the C-CDA do not encompass certain valuable information necessary for quality transformation efforts under the Blueprint for Health initiative. VHIE is developing a workaround to include a flat file of additional data be submitted to the Blueprint registry along with the C-CDA to ensure data completeness.

Due to issues with establishing robust interfaces for exchange, providers are looking to directed messaging to meet immediate needs; however, they agree this will not address all use cases, nor is it a long term substitute for interoperability. In Utah, one provider anticipates making strides towards interoperability via Stage 2 meaningful use. Stage 2 interoperability requirements function as a carrot for the provider (incentive payments) and a stick for EHR vendors who must work together on standards and upgrade their products to avoid losing market share. Providers in Iowa agree that Stage 2 will drive interoperability progress in a meaningful way, and should be marketed to the health care community as a boon for patient outcomes. This type of communication strategy would reinforce the importance of interoperability as a beneficial health system priority, rather than simply a means to collect the associated incentive payments.

> *"Interoperability is an important part of Stage 2 meaningful use, and people's interest is growing. But people need to see real world examples of the success and the actual movement of data having positive impact on patient outcomes so that interoperability…can compete with all the things they are looking at this year."*
>
> *–EHR Vendor*

Role of the State HIE Program in Facilitating Exchange

Many providers, across states and in various stages of implementation with various levels of HIE success, believed that the State HIE Program contributed to building awareness around HIE and the benefits of exchanging information among providers of all types. Providers have also become more aware of the states' efforts to help them exchange data and meet meaningful use requirements. Especially among those who were not previously exposed to HIE—for example, physicians in small practices and safety-net providers—informants believed the work of the State HIE Program ensured these providers gained an understanding and appreciation for how HIE could benefit their day-to-day activities and patients. Providers indicated close collaboration between their state-led programs and the REC ensured a deeper

comprehension of how HIE fits into the bigger picture of health and health reform and spurred desire for HIE capabilities.

Providers in all states conveyed a general sentiment that a state-based HIE effort is important because of the neutrality of their role. Several providers found that the program created a neutral space for organizations that are usually competitors (in particular, hospitals and hospital systems) to work toward the same vision of meaningful data exchange. Even though the meaningful use program did not incent long-term care and behavioral health providers, the State HIE Program was instrumental in engaging these providers, identifying their specific needs and the gaps grantees needed to fill, particularly around care continuity. HIE organizations will need to continue engaging with these types of providers under payment reform efforts and requirements to exchange information to support care transitions and reduce hospital readmissions. These efforts also have the potential to expand the reach and importance of state-led HIE services with new partnerships.

Conclusion

Awareness of and demand for HIE has been steadily increasing throughout the life of the program. Providers we spoke with in previous and current activities reported an appreciation for the State HIE Program's role in communicating with providers of all types, bringing together stakeholders, and communicating the value of HIE. Now that HIE is better established—both in terms of visibility and available services—providers have identified new priorities and challenges. These have evolved from early issues surrounding basic implementation and awareness of the benefits of HIE into a search for solutions to meet greater demand for information, while balancing cost and multiple information exchange priorities.

Providers we spoke to in Iowa, Mississippi, New Hampshire, Utah, Vermont, and Wyoming recognized the utility of HIE both in the context of meaningful use and payment reform—which continue to be strong drivers of exchange—as well as in relation to their own health care delivery priorities. They highlighted ADT alerts, services related to care coordination, and facilitating exchange among all providers involved a given patient's care, whether in a different health system or a different state. As exchange needs, federal requirements, and overall demand increase, issues of cost remain at the forefront of providers' minds. While there continues to be federal support for HIE, the price of systems and dissatisfaction with EHR and HIE vendors (including relationships, meeting provider needs, and interoperability), as well as lack of technical staff to implement systems continue to be a concern to many.

These provider experiences offer insights into the current state of HIE at the provider level, its trajectory, and provider priorities for the immediate future. Findings from these conversations also highlight certain areas for additional attention: supporting providers in meeting meaningful use requirements and payment reform goals, including accounting for their challenges and priorities for HIE; bringing additional providers into the HIE fold who are instrumental to care coordination and other priorities but are not currently incentivized under meaningful use; and emphasizing interoperability at the EHR and HIE vendor level so that health system goals for exchange and improved patient care are achievable.

Appendix 1: Meaningful Use Requirements

The following table contains requirements related to health information exchange for Stage 1 and Stage 2 of meaningful use.

	Stage 1		Stage 2	
Objective	**Type of Objective**	**Measure**	**Type of Objective**	**Measure**
Generate and transmit permissible prescriptions electronically (does not apply to hospitals)	Core	More than 40% of all permissible prescriptions are transmitted electronically using certified EHR technology	Core	More than 50% of all permissible prescriptions are compared to at least one drug formulary and transmitted electronically using certified EHRs
Provide clinical summaries for patients for each office visit	Core	Clinical summaries provided to patients within 3 business days for more than 50% of all office visits	Core	Clinical summaries provided to patients within one business day for more than 50% of office visits
Incorporate clinical laboratory test results into EHRs as structured data	Menu	More than 40% of clinical laboratory test results whose results are in positive/negative or numerical format are incorporated into EHRs as structured data	Core	More than 55% of all clinical lab tests results whose results are either in a positive/negative or numerical format are incorporated into Certified EHRs as structured data
Submit electronic immunization data to immunization registries or immunization information systems(IIS)	Menu	Perform at least one test of data submission and follow-up submission (where registries can accept electronic submissions)	Core	Successful ongoing submission of electronic immunization data from Certified EHRs to an immunization registry or IIS for the entire EHR reporting period
Submit electronic syndromic surveillance data to public health agencies	Menu	Perform at least one test of data submission and follow-up submission (where public health agencies can accept electronic data)	Core	Successful ongoing submission of electronic syndromic surveillance data from Certified EHRs to a public health agency for the entire EHR reporting period
Submit electronic data on reportable laboratory results to public health agencies (choice for hospitals only)	Menu	Perform at least one test of data submission and follow-up submission (where public health agencies can accept electronic data)	Core	Successful ongoing submission of electronic reportable laboratory results from Certified EHRs to public health agencies for the entire EHR reporting period, and in accordance with State law and practice

	Stage 1		Stage 2	
Objective	**Type of Objective**	**Measure**	**Type of Objective**	**Measure**
Transition the patient to another setting of care or provider of care or refers that patient to another provider of care with an accompanying summary care record for each transition of care or referral	Menu	Provide a summary of care record for more than 50% of transitions of care and referrals	Core	Must satisfy two measures: provide a summary of care record for more than 50% of transitions of care and referrals, and must electronically transmit 10% of them using CEHRT or via an NwHIN Exchange organization. Must also satisfy one of the following: conduct one or more successful electronic exchange of a summary of care record with an EHR technology that is different than the sender's EHR technology, or conduct one or more successful tests with the CMS designated test EHR.
Provide patients the ability to view online, download and transmit their health information within four business days of the information being available to the eligible professional			Core	More than 50% of all unique patients seen by the eligible professional during the reporting period are provided online access to their health information within four business days after the information is available to the EP; also, more than 5% of all unique patients seen by the EP during the reporting period view, download, or transmit to a third party their health information.

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