EVALUATION OF THE STATE HEALTH INFORMATION EXCHANGE COOPERATIVE AGREEMENT PROGRAM

State Approaches to Enabling HIE:

Typology Brief

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Executive Summary

The Health Information Technology for Economic and Clinical Health (HITECH) Act established the State Health Information Exchange (HIE) Cooperative Agreement Program (State HIE Program) to expand the secure movement of electronic health information within the health care system. In June 2013, as part of the Program's national evaluation, NORC at the University of Chicago collected and analyzed data on state programmatic and policy efforts to enable HIE. This brief describes approaches used by program grantees to enable electronic HIE, and the similarities and differences in programmatic approaches. Approaches fell into three domains: HIE program leadership and organizational structure; legal and policy approach; and technical approach.

HIE Program Leadership and Organizational Structure

At a high-level, HIE program leadership and organizational structure varied on three domains:

- Whether the state or a state-designated entity (SDE) received program funds;

- Whether the state or SDE implemented the operational plan; and

- Whether a single entity led both the HIE and Regional Extension Center (REC) activities in a state.

Seventy-five percent of states opted for a state-led approach; however, 43 percent of these states appointed an SDE to lead HIE implementation of the state's strategic and operational plans, classified in this brief as an 'SDE-like' approach. For the other 25 percent of states, program funds went to 'true' SDEs, non-profit entities designated by the state as eligible to directly receive Cooperative Agreement funding from the federal government. In summary, in 57 percent of cases a non-state entity (SDE or SDE-like) was responsible for implementation efforts. State-led models benefit from enhanced ability to leverage state infrastructure, but may face budgetary and other challenges. States with true SDE and SDE-like structures often have more flexibility to respond to the evolving market and do not have to adhere to state procurement processes. An SDE-like approach may additionally benefit from greater ease to leverage connectivity to state agencies while maintaining operational flexibility.

Overall, 23 percent of grantees report that the HIE and REC program are co-located within the same organization or office. This organizational structure may further enhance the ability of these entities to reach providers needing HIE services.

Legal and Policy Approaches

Grantees used a multitude of levers including legislation, financial incentives, accreditation and certification of service providers, and consent policies to build stakeholder trust and enable HIE.

- Fifty-nine percent of states enacted legislation supporting HIE or both HIE and electronic health records. Many bolstered HIE with additional initiatives and financial incentives.

- Grantees accredited and/or certify Health Information Organizations (HIOs)/HIE service providers to increase stakeholder trust of HIE entities. Over one-third used voluntary or required accreditation and/or certification of HIOs/Health Information Service Providers (HISP) within their state.

- Almost 70 percent of grantees instituted an opt-out consent model to manage query-based exchange, while 16 percent established opt-in consent models.

Technical Approach

Technical approaches varied on multiple dimensions: whether a single or multiple organizations offered HIE services, whether the focus was on a 'push' and/or 'pull' form of information exchange, and which type of specific services were enabled or planned.

- Seventy percent of grantees used a single organizational entity to provide technical services across their states. Fifty percent of this group also planned to or had already connected sub-nodes across their states or regions to create a more inclusive sharing network.

- As of Q2 2013, most grantees (79 percent) had directed, or "push", exchange as a broadly available service, which offers providers a low cost option for electronic exchange and enables exchange in the absence of other more sophisticated services or systems.

- Query-based, "or pull", exchange allows providers to find or request patient information from other providers. As of Q2 2013, 68 percent of grantees had query-based exchange services broadly available statewide via one service provider (34 percent) or multiple service providers (20 percent).

- As of Q2 2013, 45 percent of grantees (n=25) had both directed and query-based exchange broadly available.

- Services offered by grantees align strongly with the Medicare and Medicaid EHR Incentive Programs' exchange requirements; 63 percent of grantees offer services promoting the exchange of clinical summary records, while 55 percent offer the delivery of electronic lab results. In planning for future services, grantees are focused on quality reporting (61 percent), enabling query capability, and

supporting EHR Incentive Programs' public health reporting requirements (55 percent), suggesting an evolution of HIE services that aligns with Stage 2 of the EHR Incentive Programs, which requires more sophisticated forms of information exchange among eligible providers and hospitals.

The typology has allowed us to characterize grantee programmatic approaches to enabling HIE. While these factors are not necessarily associated with programmatic progress or lack therefore, there is a clear, notable trend towards certain implementation models and approaches. Subsequent evaluation activities will look at the association between grantee approaches, contextual factors, and their impact on HIE progress.

Introduction

The Health Information Technology for Economic and Clinical Health (HITECH) Act, enacted as part of the American Recovery and Reinvestment Act of 2009, established the State Health Information Exchange (HIE) Cooperative Agreement Program to expand the secure movement of electronic health information within the health care system.[1] The original funding opportunity announcement (FOA) in August 2009 allowed grantees flexibility in selecting their leadership, technical, and policy structures. It also emphasized the importance of leveraging existing HIE infrastructure as they began planning and implementing their programs.[2] For some grantees, existing infrastructure consisted of a single, statewide HIE provider such as the Delaware Health Information Network (DHIN) with whom they collaborated to enhance offerings and enable new priority services across the state. Other states, like Indiana, had multiple existing health information organizations (HIOs), hospital systems with existing HIE networks between their hospitals and affiliated providers, or regional networks, which led them to focus on connecting these sub-nodes rather than on building new infrastructure for exchange.[3]

Guidance offered by the Office of the National Coordinator for Health IT (ONC) through a Program Information Notice (PIN) in 2010 emphasized the Program's support for all forms of HIE, recognizing that different approaches would be necessary in different states. In particular, ONC highlighted the utility of market-based strategies, such as leveraging existing networks of exchange like local and regional HIOs, health center networks, and integrated delivery systems.[4] ONC also advised grantees that "the immediate priority of the State HIE Program is to ensure that all eligible providers within every state have at least one option available to them to meet the HIE requirements of Medicare and Medicaid EHR Incentive Programs."[5] As the Program progressed, grantees found it necessary to employ a variety of technical solutions to meet local needs. For example, in Oregon where there were large pockets of connectivity already in place, the grantee focused on providing limited services that filled gaps in existing coverage. In other states, like Vermont, where there was limited local connectivity, the grantee focused on more extensive, centralized services to enable exchange.

This brief describes approaches used by grantees to enable electronic exchange and the similarities and differences in programmatic approaches. As the State HIE Program comes to an end, gathering insight on state approaches to enabling HIE will help inform future national and state-level policies to advance HIE.

Methods

To characterize factors used to facilitate HIE, data was collected on 17 variables relating to current programmatic efforts and policies from all states, territories and the District of Columbia. ONC Program Project Officers (POs) provided the initial data, which State Health IT Coordinators and/or State Designated Entity (SDE) Directors then validated. The State HIE Program Measures Dashboard also served as a data source. All data is current as of June 2013. A full list of variables is provided in the appendix.

The 17 variables were selected within three domains that prior qualitative evaluation studies of the Program and published literature indicate are important factors for enabling HIE. These domains are leadership and organizational structure, legal and policy approaches, and technical approach.

► **Program leadership and organizational structure**, including state leadership and stakeholder investment, structure, and governance.

For HIE to succeed, the stakeholders who benefit most must be actively engaged under strong leadership and need to see governance structures as trusted, transparent, and collaborative platforms. The type of lead agency selected by the state to implement the Program can offer advantages and disadvantages in staffing and expertise, process efficiency, competing financial interests, balanced/imbalanced inputs to ensure sustainability, insulation or protection from political changes, ability to secure matching funds, and accountability.

► **Legal and policy approaches**, including relevant state law and regulations, and levers such as financial incentives and certification/accreditation of HIE service providers.

Legal and policy levers may act as enablers or barriers to HIE. A 2009 survey of regional HIOs revealed 61 percent of respondents cited privacy and security concerns and 56 percent cited legal/regulatory challenges as moderate or substantial barriers to HIE.[6] Policies around the exchange of sensitive and/or behavioral health information may limit a state's exchange efforts. However, policy levers like accreditation have the potential to adapt to market needs and promote the use of best practices and continuous process improvement.

► **Technical approach**, consisting of grantees' selected high-level technical model, services provided, and approaches to directed exchange.

Grantees' technical model can range from a 'heavy infrastructure' model with features like a central repository on one end of the spectrum to a 'thin layer' model with services based on a light infrastructure

that supports functions such as translation and messaging across networks; some grantees employ blended approaches that leverage features from each technical model.

Principal Findings and Significance

Program Leadership and Organizational Structure

Grantees employed varying approaches to implement the Program. Some grantees opted for a state-led approach; that is, the state government was the direct recipient of ONC Program funds and led the HIE implementation efforts. **In 75 percent of cases, the state directly received program funds (Figure 1).** As an alternative to the state leading the Program, grantees could choose an SDE-like approach in which the state receives program funds but designates another entity, typically a non-profit organization, to lead HIE implementation efforts.[7] Of the states that directly received program funds, 43 percent of these states appointed an SDE to lead HIE implementation of the state's strategic and operational plans. In the 25 percent of states that did not receive Program funds directly, true SDEs received ONC Program funds and led HIE efforts. In summary, in 57 percent of cases a non-state entity (SDE or SDE-like) was responsible for implementation efforts.

**Figure 1:** Lead Entity Receiving Program Funds and Responsible for Implementing the Program
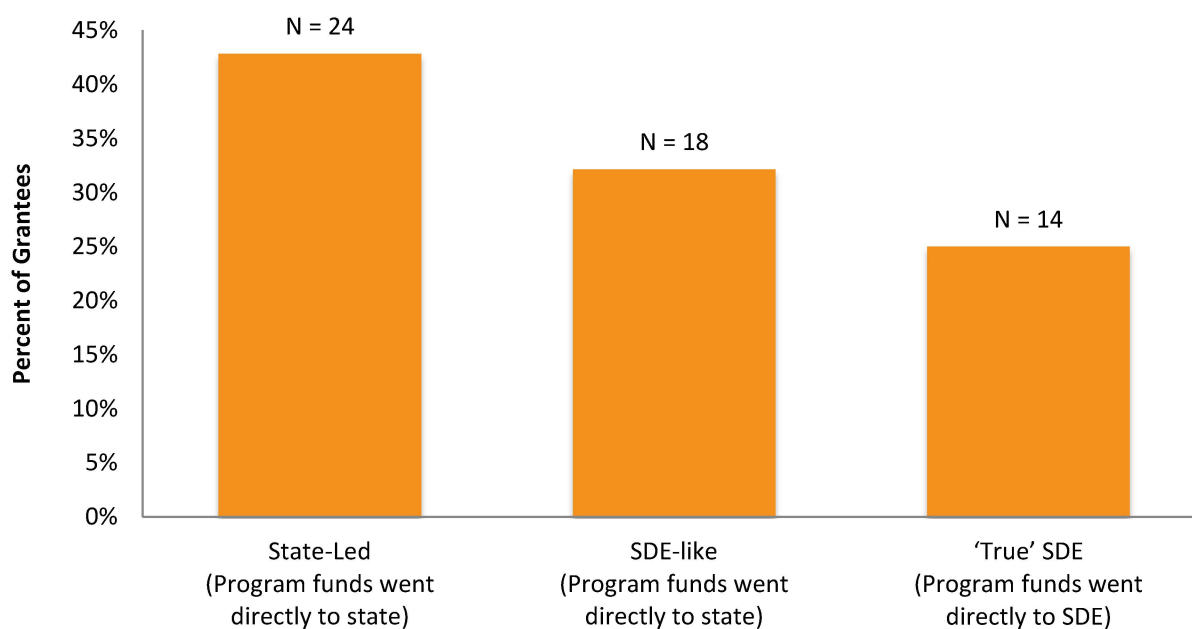
SOURCE: 2013 Program Data Collected by NORC

Prior evaluation findings suggest that programs with state-led approaches can benefit from an enhanced ability to provide direction, oversight, and transparency of activities, though states may often face budgetary challenges, administration and directional changes, or lack of flexibility to respond to a changing environment.[8] States directly leading HIE efforts have the advantages of leveraging existing state infrastructure and finances, and setting policies. However, they may have limited ability to evolve with the market. States with true SDEs often have more flexibility to respond to an evolving market, can engage multiple types of stakeholders, and can be insulated from government funding cuts though they may also have less competency managing federal grants. An SDE-like approach offers the same advantages as a true SDE and may provide greater operational flexibility and greater ease connecting to other state agencies. However, this governance structure may require the SDE to operate under more stringent state rules for e.g., procurement processes for HIE vendors.[9]

Another organizational factor that may influence HIE progress is whether the state's Regional Extension Center (REC) is co-located with the State HIE Program grantee. HITECH established the REC Program to help individual and small provider practices, and those who provide primary care services in public and critical access hospitals, community health centers, and other underserved settings, adopt and meaningfully use EHRs.[10] Only grantees that were SDEs or SDE-like entities could also be eligible for REC funding. **Overall, 23 percent of grantees report that the HIE and REC programs are co-located within the same organization or office (Figure 2).** The physical and organizational location of the grantee's program with an REC may enhance the grantee's ability to reach providers that need HIE services.

Figure 2: State HIE Program Co-located with the REC
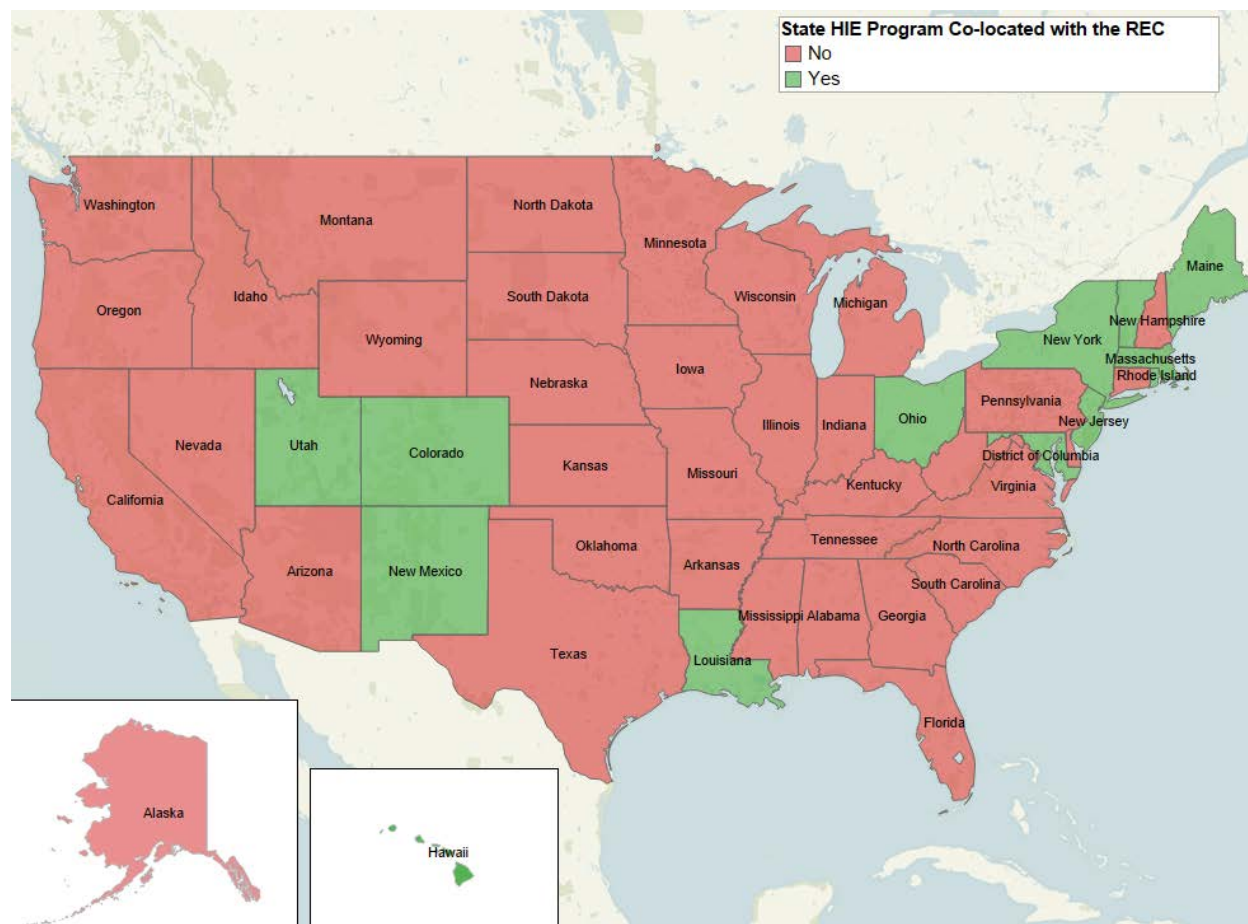
SOURCE: 2013 Program Data Collected by NORC

Legal and Policy Approaches

States can use legislative and policy levers, including regulation around patient consent, data ownership and storage, data sharing agreements, enforcement, liability laws, e-prescribing for controlled substances, third party audit of the exchange, exchange of behavioral health information, laboratory exchange, or access to newborn data, to promote the exchange of health information.[11] In fact, **59 percent of states have enacted legislation supporting HIE or HIE and electronic health records (EHRs), and many are bolstering its use with additional initiatives and financial incentives (Figure 3).** Thirty-six percent of states (n=20) have laws promoting HIE and 23 percent (n=13) support the use of both HIE and EHRs.

Figure 3: Legislation Passed
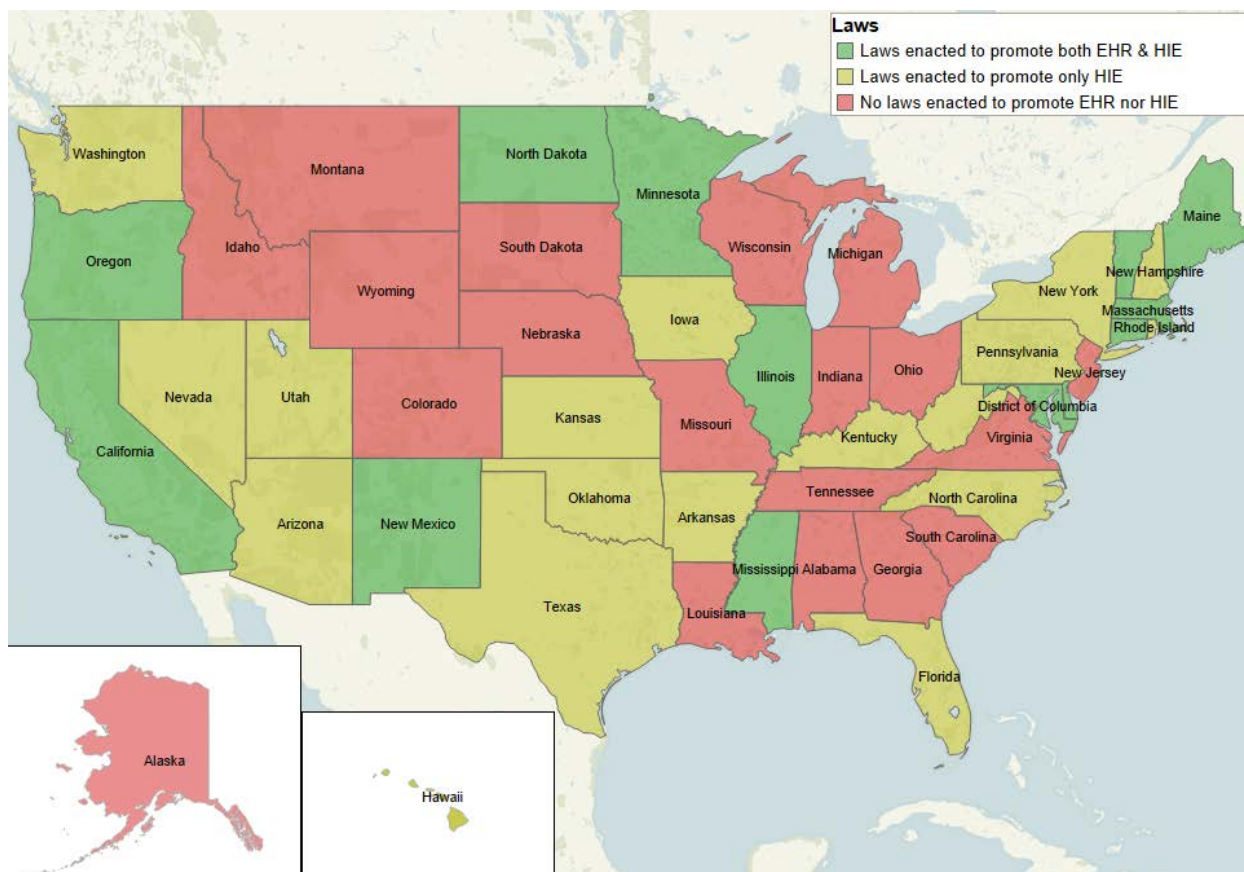
SOURCE: 2013 Program Data Collected by NORC

Additionally, states may mandate provider participation in the statewide HIE Program or address the Health Insurance Portability and Accountability Act (HIPAA) as it pertains to disclosure of personal health information.[12] For example, North Carolina passed House Bill 834 as part of the North Carolina Health Care Cost Reduction and Transparency Act of 2013, which requires all hospitals with EHR systems to connect to the North Carolina Health Information Exchange (NC HIE) in order to submit patient demographic and clinical data on services paid for by Medicaid.[13] Similarly, in 2011 the Maryland Commission mandated all acute care hospitals to submit demographic data to the Chesapeake Regional Information System for our Patients (CRISP), Maryland's SDE.[14]

Over one-third of states used voluntary or required accreditation and/or certification of HIOs/Health Information Service Providers (HISPs) within their state (Figure 4). States found they could accredit and/or certify HIE service providers to increase stakeholder trust in HIE efforts. In other cases, states that opted to makes sub-awards to existing HIOs required those HIOs to be accredited or certified by third parties as a pre-requisite for state funding. For example, the 2010 Minnesota Health

Information Exchange Oversight Law required entities aspiring to serve as HIE service providers to apply for a Certificate of Authority.[15] All State-Certified HIE Service Providers applying for certification to operate in Minnesota had to demonstrate established policies and practices to comply with all federal privacy and security laws, as well as those specific to Minnesota (many are more stringent than HIPAA).

States also certified HISPs, organizations that provide services necessary to enable point-to-point exchange using the Direct Protocol (discussed further in the Technical Approach section of this brief). HISP responsibilities include trust management between senders and receivers of secured messages.[16] For example, the Texas Program certifies HISP vendors to enable trust among providers using those vendors.[17]

Figure 4: Use of Accreditation/Certification of HISPs and/or HIOs as Policy Levers
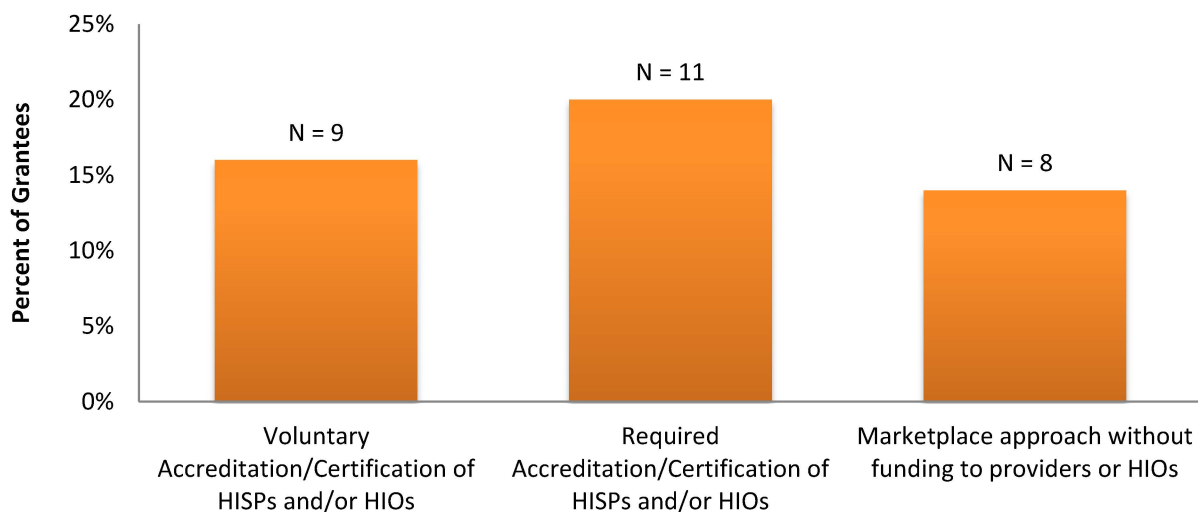
SOURCE: 2013 Program Data Collected by NORC

The data suggests that states that chose to directly receive program funds and lead operational efforts for HIE implementation were also more likely to enact legislation to promote HIE. **Of the 20 states using voluntary or required accreditation and/or certification of HIOs/HISPs, 60 percent (n=12) were state-led Programs (Figure 5).**

Figure 5: Lead Entity Receiving Program Funds and Responsible for Implementation, by Use of Policy Levers
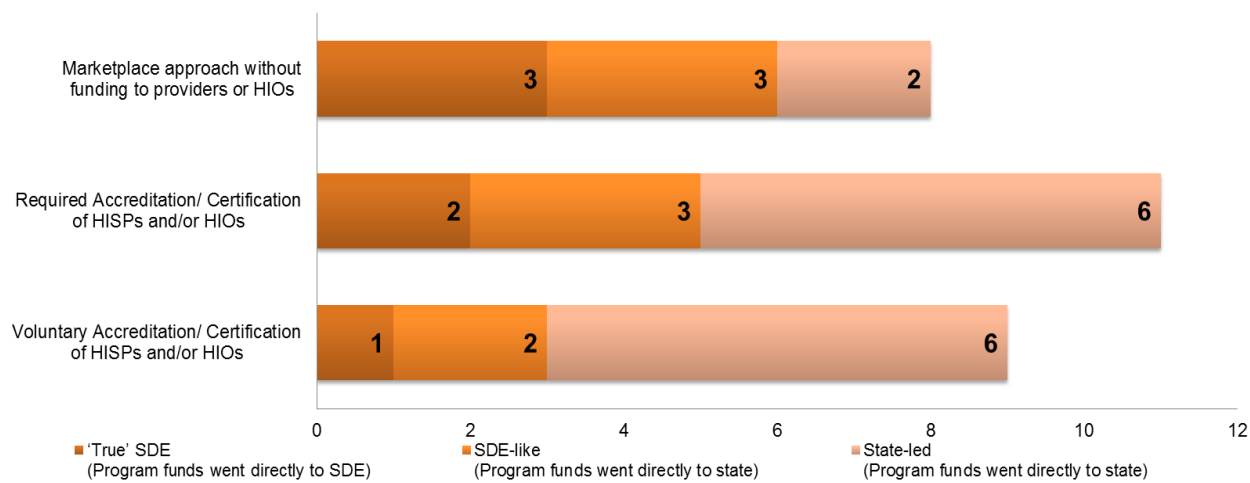
SOURCE: 2013 Program Data Collected by NORC

Furthermore, state consent policies are required when providers use query-based, or "pull", exchange (discussed in the Technical Approach section of this brief). In states with opt-out consent models, patients' data is automatically eligible to be exchanged unless the patient actively chooses to opt out.[18] Some opt-out states allowed patients to restrict certain data elements from being exchanged, including sensitive information like mental health and substance abuse data. Other states utilized opt-in models that required patients to actively consent for all or a pre-defined set of their data to be made available for electronic exchange. **Most grantees (68 percent) instituted an opt-out consent model and only 16 percent established opt-in consent models (Figure 6).** Grantees pursuing 'other' approaches to consent likely include states where there is no single statewide consent model selected.

Each type of consent model has both benefits and disadvantages. Opt-in models impose an upfront burden on providers as patients need to explicitly consent to the electronic exchange of their data. However, this model tends to engender significant patient trust. Grantees with opt-out consent models face fewer initial obstacles in getting patients to exchange their data electronically and can secure participation from the largest number of patients in information exchange while avoiding the challenges associated with obtaining individual patient consent. However, opt-out models can raise questions about patient privacy and security, particularly in relation to sensitive health data.

Figure 6:   Consent Model Selected by Grantee for Query-Based Exchange
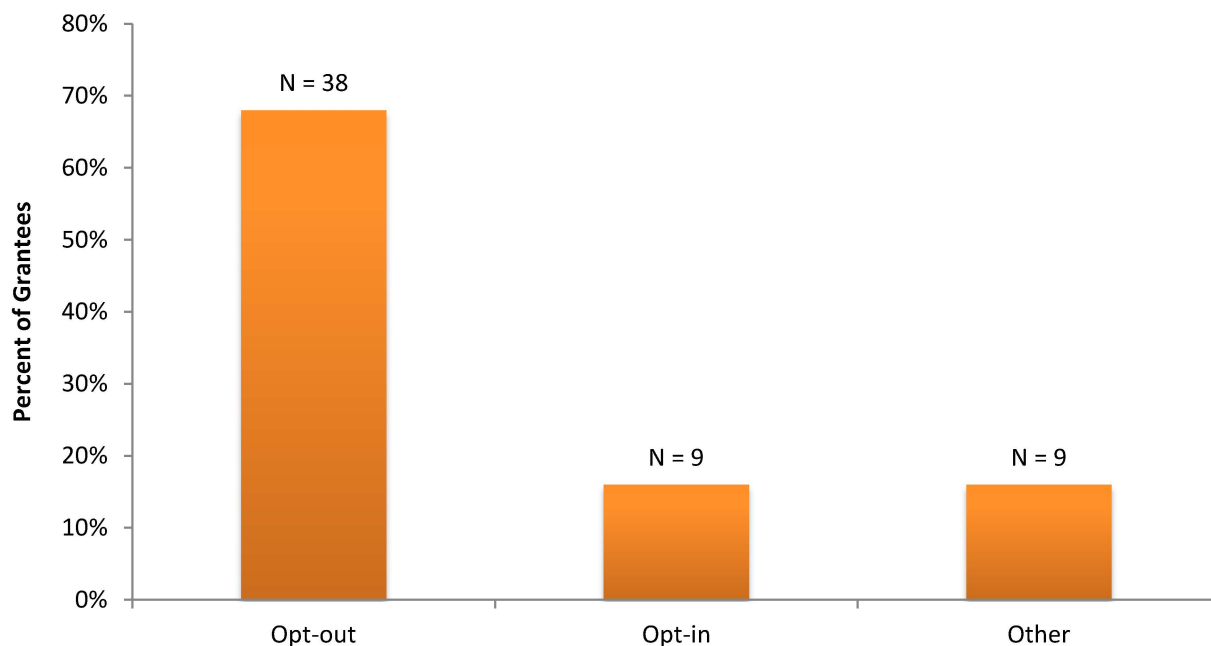
SOURCE: 2013 Program Data Collected by NORC

Technical Approach

A grantee's technical model encompasses the high-level approach and underlying support services that enable HIE to take place. The high-level approach includes using a single organizational entity that provides services across the state or using a market-based or capacity building approach where the grantee bolsters information exchange through financial support (i.e. sub-grants, for local HIOs) and technical assistance depending on state and local market needs and demands.[19] Though initially only four grantees were classified as using a capacity-building model for HIE, an increasing number (21 by September 2012) launched capacity-building approaches that included making sub-awards to existing HIOs, subsidizing provider costs for establishing interfaces, offering incentives to providers to use directed and query-based exchange services or providing exchange-related technical assistance to providers and health care delivery organizations.[20]

Although most grantees (70 percent) used a single organizational entity to provide technical services across the state, as opposed to achieving coverage with the help of multiple organizations, 50 percent of these grantees planned to or are connecting sub-nodes (Figure 7). Grantees can connect sub-nodes such as local and regional HIOs, large health systems, and health center controlled networks (HCCNs) across their states or regions to create a more inclusive sharing network. Grantees pursuing this

'mixed' model approach may be looking to leverage existing infrastructure while establishing central services to fill gaps in the market, ensuring all providers have options to participate in HIE.

Figure 7: Approach to Sub-nodes, by Grantees' General Approach to Enabling Exchange

■ No plan to connect sub-nodes ■ Plan to connect sub-nodes ■ Have connected sub-nodes ■ Not applicable
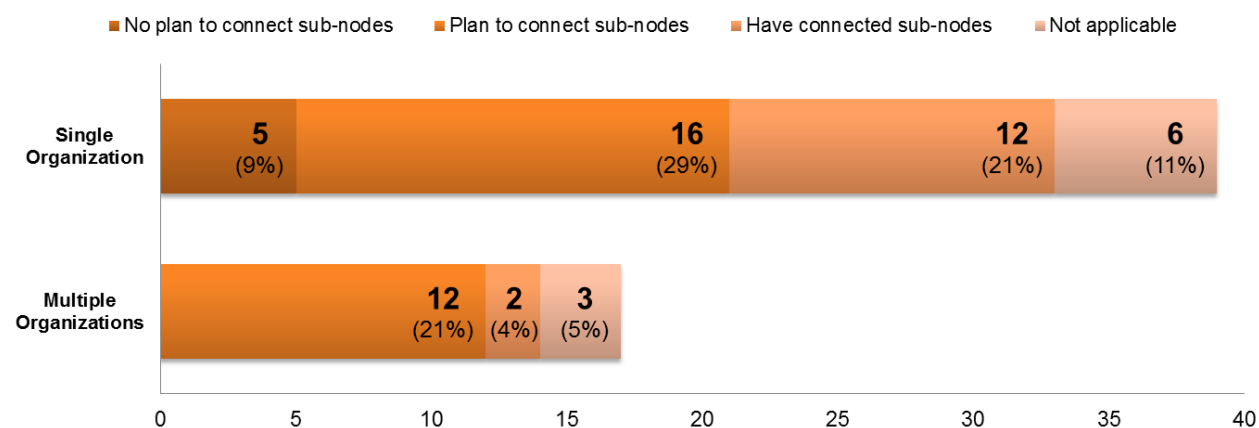
SOURCE: 2013 Program Data Collected by NORC

Various factors influenced a grantee's selection of a technical approach, including level of community involvement, state population, presence of established HIOs, and HIE maturity at the beginning of HITECH. In general, grantees sought to pursue models of HIE that were least disruptive to existing relationships and regulations.[21] Notable examples of grantees pursuing a central HIE infrastructure include Rhode Island, Maine, Delaware, and Vermont. Grantees pursuing market-based or capacity-building approaches include Indiana, Florida, Michigan, and Texas.[22]

Another key facet of the approaches grantees are taking to enable exchange is the option to support directed exchange, query-based exchange, or a combined approach. Directed, or "push", exchange is the ability to securely send and receive information electronically between care providers.[23] For instance, providers can exchange laboratory orders and results, patient referrals, and discharge summaries over the Internet in an encrypted, secure, and reliable manner, often compared to sending secured email. As of Q2 2013, **the vast majority of states (79 percent) had directed exchange as a broadly available service, compared to regional services only (4 percent) and pilot projects (7 percent) (Figure 8).** Directed exchange offers providers a low cost option to electronically exchange information with other providers and trading partners, and enables exchange in the absence of other more sophisticated services or systems.

Figure 8: Directed Exchange Implementation Status

SOURCE: ONC State HIE Program Measures Dashboard (Q2 2013) available here: http://www.healthit.gov/policy-researchers-implementers/state-hie-program-measures-dashboard

Sixty-three percent of grantees are offering directed exchange services or contracting with HISPs to provide the service (Figure 9). Some grantees (34 percent) are offering providers financial incentives for connecting to HISPs, while 18 percent are certifying or qualifying HISPs as Direct service providers. Forty-three percent of grantees are enabling directed exchange services through other mechanisms. These findings suggest that in most cases, grantees chose an implementation approach to Direct, which gave them greater control of how and by whom these services were established.

Figure 9: Grantee Approach to Facilitating Directed Exchange Services
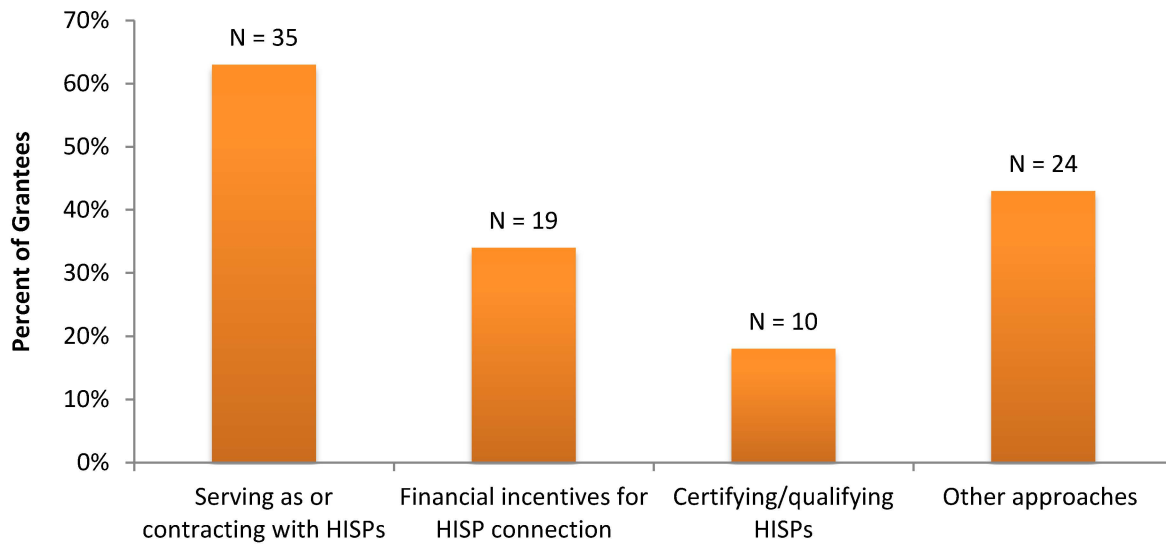
SOURCE: 2013 Program Data Collected by NORC

Of the states with directed exchange broadly available (n=44), 70 percent are serving as or contracting with HISPs, 36 percent are providing financial incentives to encourage connections to HISPs, and 23 percent are certifying or qualifying HISPs (Figure 10). Forty-one percent of grantees with directed exchange broadly available across the state are using other approaches to facilitate directed messaging. These findings suggest grantees who served as or contracted with HISPs had a higher likelihood of making directed exchanging broadly available.

Figure 10: Grantee Approach to Facilitating Direct Services, in States with Directed Exchange Broadly Available
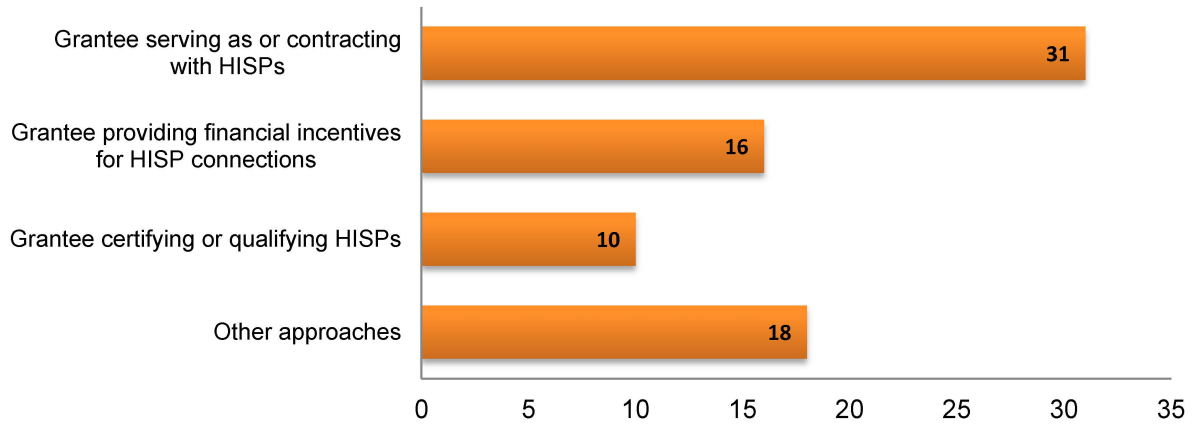
SOURCE: 2013 Program Data Collected by NORC

Alternatively, grantees and providers may enable query-based, or "pull", exchange, meaning that providers have the ability to search and retrieve stored health information. For example, providers in emergency departments may query other providers for access to patient information such as medications, recent radiology images, and problem lists. As of Q2 2013, **68 percent of grantees have implemented query-based exchange and have made these services broadly available statewide via one service provider (34 percent) or multiple service providers (20 percent), with 14 percent of states offering services only to certain regions (Figure 11).**

Figure 11: Query-based Exchange Implementation Status
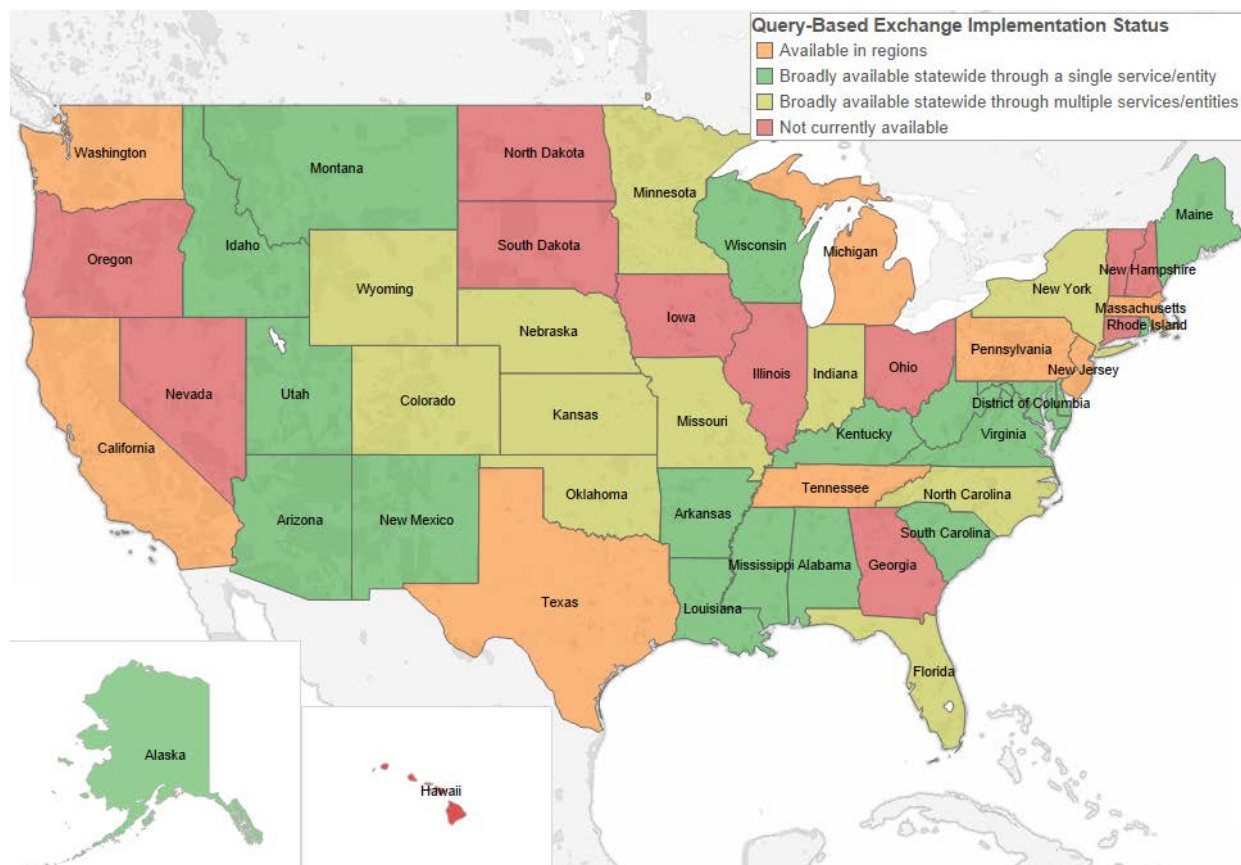
These findings confirm grantees have pursued both short- and long-term goals in enabling HIE, which requires the evolution of exchange models. In the short-term, grantees focused on directed exchange to ensure that all providers had at least one option to exchange information and comply with the EHR Incentive Programs' Stage 1 meaningful use requirements. In the longer-term, grantees are pursuing strategies to enable more robust, query-based exchange.[24] As of Q2 2013, 45 percent of states (n=25) have both directed and query-based exchange broadly available (Figure 12).

Figure 12: States with Directed and Query-based Exchange Broadly Available
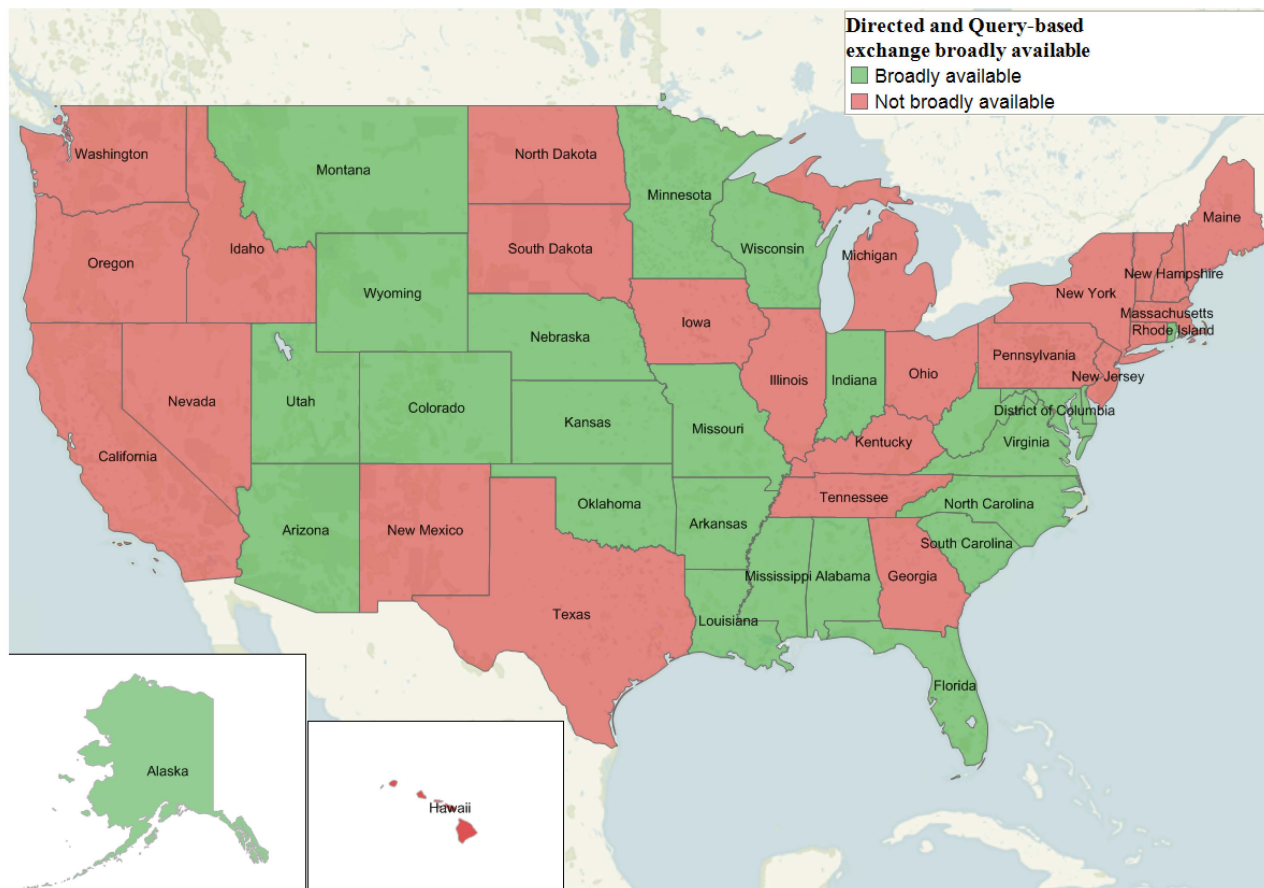
Source: SOURCE: ONC State HIE Program Measures Dashboard (Q2 2013) available here: http://www.healthit.gov/policy-researchers-implementers/state-hie-program-measures-dashboard

Top Ten Services Currently Offered or Planned

Grantees offer a range of services, from consent management and provider directory services to secure messaging. Twenty-nine percent offer or enable 11 to 15 services, 38 percent offer six to ten services, and the remaining grantees (34 percent) offer or enable five or less services. **Current services offered by grantees align strongly with the EHR Incentive Programs' Stage 1 HIE priorities (Figure 13).** Sixty-three percent (n =35) offer the exchange of clinical summary records while fifty-five percent (n= 31) offer the delivery of electronic lab results. The other top services offered are secure messaging and/or Direct (75 percent), and HISP services (61 percent), all necessary elements for 'push' forms of information exchange. Stage 1 of the EHR Incentive Programs established HIE objectives in specific areas: electronic prescribing, exchange of clinical care summaries, integrating laboratory results into EHRs and reporting of immunizations and syndromic surveillance data to public health departments.[25] In their July 2010 PIN,

ONC emphasized that grantees should focus on enabling three of these HIE capabilities: e-prescribing, receipt of structured lab results, and sharing of patient care summaries.[26]

Figure 13: Top Ten Services Directly Offered or Enabled* by Grantees

Percent of Grantees

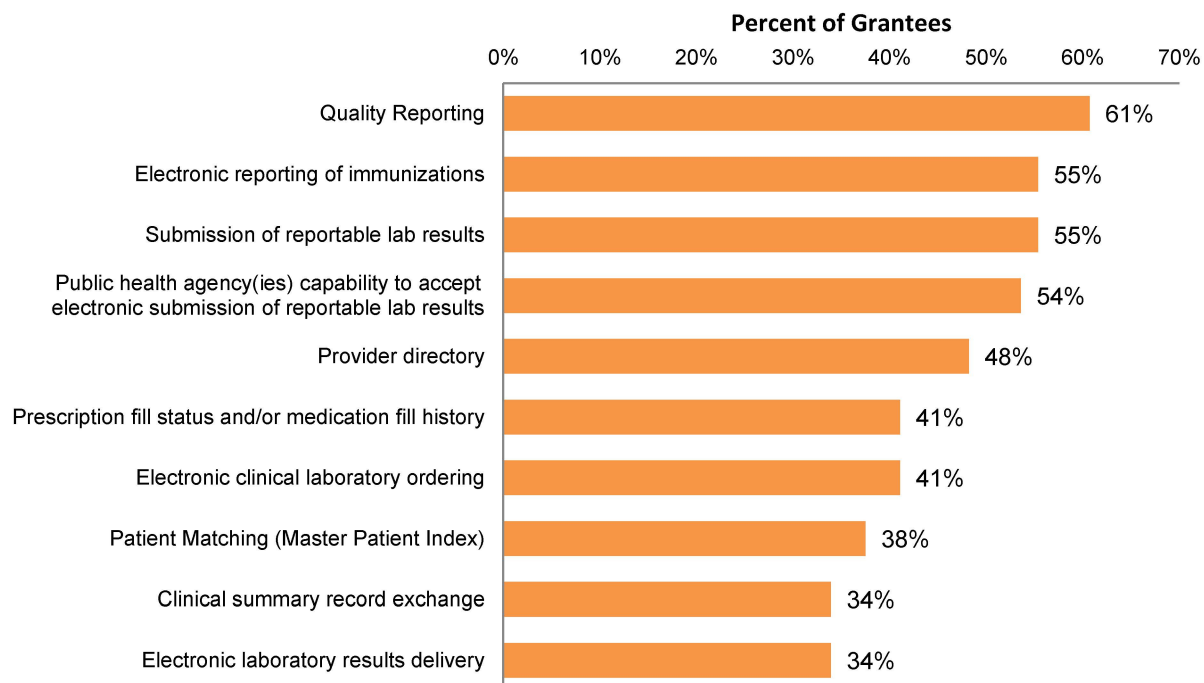| Service	Percent
Secure messaging and/or Direct	75%
Clinical summary record exchange	63%
Health Information Service Provider (HISP)	61%
Electronic laboratory results delivery	55%
Provider authentication as shared service	55%
Patient Matching (Master Patient Index)	46%
Public health agency(ies) capability to accept electronic submission of reportable lab results	41%
Provider directory	38%
Consent Management	36%

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* Directly offers refers to where the state is directly providing the service. Enables refers to the state supporting the service through funding another entity or through providing technical assistance.

SOURCE: 2013 Program Data Collected by NORC

Stage 2 of the EHR Incentive Programs' meaningful use requirements have markedly expanded the HIE requirements for providers to improve care coordination and care quality, and reduce inefficiencies such as duplicative testing.[27] **Grantees' top ten planned services will be focused around quality reporting, enabling query capability, and supporting meaningful use public health reporting requirements (Figure 14).** Sixty-one percent of grantees (n=34) plan to offer quality reporting services, while fifty-five percent (n=31) plan to offer the electronic reporting of immunizations or the submission of reportable lab results to public health departments. These findings suggested an evolution of HIE services to support more sophisticated forms of information exchange that will help providers meet the Stage 2 requirements of the EHR Incentive Programs and support payment/care delivery reform.

Figure 14: Top Ten Services Grantees Plan to Directly Offer or Enable*

Percent of Grantees

Quality Reporting	61%
Electronic reporting of immunizations	55%
Submission of reportable lab results	55%
Public health agency(ies) capability to accept electronic submission of reportable lab results	54%
Provider directory	48%
Prescription fill status and/or medication fill history	41%
Electronic clinical laboratory ordering	41%
Patient Matching (Master Patient Index)	38%
Clinical summary record exchange	34%
Electronic laboratory results delivery	34%

* Directly offers refers to where the state plans to directly provide the service. Enables refers to the state planning to support the service through funding another entity or through providing technical assistance.

SOURCE: 2013 Program Data Collected by NORC

Conclusion

The typology has allowed us to characterize programmatic approaches among State HIE Program grantees to enabling HIE. Leadership and governance structures, legal and policy approaches, and technical models are important factors in the grantees' abilities to enable or expand HIE. While these factors are not necessarily associated with programmatic progress or lack therefore, there is a clear trend towards certain implementation models and approaches.

HIE leadership models range from state-led approaches, where the states themselves are implementing the Program, to true SDE approaches where a third party designated entity was the direct recipient of program funds and is leading HIE implementation efforts. Though the majority of states (75 percent) received program funds, 43 percent of these states opted to employ an SDE-like approach where the state designated another entity to lead implementation efforts. In summary, in 57 percent of cases a non-state entity (SDE or SDE-like) was responsible for implementation efforts. These findings suggest that at least half of the states are decoupling governance and technical roles, allowing entities to "play to their

strengths." Using this approach, the state provides guidance based on the policy and legislative environment while an SDE provides technical expertise and market savvy.

Many states are using legal and policy levers as mechanisms to promote HIE activities. These include 59 percent of states enacting legislation that promotes HIE and/or EHRs adoption, and over one-third accrediting and/or certifying HIE service providers (such as HIOs or HISPs) to increase stakeholder trust of HIE entities. Grantees pursuing query-based exchange have also adopted statewide consent policies; the opt-out consent model has been the most commonly selected approach with about 68 percent of grantees pursuing that option.

Grantees' technical approaches range from using a single organizational entity that provides services across the state or using a market-based or capacity building approach where the grantee bolsters information exchange through financial support and technical assistance depending on state and local market needs and demands. Although most (70 percent) used a single organizational entity to provide technical services, half of these grantees plan to or are connecting sub-nodes. These findings suggest grantees are leveraging existing exchange infrastructure, including both private and community-based HIOs.

Seventy-nine percent of grantees have directed exchange as a broadly available service across the state and 68 percent have implemented query-based exchange, making these services broadly available statewide via one service provider or multiple service providers. Current services offered align strongly with the EHR Incentive Programs' Stage 1 meaningful use HIE priorities, while states' top ten planned services are focused on provider needs for Stage 2 requirements (i.e., supporting quality reporting and meaningful use public health reporting requirements). These findings confirm states have pursued both short- and long-term goals in enabling HIE, which suggests an evolution of HIE services to support more sophisticated forms of information exchange.

Subsequent evaluation activities will assess the impact of grantees approaches and state contextual factors such as geography, demographics, healthcare market characteristics, health IT and HIE maturity at the outset of HITECH on HIE outcomes. Using a combination of secondary data sources and qualitative data from case studies we will analyze the key factors promoting HIE progress.

Appendix

This appendix includes all the data tables derived from the typology analysis exercise and the full variable list.

Table 1: Lead Entity Receiving Program Funds and Responsible for Implementation

State Received Program Funds	Frequency	Percent
State-Led (Program funds went directly to state)	**24**	**43%**
SDE-like (Program funds went directly to state)	**18**	**32%**
True SDE (Program funds went directly to SDE)	**14**	**25%**
Total	**56**	**100%**

Table 2: State HIE Program Co-located with the REC

	Frequency	Percent
No	43	77%
Yes	13	23%
Total	**56**	**100%**

Table 3: Legislation Passed

Legislation	Frequency	Percent
No laws enacted to promote EHR nor HIE	23	41%
Laws enacted to promote only HIE	20	36%
Laws enacted to promote both EHR & HIE	13	23%
Total	**56**	**100**

Table 4: Use of HISP-Related Policy Levers (Accreditation, Certification)

Policy Levers	Frequency	Percent
Voluntary Accreditation/Certification of HISPs and/or HIOs	9	16%
Required Accreditation/Certification of HISPs and/or HIOs	11	20%
Marketplace approach without funding to providers or HIOs	8	14%

Table 5: Lead Entity Receiving Program Funds and Responsible for Implementation, by Use Accreditation/Certification of HISPs and/or HIOs as Policy Levers

		Use of Policy Levers			Total
		Voluntary Accreditation/ Certification of HISPs and/or HIOs	Required Accreditation/ Certification of HISPs and/or HIOs	Marketplace approach without funding to providers or HIOs	
Entity Receiving Program Funding	True SDE *(Program funds went directly to SDE)*	1	2	3	6
	SDE-like *(Program funds went directly to state)*	2	3	3	8
	State-led *(Program funds went directly to state)*	6	6	2	14
	Total	9	11	8	28

Table 6: Consent Model Selected by Grantees for Query-based Exchange

	Freq.	Percent
Opt-out	38	68%
Opt-in	9	16%
Other	9	16%
Total	**56**	**100%**

Table 7: Grantee's General Approach to Enabling Exchange

	Frequency	Percent
Single organization entity is responsible for providing services across the state	39	70%
Multiple organizations cover state (*market-based or capacity building approaches*)	17	30%
Total	**56**	**100%**

Table 8: Approach to Sub-nodes

	Frequency	Percent
No plan to connect sub-nodes	5	9%
Plan to connect sub-nodes	28	50%
Have connected sub-nodes	14	25%
Not applicable	9	16%
Total	**56**	**100%**

Table 9: Approach to Sub-nodes, by Grantees' General Approach to Enabling Exchange

		What is the grantee's general approach to enabling exchange?		
		Single Organization	**Multiple Organizations**	**Total**
Is there a plan to connect sub-nodes?	**No plan to connect sub-nodes**	**5** (8.9%)	**0** (0%)	**5** (8.9%)
	Plan to connect sub-nodes	**16** (28.6%)	**12** (21.4%)	**28** (50%)
	Have connected sub-nodes	**12** (21.4%)	**2** (3.6%)	**14** (25%)
	Not applicable	**6** (10.7%)	**3** (5.4%)	**9** (16.1%)
	Total	**39** (69.6%)	**17** (30.4%)	**56** (100%)

Table 10: Directed Exchange Implementation Status as of Q2 2013

	Frequency	Percent
States/territories with directed exchange broadly available	44	79%
States/territories with directed exchange available in regions but not statewide	2	4%
States/territories piloting directed exchange solutions	5	9%
States/territories with directed exchange currently unavailable	5	9%
Total	**56**	**100**

Table 11: Grantee Approach to Facilitating Direct Services

	Frequency	Percent
Is the grantee serving as or contracting with HISPs?	35	63%
Is the grantee providing financial incentives to encourage connection to HISPs?	19	34%
Is the grantee certifying or qualifying HISPs?	10	18%
Is the grantee using other approaches to enable Direct?	24	43%

Table 12: Grantee Approach to Facilitating Direct Services, by Directed Exchange Implementation Status

States with directed exchange broadly available (n=44)		Number	Percent
Grantee Approach to Facilitating Direct Services	Is the grantee serving and contracting with HISPs?	31	70%
	Is the grantee providing financial incentives to encourage connection to HISPs?	16	36%
	Is the grantee certifying or qualifying HISPs?	10	23%
	Is the grantee using other approaches to enable Direct?	18	41%

Table 13: Query-Based Exchange Implementation Status as of Q2 2013

	Frequency	Percent
Operational query-based exchange broadly available statewide through a single service/entity	19	34%
Operational query-based exchange broadly available statewide through multiple services/entities	11	20%
Operational query-based exchange available in regions but not statewide	8	14%
No operational query-based exchange options available	18	32%
Total	**56**	**100**

Table 14: States with Directed and Query-Based Exchange Broadly Available

Query-Based Exchange Implementation Status	Directed Exchange Implementation Status				
	Available in regions	Broadly available	Not currently available	Pilot	Total
Available in regions	1	5	1	1	8
Broadly available statewide through a single service/entity		15	1	3	19
Broadly available statewide through multiple services/entities	1	10			11
Not currently available		14	3	1	18
Total	2	44	5	5	56

Table 15: Top Ten Services Directly Offered or Enabled by Grantees

Services Offered	Grantee Offers Directly or Enables Service*
Secure messaging	39
Direct	39
Clinical summary record exchange	35
Health Information Service Provider (HISP)	34
Electronic laboratory results delivery	31
Provider authentication as shared service	31
Patient Matching (Master Patient Index)	26
Public health agency(ies) capability to accept electronic submission of reportable lab results	23
Provider directory	21
Consent Management	20

Table 16: Top Ten Services Grantees Plan to Directly Offer or Enable

Services Offered	Grantee Plans to Offer Directly or Enable*
Quality Reporting	34
Electronic reporting of immunizations	31
Submission of reportable lab results	31

Services Offered	Grantee Plans to Offer Directly or Enable*
Public health agency(ies) capability to accept electronic submission of reportable lab results	30
Provider directory	27
Prescription fill status and/or medication fill history	23
Electronic clinical laboratory ordering	23
Patient Matching (Master Patient Index)	21
Clinical summary record exchange	19
Electronic laboratory results delivery	19

Table 17: State HIE Program Variables

Variable	Responses
Entity funded by ONC under the State HIE Program	■ Yes ■ No
Lead entity responsible for implementing approved strategic and operational plan	■ SDE-like ■ True SDE ■ State led
What is the grantee's general approach to enabling exchange?**	■ Single organization entity is responsible for providing services across the state (SDE/SDE-like) ■ Multiple organizations cover state (market-based or capacity building approaches)
Directed exchange implementation status**	■ States/territories with directed exchange broadly available ■ States/territories with directed exchange available in regions but not statewide ■ States/territories piloting directed exchange solutions ■ States/territories with directed exchange currently unavailable
Query-based exchange implementation status**	■ Operational query-based exchange broadly available statewide through a single service/entity ■ Operational query-based exchange broadly available statewide through multiple services/entities ■ Operational query-based exchange available in regions but not statewide ■ No operational query-based exchange options available
Legislation passed	■ No laws enacted to promote EHR nor HIE ■ Laws enacted to promote only EHR ■ Laws enacted to promote only HIE ■ Laws enacted to promote both EHR & HIE
State clinical lab test release laws	■ No, the state does not have this ■ Yes, the state has this
Use of policy levers (accreditation, certification)	■ None ■ Voluntary Accreditation/Certification ■ Required Accreditation/Certification ■ Marketplace approach without funding to providers or HIOs

Variable	Responses
Trust framework for Direct: approach to digital certificates	■ None ■ Individual certificates ■ Organization level certificate ■ HISP level certificates ■ Mixed
Consent model selected by states for query-based exchange	■ Opt-out ■ Opt-out with exception ■ Opt-in ■ Other
Capacity-building: has the grantee taken the following approach(es) for capacity building?	■ Funding available to providers to connect to HIO / HISP (e.g., vouchers or grants) ■ Funding available for white space (sign-up a requisite number of providers in a specific geographic area that previously did not have HIE services) ■ Direct funding to HIOs to develop or expand services ■ Funding technical assistance (e.g., REC for HIE)
Approach to sub-nodes (local/regional HIOs, large health systems, HCCNS)	■ No plan to connect sub-nodes ■ Plan to connect sub-nodes ■ Have connected sub-nodes ■ Not applicable
Have you ever received funding for a Regional Extension Center?*	■ Yes ■ No
In what department does the State HIT Coordinator currently sit within your state government (check all that apply)*	■ Governor's Office ■ Separate Health IT Office ■ Public Health ■ Medicaid ■ Public Health and Medicaid ■ Other
How many different persons have served as State HIT Coordinator since the grant was awarded?*	■ Number of different persons
State/SDE approach to facilitating Direct services	■ Is the state serving and contracting with HISPs? ■ Is the state providing financial incentives to encourage connection to HISPs? ■ Is the state certifying or qualifying HISPs? ■ Is the state using other approaches to enable Direct?

Variable	Responses
Services ■ Provider authentication as shared service ■ Patient matching (Master Patient Index) ■ Statewide licensed clinical laboratory directories ■ Authoritative, statewide health plan directories ■ Provider directory ■ Claims transactions ■ Electronic eligibility ■ Quality reporting ■ Prescription fill status and/or medication fill history ■ Submission of reportable lab results ■ Public health agency(ies) capability to accept electronic submission of reportable lab results ■ Electronic reporting of immunizations ■ Electronic clinical laboratory ordering ■ Secure messaging ■ Direct ■ Clinical summary record exchange ■ Electronic laboratory results delivery ■ ePrescribing ■ Consent management ■ Health Information Service Provider	■ Grantee directly provides this service as of February 2013 ■ Grantee does not currently directly provide this service, but plans to do so in the next 12 months ■ Grantee currently enables this service through funding or technical assistance as of February 2013 (e.g., capacity building) ■ Grantee does not currently enable this service through capacity building, but plans to do so in the next 12 months ■ No, the grantee does not provide/enable this service nor does it plan to do so in the next 12 months

* Questions added during the state validation exercise.
** Items populated using the ONC Health IT Dashboard.

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