State HIE Strategic and Operational Plan Emerging Models

Department of Health & Human Services (HHS) Office of the National Coordinator for Health Information Technology (ONC)

The Office of the National Coordinator for
Health Information Technology

Department of Health & Human Services (HHS) Office of the National Coordinator for Health Information Technology (ONC)

State HIE Strategic and Operational Plan Emerging Models

DRAFT

February 16, 2011

Table of Contents

Introduction

State governments or their designated entities (SDEs) play a critical role in advancing health information exchange to accelerate meaningful use, improve care outcomes and increase efficiency of care delivery. As partners in the four-year State HIE Cooperative Agreement Program, state leaders and ONC have been working closely together to draft, review, and finalize Strategic and Operational plans. As plans are approved and activities move from planning into implementation and evaluation phases, it is evident that multiple approaches are being used to achieve program goals. The variety of models reflects that each plan is tailored to the existing capacity, exchange patterns and market conditions in the state.

ONC has identified four broad illustrative models emerging from the plans approved to date:

- **Elevator** – Rapid facilitation of directed exchange capabilities to support Stage 1 meaningful use

- **Capacity-builder** – Bolstering of sub-state exchanges through financial and technical support, tied to performance goals

- **Orchestrator** – Thin-layer state-level network to connect existing sub-state exchanges

- **Public Utility** – Statewide HIE activities providing a wide spectrum of HIE services directly to end-users and to sub-state exchanges where they exist

In the sections below, we describe how these models can be used, important assumptions that should be taken into consideration in reviewing the models, successful approaches that apply across all models, and a detailed description of each of the models.

Goals and Objectives

These models can be useful in a wide variety of ways:

- *For grantees still in the plan approval process*, the models can highlight approaches that approved plans have used to build on local assets and exchange conditions to enable Stage 1 meaningful use requirements.

- *For grantees whose plans have been approved,* the models can provide valuable perspective for the ongoing refinement and phasing of their approaches.

- *For all grantees*, the models can expedite the process for revision, review and technical assistance for State HIE Strategic and Operational plans and identify grantees that have common characteristics to share perspectives, promising practices, and lessons learned.

- *For sub-state exchanges, providers, provider organizations and commercial vendors*, the models can provide frameworks and strategies to help shape their own HIE plans and investments.

- *For researchers and industry analysts*, the models can provide evaluation frameworks to support study and analysis of the successes and challenges of emerging models.

Scope and Assumptions

Readers need to be aware of the assumptions used in articulating the models and important caveats to applying the models in practice:

- The models are based on the patterns observed in State HIE Strategic and Operational plans that have been approved at the time of analysis. As more plans are approved and grantees adjust their strategies based on implementation experience, the models may shift or new models may emerge.

- Though some states are highlighted to showcase key elements of each of the models, it should be noted that no model completely describes any particular grantee or set of grantees, and no grantee or set of grantees exactly fits into any particular model. Indeed, most grantees exhibit characteristics of more than one model.

- The models serve only as a guide to highlight common practices and approaches among approved plans. A successful approach in any state or territory will be one that is viable and achievable given the local characteristics of the grantee, complementing the local HIE environment.

- The models are reflections of what exists in the approved plans today and are provided as a tool for plan development and refinement. Adopting a particular model or combination of models does not guarantee ONC approval of a plan or plan refinement.

- None of the models or approaches is favored over another, nor is there any assumption that the models represent "stages of maturity" or "levels of progression". Successful plans make the best use of available resources to achieve HIE program goals, taking into account the strengths and constraints of current local market conditions. The approach that most effectively accomplishes this is the right model for any particular state or territory.

- Please note the following terms and definitions used throughout this document:

  o Sub-state network or node – This term refers to coordinated HIE activity usually focused on a specific geography or health care delivery system, such as a regional HIO, integrated delivery network (IDN) or hospital-based HIE. Nodes coordinate governance and services to a specific end-user base. In a "network-of-networks" approach, these nodes provide governance and services to end-users and also act as gateway entities to orchestrate exchange activities and services between their end-users and higher-layer networks. For simplicity, this term also includes exchange services provided by cross-state national service providers such as EHR vendors, Surescripts, and telecommunications companies.

  o Un-tethered providers – End-users currently not connected with a state-level or sub-state network through which they can access HIE services. Also known as "white space".

  o HIO (health information organization) – An organization that manages governance and deployment of coordinated HIE services for exchange of PHI among clinical entities. Collaborative HIOs encompass multiple clinical entities across legal entities or arrangements. Enterprise HIOs provide such services within a legal entity (like an IDN) or trading arrangement (such as an OHCA or organized health care arrangement).
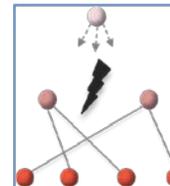
Strategic and Operational Plan Promising Practices

Regardless of the model adopted, state plans approved to date display many common promising practices:

- **Focus on strategies that rapidly enable providers to achieve meaningful use** – Though HITECH represents the most significant financial investment in HIT in our nation's history, there is not sufficient federal funding to meet all robust exchange requirements for all potential participants. States must catalogue, assess, utilize as necessary, and constantly monitor current and developing HIE capabilities within regions, communities, and enterprises. Instead of attempting to solve the HIE needs of all stakeholders, ONC encourages grantees to adopt gap-filling approaches which focus on energizing the activities of those who are already investing in HIE and providing essential services for those stakeholders currently without HIE capabilities (e.g. critical access hospitals, rural health clinics, solo practices etc.).

- **Recognize and leverage existing assets within the state** – States must be realistic about what is feasible within limited financial constraints and tight implementation timeframes. ONC expects states to capitalize on existing HIE capabilities and on other HITECH programs in the state (Regional Extension Centers (RECs), Beacon Communities, Workforce programs, etc.) to share resources and align strategies. Grantees are strongly encouraged to embrace and enable services and approaches to complement existing regional/community HIOs, enterprise exchanges or existing state-level programs currently enabling data exchange, rather than viewing existing infrastructure or entities as competitive or a threat to sustainability. State leaders should also use policy and contracting levers to extend HIE capabilities while focusing on building capacity to address gaps in functionality, access or use.

- **Take a viable and incremental approach –** Grantees should consider how to develop statewide interoperability in phases, ensuring that each phase of the work plan has clear deliverables for users and benchmarks indicating success, building the confidence of stakeholders and providing necessary momentum and support for moving to the next stage. Early efforts can focus on achieving basic data exchange in 2011 – rapidly increasing data liquidity while also meeting stakeholder expectations from a technical and business perspective. This may require development of openly available state-level services—such as directories—that are easy-to-use, that enable meaningful use, and that will support future stages of information exchange infrastructure. By taking a modular approach, a more flexible business model can be developed so that stakeholders can utilize HIE services appropriate to their needs, rather than requiring that all stakeholders use all levels of service.

  Monitor for change and adapt over time – States should use approaches that are flexible and adaptable to inevitable changes in policies, technology offerings, stakeholder needs, and leadership.

- **Support the "little guy"** – States have an obligation to assure that stakeholders with the most limited resources—critical access hospitals, rural clinics, small practices, independent pharmacies and labs, etc.—have an option to meet and support meaningful use, whether through the use of state-level services or through access to existing HIE capabilities. For grantees, this means working with RECs, Beacon Communities, and other HIT programs in the state to devise the most cost-effective approaches to providing needed technical assistance to these stakeholders. Grantees should consider a wide range of vehicles to remove barriers to adoption, such as offering subsidies, loans, or grants to encourage the use of HIE services, or developing easy-to-use, low-cost and replicable options for interfaces and other infrastructure.

- **Rely on the Market** – State leaders must take advantage of an ever-expanding, dynamic, competitive HIE market to enable statewide interoperability. By embracing the capabilities and needs of healthcare stakeholders and EHR/HIE vendors in the state who are already providing products and services to exchange and aggregate data, statewide initiatives can reduce the burden of point-to-point connections and assure access to technical services. Approaches that are brittle to market change and innovation are unlikely to deliver sustained value to their stakeholders.
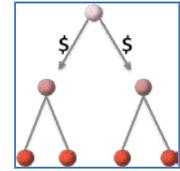
Elevator Model

Definition	This model is characterized by states that employ an initial, focused effort to rapidly enable simple interoperability through directed exchange to ensure providers have an option to meet meaningful use (MU) in 2011. A key component of this model is the development of Health Information Service Providers (HISPs) to facilitate directed exchange services across the entire state and directory services to support care summary exchange across providers. This approach may leverage private entities such as commercial EHR/HIE vendors, existing sub-state nodes (if present), or national HIE providers such as Surescripts, LabCorp and others for directed exchange capabilities. Within this strategy, there is often a concerted effort to assist providers and data trading partners with limited HIE capabilities, such as small/rural labs and pharmacies to participate in health information exchange through outreach and technical assistance activities. While the initial phase focuses on simple interoperability, this model may eventually transition to offering more robust exchange services to meet Stage 2 and Stage 3 MU, once performance goals in Stage 1 have been met.
Key principles	- Use of directed exchange (Direct, when available, or vendor-provided directed exchange solutions) to quickly enable HIE requirements for Stage 1 MU - Jumpstart HISP services that will interact with other privately developed HISP services in the state - Leverage commercial vendor efforts, sub-state nodes (if applicable) and national exchange such as Surescripts, LabCorp, etc. - Strong focus on enabling connectivity for those currently without HIE capabilities, including small providers and independent labs - Targeted development of modular, openly available services, such as translation/transformation services or provider/entity directories - May develop more robust exchange in a phased approach to meet HIE requirements for Stage 2 and Stage 3 MU
Preconditions	Can be large areas or entire state with: - Relatively little operational HIE activity between unaffiliated organizations - Limited or no existing HIT or HIE organizations or activities (regional/community HIOs, enterprise networks, EHR-sponsored networks etc.) - Sometimes associated with high percentage of providers or data trading partners that have limited HIT capabilities - Sometimes associated with high-level of capability within sub-state networks, but no substantial capability across networks

Organization	• Partner with vendors to rapidly develop a provider directory and directed messaging in state to reach all providers in the state • Work with REC and EHR vendors to integrate Direct specifications (when available) into products • Coordinate with REC and other service providers to put boots-on-the-ground to meet connectivity needs of providers and data trading partners with limited HIT capabilities • Enable HISP services for directed exchange to complement privately developed HISP services and promote commercial retail service penetration as rapidly as possible

Technical	• Phased implementation, initially focused solely on directed exchange and then moving in later phases to more advanced exchange capabilities to enable future MU stages
	
	   ○ Typical phase 1 implementation: Promote directed exchange services
	
	      ▪ Establish HISP or HISP-supplementation services to complement commercial HISP services
	         • E.g., statewide provider directory, certificate authority, SMTP/XDD adaptors
	
	      ▪ Marketing and education activities to bolster adoption of directed exchange, including provider registration services
	
	      ▪ Targeted development of services to support directed exchange including directory services, translation/transformation services and authentication/certificate management
	
	      ▪ Boots-on-the-ground support of providers/data trading partners such as rural hospitals, clinics and independent labs to enable them to share care summaries and send lab results using directed specifications
	
	   ○ Typical phase 2 implementation: More robust, modular state-level shared services to connect HISPs with each other and to share information with state/federal agencies and other developing sub-state entities, leveraging any services built for directed exchange in phase 1. May evolve to look like the Orchestrator or Public Utility model, which could include services such as:
	      ▪ Master patient index (MPI)/record locator service (RLS)
	      ▪ Higher level analytics or repositories initially populated/enabled through push messages
	      ▪ Nationwide Health Information Network (NWHIN) Gateway

Legal/policy	• Minimal requirements for legal/policy infrastructure during initial phase of directed exchange ○ Refinement of legal/policy framework when state moves to more robust exchange to meet Stage 2 and 3 MU • Accountability mechanisms for HISPs or other HIE vendors to ensure providers reach MU

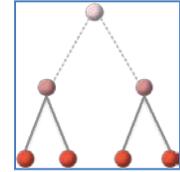|	

Risk areas and mitigation strategies	• Little exchange capability in market today; requires rapid ramp-up in supply-side capacity
	   o Mitigation strategies:
	      ▪ Leverage REC and local and national HIE providers to enable rapid ramp-up
	• Limited control over business model – heterogeneity in services, service levels, pricing may be a barrier to rapid adoption and may proliferate proprietary approaches that are less extensible in the future
	   o Mitigation strategies:
	      ▪ Use policy and contractual levers to ensure HISPs and other HIE service providers are providing core services, fair pricing, and adhering to national standards
	      ▪ Constantly evaluate HISPs and other HIE service providers to ensure they are meeting stated objectives
	• If not phased to more robust methods of exchange, model may not meet future stages of MU
	   o Mitigation strategies:
	      ▪ Plan for incremental approach to advancing exchange methods; use directed messages to populate repositories for query/retrieve
	      ▪ Implement services in phase 1 that can be leveraged in later phases such as directories and security services
	      ▪ Provide opportunities for retail HIE market to develop advanced capabilities

Key success factors	• Detailed environmental scan to understand HIT penetration and to identify priority EHR/HIE vendors that can offer directed services to providers and/or embed Direct specifications into products (when available) • Coordination with national HIE service providers (e.g., Surescripts, LabCorp, Quest, Verizon, AT&T, etc.) to offer support for directed exchange • Promotion of directed exchange through formal communication and marketing/sales • Provision of REC-like services to engage and enable sub-national data trading partners, such as independent labs, critical access hospital and community pharmacies, to participate in exchange activities • Participation in Direct pilot implementations • Creation of infrastructure to complement directed exchange, such as provider directories, HISP and certificate management services • Creation of accountability mechanisms for HISPs and other HIE service providers • Phased strategy to support more advanced HIE methods and meeting later stages of MU
States that display aspects of model	Illinois, Iowa, Missouri, Ohio, Wisconsin Other states with focused Direct efforts include such as California, North Carolina, Oregon, Rhode Island, and Vermont

Capacity-builder Model

Definition	This model's initial focus is on bolstering existing exchange capabilities through financial and technical support or incentives. The distinct difference between the Orchestrator and the Capacity-builder model is the Capacity-builder's *early focus* on enabling—through financial or technical support—existing or developing exchanges to support their local regions or communities rather than connecting them through state-level services. The similar existing environmental factors (preconditions) form the foundation for the Capacity-builder to potentially transition to an Orchestrator model in states where there is sufficient market demand and buy-in.
Key principles	• Initial focus to build capacity of sub-state nodes through temporary financial and technical support to achieve end-user access to core HIE services • May include financial or technical assistance to providers or data trading partners that have limited HIT capabilities such as critical access hospitals, rural clinics, independent pharmacies or labs, etc. • State-level shared services (provider directories, authentication services, etc.) deployed centrally or among sub-state nodes to decrease cost of service provision to end-users • State-level shared services to connect sub-state nodes (potential transition to Orchestrator model)

Preconditions	• Multiple sub-state nodes covering large portion of state
	    o Most efforts are near operational, with momentum, but require assistance to:
	        ▪ Become fully operational
	        ▪ Connect to more providers/data trading partners within their specified service area/region
	
	• Little to no cross-node exchange
	
	• No existing statewide exchange entity
	
	• Distinct regions or localities where HIE is focused on business cases specific to local trading partner needs; varied approaches to HIE within the state

Organization	• State-level sponsored funding program (grants or incentives) to help sub-state nodes fill capability gaps in local infrastructure, to connect providers with sub-state nodes, to support interoperability between nodes, or to address providers/data trading partners that have limited HIT capabilities
	    o Funding program can be competitive or non-competitive
	    o Program may include base-level eligibility criteria in order to receive funding:
	        ▪ Implementation of core HIE services
	        ▪ Compliance with required state-level and national policies and standards
	        ▪ Commitment of matching funds to support implementation
	    o Program may include funding levels based on various criteria:
	        ▪ Base component (each grantee receives set amount)
	        ▪ Proportionate amount based on:
	            • Number of providers/ hospitals planned to serve
	            • Need or stakeholder type (e.g. rural clinics, critical access hospitals, etc.)
	    o State-level monitoring and evaluation of grantees to ensure that criteria are met and maintained (i.e. delivery of core services, enabling MU, etc.)
	• Strategies to assure access for providers not affiliated with a sub-state node (or white space) include:
	    o Use of state-level contractual or policy levers to:
	        ▪ Encourage sub-state networks to serve un-tethered providers *within* their region/community
	        ▪ Encourage sub-state networks to expand their reach geographically, providing services outside their original region, community, medical trading area (MTA), etc.
	    o State-sponsored competitive RFP process:
	        ▪ Respondents may include sub-state nodes, RECs, vendors, etc.
	        ▪ Similar to grants program, consideration for award includes various criteria:
	            • Quality, cost, readiness, coverage
	            • Service offering requirements such as offering directed exchange or Direct (when available)
	• Responsibility for building interface(s) to state-level infrastructure/services falls to sub-state nodes and other HIE providers in state
	• Strong state-level accountability and oversight focus, including ongoing monitoring of sub-state networks, vendors, or others providing HIE services under funding program

Technical	• Phased implementation, initially focused on provision of financial and technical assistance to sub-state nodes then moving to implementation of state-level shared services
	    ○ Typical phase 1 implementation: Development and implementation of funding program including creation of eligibility criteria, review and selection process, performance expectations and program monitoring and evaluation
	        ▪ State-level support services to assist grantees to implement HIE according to federally approved standards and to guarantee inter-HIE interoperability
	            • Current technical standards and service definitions
	            • Implementation guides
	            • Reference implementations
	    ○ Typical phase 2 implementation: Thin backbone of state-level shared services, which bridge to the Orchestrator model to facilitate node-to-node exchange and other value-added services including:
	        ▪ Messaging/routing service
	        ▪ Provider directory service
	        ▪ Security services
	        ▪ Value-added services may be introduced over time including Nationwide Health Information Network (NWHIN) Gateway and MPI/RLS for query/retrieve

Legal/policy	• Policies and procedures to address funding program
	    ○ Minimum standards, policies or performance measures which must be met to gain/maintain funding
	        ▪ Criteria may certify sub-state nodes as "qualified organizations"
	    ○ Processes to monitor sub-state nodes
	• May use contractual or attestation method to ensure compliance with state-level policies, including legal, business, and technical rules
	• Sub-state nodes may establish local policies to guide regional/local exchange beyond state-level policy/legal framework

Risk areas and mitigation strategies	• Heterogeneity of approaches provided by sub-state exchange activities can inspire innovation but also lead to lack of uniformity in services, service levels, and pricing
	    ○ Mitigation strategies:
	        ▪ Tie clear requirements, performance goals and metrics to funding program to ensure that any provider can achieve MU
	        ▪ Constantly evaluate grantees to ensure they are meeting stated objectives, including provision of services to enable MU
	        ▪ Provide a roadmap to sub-state nodes to achieve HIE goals, including required standards
	• Dependency on sub-state node technical, business, and financial capabilities, capacity, and initiative for state-level sustainability
	    ○ Mitigation strategies:
	        ▪ Establish state-level processes for identifying sub-state node vulnerabilities early-on, as well as an approach to ensure continuity of services in the event of failure of a sub-state node
	• Complex business and governance model leads to complicated decision-making processes
	    ○ Mitigation strategies:
	        ▪ Employ a bottoms-up governance approach to ensure sub-state nodes are engaged in the decision-making process
	• Assumes that stakeholders will connect to state-level services via sub-state nodes
	    ○ Mitigation strategies:
	        ▪ Use levers to encourage sub-state nodes to support un-tethered providers within their region/community or expand their area of service to reach providers in areas without coverage
	        ▪ Support and leverage all existing exchange efforts in the state, including HIOs, IDNs, EHR hubs, etc.

Key success factors	• Definition, development, and implementation of capacity-building funding program to align objectives with MU achievement • Strong coordination including program monitoring, management, and remediation to ensure performance goals are met and to assure alignment of services, policy requirements, service levels, and pricing across sub-state programs • Rapid identification of state-level shared services opportunities that provide high value to sub-state nodes • Strategy to ensure un-tethered providers meet MU • Consideration of sub-state node viability to inform overall state-level sustainability
States that display aspects of model	Indiana, Michigan (phase 1), New Jersey, Texas

Orchestrator Model

Definition	This model is characterized by a thin-layer state-level network which facilitates HIE transactions across existing sub-state exchanges, forming a network-of-networks. It is distinguished from the Capacity-builder model in that it focuses on the creation of a statewide network (rather than on building capacity of sub-state nodes), and differs from the Public Utility model due to its primary focus on connecting existing nodes rather than providing "retail" HIE services directly to end-users or deploying a full-spectrum of centralized HIE services.
Key principles	• Build on existing sub-state nodes to achieve statewide interoperability • Light statewide "network-of-networks" architecture to connect sub-state nodes • State-level shared services as appropriate to support sub-state nodes • Reliance on sub-state nodes for engaging and providing services to end-users • Where gaps in HIE coverage exist, use policies and funding to establish or extend sub-state nodes to provide "retail" services to end-users o In general, no state-level responsibility for provisioning of direct services to end-users

Preconditions	• Multiple regional or community operational exchange nodes that cover large portion of state
	    o High or rapidly emerging level of operational exchange within nodes
	• Operational nodes may have limitations that can be addressed by this strategy including:
	    o Operational nodes do not share information with each other
	        ▪ Lack of state-level infrastructure (directories, MPI) that can support connecting nodes
	    o Not providing services to all providers in respective region/community
	    o A focus on business cases specific to local needs or dominated by the needs of one stakeholder type
	• Diverse health care delivery market with multiple MTAs
	• Strong backing by state government and/or strong stakeholder buy-in
	• No existing statewide exchange entity

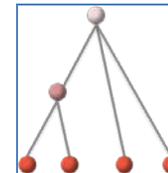|	

Organization	• Criteria to define "qualified organizations" to participate in state-level exchange, which may include:
	
	    ○ Responsibility to provide HIE services to end-users
	    ○ Privacy and security requirements/thresholds
	    ○ Technical standards
	    ○ Testing requirements
	    ○ Obligation to contribute financially to cover capital/operating costs
	    ○ Agreement to submit to an accreditation process
	    ○ Sanctions for failure to adhere to requirements
	
	• Qualified organizations can include one or more types of entities: regional/community HIOs, IDNs, IPAs, HISPs, EHR hubs, etc.
	
	• State-level entity use of contractual or policy levers to encourage or mandate provision of services to end-users currently without exchange capability, either through existing or newly-established networks

Technical	• Light-weight, modular state-level services designed to connect existing sub-state nodes, starting with minimum technology necessary to connect nodes and moving to more complex technology over time
	
	    ○ Typical phase 1 implementation: Focus on directed exchange (push) and services that enable basic directed exchange across sub-state networks in alignment with Stage 1 MU requirements
	        ▪ Messaging hub or gateway to route messages across nodes with minimal intervention in message handling
	        ▪ Security services to enable secure exchange across nodes including node authentication, audit/logging, and encryption
	        ▪ Provider/entity directories to facilitate unambiguous addressing of messages
	
	    ○ Typical phase 2 implementation: Expand core infrastructure to support query/retrieve (pull) of patient data and other value-added services such as data aggregation, analytics, or patient access to information
	        ▪ Federated MPI and RLS to match patient identities and locate patient data across sub-state networks; typically no state-level repositories of PHI
	        ▪ Value-added services as viable such as routing services for patients or patient access (PHR), event notification services, and lab or CCD translation (i.e. non-standard data to CCD or CCR-formatted record)
	        ▪ State-level services may move from push to pull methods of exchange by initially populating repositories using push method later made available for query/retrieve
	
	• State-level network employs a minimal level of central intervention in messaging and transactions
	
	    ○ State-level network can "handle" HIE messages, but mainly for the purposes of secure routing between sub-state nodes
	    ○ PHI reside locally with HIE participants rather than centrally at state-level

Legal/policy	• Light layer state-level policy infrastructure to allow minimum necessary alignment for statewide exchange o Policies may require refinement as state-level services become more complex and support query/retrieve • State-level contracts or accreditation/attestation for existing exchanges to comply with state-level policies, including legal, business, and technical rules • Sub-state nodes have or develop own policies to guide regional/local exchange beyond state-level policy/legal framework

Risk areas and mitigation strategies	- Heterogeneity of approaches provided by sub-state exchange activities can inspire innovation but also lead to lack of uniformity in services, service levels, and pricing - Mitigation strategies: - Use state-level shared services to offer base-level functionality without duplicating services offered by sub-state nodes - Use contractual or policy levers to require/incent sub-state nodes to offer certain services - Strong policy coordination, cross-node policy alignment and governance, and monitoring function at state-level entity - Potential to narrowly define a "qualified organization" to participate in state-level exchange - Mitigation strategies: - Allow all existing and viable entities that meet criteria participate including HIOs, IDNs, IPAs, EHR hubs, etc. - Requires considerable effort and initiative by sub-state nodes to provide services to end-users and make connection to state-level network - Mitigation strategies: - Use governance processes and contractual/policy levers to assure access to common core services to all end-users across all nodes - Assumes that stakeholders will connect to state-level services via sub-state nodes - Mitigation strategies: - Use levers to encourage sub-state nodes to support un-tethered providers within their region/community or expand their area of service to reach providers in areas without coverage - Support and leverage all existing exchange efforts in the state, including HIOs, IDNs, EHR hubs, etc. - Dependency on sub-state node technical, business, and financial capabilities, capacity, and initiative for state-level sustainability - Mitigation strategies: - Establish state-wide governance and collaboration processes - Create policies for business continuity in the event of sub-state node failure - Employ strong monitoring capabilities and metrics

Key success factors	• Rapid identification of state-level shared services opportunities that provide high value to sub-state nodes • Collaboration and coordination mechanisms to build trust among sub-state nodes and assure future commitment and participation • Strategy to ensure ability of un-tethered providers to meet MU • Development of certification/accreditation processes for sub-state exchange participation in state-level network • Clear articulation of services offered at the state-level versus what sub-state nodes provide • Reconciliation of legal/policy frameworks for sub-state nodes and state-level structure • Consideration of sub-state node viability to inform overall state-level sustainability
States displaying aspects of model	California, Florida, Illinois, Iowa, Massachusetts, Michigan, Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Oregon, Tennessee, Texas, Washington, Wisconsin

Public Utility Model

Definition	This model represents the highest degree of centralized policies and services of the four models. It is characterized by a proactive state-led approach, founded upon a relatively robust statewide entity that has broad participation and support among stakeholders across the state; well-developed management and staff capable of policy development, business analysis, project management, and technology deployment; provision of retail services directly to end-users including individual providers and potentially patients; and strong policy and/or funding support from the state government or other stakeholders. This model differs from the Orchestrator model by focusing on the state-level entity as the central nexus of HIE activities in the state rather than being the coordinator of multiple networks. Resources are directed to launch or expand upon a state-level infrastructure that centrally handles/routes messages and provide shared services across existing HIE capacity (where it exists) as well as directly to end-users.
Key principles	• Create or leverage a relatively robust statewide organization and technical infrastructure/service platform for centrally orchestrated HIE connectivity, provisioning of shared services and establishment of standards • Significant "retail" services offered directly to end-users (e.g., clinicians, patients, labs, etc.) • Strong support from state government (legal authority and funding) to sustain statewide network • Statewide network envisioned as a centralized "hub" for HIE activity across the state

Preconditions	• Operational state-level exchange offering core infrastructure and services to a large portion of the state
	
	• Operational state-level exchange with a mature governance structure and capacity (formal governance boards, charters, operating committee structures, operational plans, etc.)
	
	• Permanent staff in place to support day-to-day operations of current state-level infrastructure
	    o State-level management is tenured and has built solid relationships with stakeholders
	
	• Relatively consistent approach to HIE among stakeholders
	
	• Little competition between state-level efforts and existing HIOs or other exchange activities
	
	• Strong stakeholder buy-in, especially from data trading partners/hospitals
	    o Many (but not all) stakeholders connected or plan to be connected to state-level exchange
	    o Willingness of stakeholders to financially support (through ongoing funding, fees, or one-time contributions) state-level exchange efforts
	
	• Strong role for state government officials in state-level efforts
	    o Recognition of governance entity via Executive Order, legislation, etc.
	    o Direct financial support via one-time or ongoing appropriations, grants or loans
	    o Mandates for financial support from businesses, payers, or other stakeholders
	
	• Well-developed HIE legal or policy infrastructure

Organization	• State-level entity implementation responsibility to connect stakeholders to state-level infrastructure
	    o Close coordination with REC to implement interfaces or applications
	        ▪ REC can require that preferred EHR vendors create interface to state-level network
	    o Work with EHR aggregators or major health systems that cover substantial portions of state to reduce number of interfaces
	• Well-established multi-stakeholder governance with strong role for state government
	• Permanent staff established to support day-to-day operations
	    o May require additional permanent staff as state-level infrastructure and services expand

Technical	• Current or planned higher-level message processing such as conformance checking, translation services, patient-matching, etc.
	• User-facing applications such as portals, EHRs, PHRs, etc.
	• Ancillary services such as hosting, training, and help desk support
	• Multi-layered model of directed exchange and query-response exchange, often implemented in phases
	• Typical phase 1 implementation (often already in place for significant number of providers/entities):
	    o Connect providers to current infrastructure, with focus on "white space" providers
	    o Enhance existing network to provide services to support MU, including clinical messaging or routing of lab results and exchange of care summaries
	• Typical phase 2 implementation:
	    o Enhance network to support data aggregation and related services, such as query/retrieve access to longitudinal patient record or analytics for secondary uses
	    o Connect network to federal agencies, other states, etc. via Nationwide Health Information Network (NWHIN) Gateway
	    o Use data to support secondary purposes such as analytics
	    o Connect consumers with state-level infrastructure

Legal/policy	• Statewide policy framework relatively well-developed including:
	    o Consent, auditing and other privacy and security policies
	    o Day-to-day operational infrastructure policies (staffing policies, etc.)
	• State government commitment to policy and financial levers to sustain state-level activity in the future

Risk areas and mitigation strategies	- Reliance on single organization and infrastructure is "single-point of failure" in HIE strategy - Mitigation strategies: - Establish statewide funding and policy foundation as rapidly as possible - Take a modular approach so that users can depend on the services and functions that are most valuable to them - Depends on high level of policy, business, organizational, and technical infrastructure that requires adequate time and resources to fully implement - Mitigation strategies: - Use a phased approach, starting with less advanced forms of exchange to reduce technical, operational, and legal/policy infrastructure - Leverage REC, Beacon and other state HIT programs to share and coordinate resources - Work with major health providers, private efforts, EHR aggregators, etc. to reduce number of interfaces - Reliance on strong and consistent role for state government to reinforce business and governance model - Mitigation strategies: - Identify key threshold state policy/funding levers (e.g., state-level designation, funding, etc.) - Potential to create a "closed" network by assuming all stakeholders will connect to state-level exchange - Mitigation strategies: - Reduce barrier to entry by implementing open architecture and standards-based approaches - Make core infrastructure such as directories openly available - Deploy modular services - Assume there will be some level of private exchange developed in the state, and design a way to easily connect to these nodes
Key success factors	- Development and maintenance of full-service HIO to meet utility model requirements and expectations - Boots-on-the-ground to implement connections to state-level network, implement user applications, etc. - Availability of qualified personnel to respond to rapidly-emerging issues - Strong public-private collaboration with actively engaged state government to identify policy and funding levers to support statewide HIE going forward - Marketing strategy to "sell" retail services, such as end-user applications to stakeholders - Well-managed technical infrastructure that keeps pace with private efforts (in state and nationally) and maintains high service levels in order to protect stakeholder buy-in and financial sustainability - Creation of well-grounded policy, statutory and regulatory framework to support trusted exchange
States displaying aspects of model	Delaware, Idaho, Maine, Maryland, Nebraska, New Mexico, Rhode Island, South Carolina, Utah, Vermont, Washington

Approved State Plans by Model

The following table displays how approved grantees map to the four broad models. Please note that an "X" does not denote that a particular grantee exemplifies *all* characteristics of a model.

State	Elevator	Capacity-builder	Orchestrator	Public Utility
California	X		X	
Delaware				X
Florida			X	
Idaho				X
Illinois	X		X	
Indiana		X		
Iowa	X		X	
Maine				X
Maryland				X
Massachusetts			X	
Michigan		X	X	
Missouri	X		X	
Nebraska				X
New Hampshire			X	
New Jersey		X	X	
New Mexico				X
New York			X	
North Carolina	X		X	
Ohio	X		X	
Oregon	X		X	
Rhode Island	X			X
South Carolina				X
Tennessee			X	
Texas		X	X	
Utah				X
Vermont	X			X
Washington			X	X
Wisconsin	X		X	