



Building A Solid Base: A Solution Model for a Multi-Community Health Information Exchange (HIE)

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The growth of health information exchanges (HIEs) in the U.S. has transitioned from slow to hyper-evolution, according to a recent Gartner Report.¹ In fact, HIEs are now coming online at a rapid pace, fueled by federal dollars and the demands of an increasingly mobile population. Currently, there are at least 73 operational HIEs, a jump from 57 operational exchanges in just the last year, and a giant leap from the nine operational HIEs in 2004.²

Multi-community health information exchanges represent the next phase in how health care information will be managed to improve patient care by using aggregated data to identify specific medical conditions, determine corresponding treatment patterns, and provide tools to match these treatment patterns to individual patient needs. This approach more effectively manages the condition in the most patient-centric, efficacious and efficient manner possible.

But this transformation comes with a caveat. As Wes Rishel, vice president and distinguished analyst at Gartner, Inc, the leading information technology research and advisory company, explains, “The name of the game for HIEs is time to value. Inter-HIE information sharing could easily slow down the formation of HIEs unless their Boards are comfortable that they can defer those issues until after the HIE is operational for its own community.”³

This prudent approach toward developing cross-community policies and procedures for sharing takes time and vigilance. If health care facility administrators rush into the market place without fully understanding what their technology needs are and what its functions should entail, they risk choosing inadequate technology and spending time and effort bolstering a foundering HIE.⁴

Fortunately, technology solutions exist that are designed specifically to allow each community to quickly achieve individual value within the same infrastructure while they work on such issues and open sharing channels. Additionally, they can fulfill the Gartner Report’s recommendation that future HIE software include the ability to implement cross-organizational workflows and support for natural language processing and data analytics.⁵

Choosing the Best Solution: The Big Picture

As HIEs continue to become the dominant model for sharing clinical patient health data, multi-community HIEs are increasingly being recognized as offering some of the most cost-effective models by which to share clinical information in a regional setting. Two key reasons for this success are:

- A shared infrastructure and a common solutions platform enable HIE common services to be leveraged across communities — with the solution configured to address the specific needs of each autonomous community.
- Concurrently, the solution allows them to operate separately, enjoying the economic benefits of a joint solutions platform.

The diagram below provides a high level depiction of how a multi-community HIE model is structured.



Community Autonomy

The multi-community model is designed to establish a solution tailored to the individual needs of the community. These needs may include patient privacy and security policies; functional capabilities, which will vary from community to community; an implementation roadmap; the scope of implementing a pilot program, and then finally going live within the greater community. Each solution provides individual patient record access across all participants within the individual community, as well as tools to help ambulatory and acute healthcare providers meet meaningful use requirements and an infrastructure for accountable care organizations to form.

The Economies of the Multi-Community Solution Model

The broader economic and clinical value of the multi-community HIE solution model can also be seen in software, people, infrastructure, and support. From the software perspective, each community uses the same release version of the software solution. This benefit ensures that software functions available to one community will be available to others and allows for consolidated release management and testing across communities. Software services such as bio-surveillance, semantic interoperability, quality reporting, Nationwide Health Information Network (NHIN) and NHIN-direct interoperability, and integration with state services are shared across communities using a standard web-

services framework. Integrations with EMRs, other clinical systems, and third-party lab/radiology providers common between communities can also be replicated to save dollars while expediting timelines.

From a personnel perspective, shared infrastructure enables multiple communities to leverage resources of a single team to coordinate, manage, and support services across communities, eliminating the need and expense for multiple teams across participating communities, increasing consistency and bolstering reliability. This single team approach helps establish policies, coordinate workgroup activities, provide HIE-level administrative support and manage release deployments and testing across communities. Typically, in this scenario, dedicated resources act as the HIE coordinator throughout the term of an agreement. In this role the HIE coordinator will be a facilitator between communities and within each HIE to ensure success, participation, and sustainability. Finally, user groups can be engaged across the participating communities to share lessons learned and leverage best practices.

Shared physical infrastructure and support enables each community to run on a common technical platform hosted by a designated provider. Each community is also able to access the same base of resources for ongoing support of the application. Specific sharing requirements may include hosting and managing the shared solution with the vendor serving in a coordinating role across each of the communities.

There are several aspects of a shared solution environment requiring agreement across the communities to accommodate this shared infrastructure. All communities participating in this environment must decide upon a common user authentication process, and any related third-party providers must be common across communities (i.e., a “trusted network”, single sign on model, two-factor authentication software). A common framework for patient consent and user administration must be shared across communities. Within this framework, each community will have autonomy to set up and manage user access and patient consent parameters. Common policies for data archive and other system administration functions are required to be standard across communities as well. Outside of these requirements, each community will be able to configure and operate the solution to meet its own particular needs and policies.

Overall Benefits To Look For

By utilizing shared NHIN functionality, multiple communities can interoperate within and among HIEs, across states and with federal agencies. This approach delivers more than just technology to simplify the health care process,⁶ allowing for:

- Collaboration with providers, patients, and stakeholders to integrate care, improve health, and provide needed information at the point of patient care.
- Delivery of real, measurable results with accelerated implementation and adoption both within a community and across communities.
- Provision of mechanisms for proactive disease management, seamless coordination across practice settings, improved transitions of care and improved clinician workflow.
- Enablement of a cost-effective, technical solution that is easy-to-use, easy-to-adapt, and easy-to-adopt at an average annual operating cost of less than \$1 per resident.⁷

Choosing the Best Solution: The Details

Vendors providing a solution as a hosted service should ensure that an HIE coordinator is provided to be responsible for exchange-related activities across the communities. This coordinator should orchestrate the set-up, configuration, and support of hardware, network, and other infrastructure components necessary to deliver the solution, including client production, client staging, and client testing environments. System back-up and other infrastructure administration tasks are also a key part of hosting and support services. Disaster and recovery plans should also be established and maintained. Finally, applications should be monitored and supported and a help desk should be provided for all participants.

Solution Scope

The solution scope of a robust multi-community HIE should include the following components:

- A multi-community data aggregation engine configuration with the ability to receive, aggregate and securely segregate patient demographics, patient activity, diagnostic/procedure codes, clinical results, encounter summaries, discharge summaries and other clinically relevant data from:
 - CCD/CCR/CDA based data feeds
 - HL7 data feeds
 - Custom clinical data feeds from non-standard systems
- Semantic interoperability capabilities for labs, medications, and allergies.
- Security and audit functions to facilitate HIPAA-compliant user authentication service including user-id/password and trusted network single sign-on authentication support.
- Capability to incorporate a community designated two-factor authentication process integrating a third party vendor if necessary.
- Network Master Patient Index with built-in patient matching and record locator service components.
- Optional clinical portal with an aggregate, longitudinal view of standard and non-standard based patient information across source systems, and automated and user-defined patient lists. The portal should also be flexible enough to provide multiple user-specific patient views including patient summaries, flow sheet views, etc. and notification and alerting functions for new results, critical values, reminders and external source system alerts.
- Interoperability to send and receive standard CCR/CCD documents with external EMRs in compliance with meaningful use requirements and applicable IHE protocols, and the ability to send and receive order and results into external EMRs and other clinical systems.
- Integrated clinical dashboards tailored to wellness conditions and specific chronic diseases, as well as built-in decision support alerts in compliance with meaningful use certification criteria.

Process Expectations

In general, HIEs can expect their solution provider to take these implementation steps⁸:

- Assess community readiness
- Identify potential candidate communities for pilots
- Establish core state services and connect pilot communities
- Viral rollout planning to connect additional participants and communities
- Rollout of additional value-added statewide services as required

The best solution providers begin implementation with communities that are most connected and can support the ability to quickly connect to other HIEs. They conduct a needs assessment to determine which communities will be the best candidates for the pilot implementation, and the most appropriate starting points from multiple communities.

Furthermore, they view the timeline as being contingent upon the collective technical readiness of the numerous communities within the prescribed area, as well as the readiness of services, such as Public Health to support state level connectivity.

For existing HIEs that are technically ready to connect to statewide services, top solution providers can support pilot connections within six months. For communities with partial or no capabilities and require community level HIE assistance, they should be able to establish core statewide interoperability services within a six-to-nine month period once the base HIE functionally has been established.⁹

During the pre-pilot phase, the solution provider performs a community analysis to identify providers that are strategically, clinically, or geographically critical to the exchange regardless of their current readiness and prioritize participants accordingly to ensure the overall success of the project.

Extending a Single Community into a Multi-Community HIE

The right solution should be designed to stretch existing infrastructure to save on costs. It should also enable users to hit the ground running, especially for organizations with constrained budgets or limited infrastructure. At the moment, there is no universal sustainability model, and because usability must be quantified in the larger realm, it's difficult to distribute associated costs. Therefore, value must depend upon getting as many individuals and organizations as possible to participate in order to justify going forward. Critical mass drives adoption, value and thus sustainability.

Tennessee

Using technology originally envisioned through the physicians and IT specialists at Vanderbilt Medical Center, Informatics Corporation of America (ICA) has commercialized aspects of the decades of research and development of Vanderbilt's biomedical informatics department over the past two decades and designed a solution that offers one of the most robust multi-community HIEs in the industry, capturing all of the characteristics and components noted above. This solution offers comprehensive and

sophisticated HIE infrastructure and functionality, including one at MidSouth eHealth Alliance (MSeHA) in Tennessee.

As one of the oldest operating HIEs in the country, MSeHA was originally established in 2005 under an Agency for Healthcare Research and Quality (AHRQ) grant in collaboration with the state of Tennessee and deployed through the Vanderbilt Center for Better Health and the Regional Informatics team. The exchange encompasses all the major medical facilities and a large cohort of physicians in the greater Memphis area. Although the focus of the exchange is on the underserved population, the vision of MSeHA has always been to improve the quality of care for the citizens of the Greater Memphis area at a lower cost.

Since its inception, MSeHA targeted sustainability as an essential goal for long term adoption and success of the project. Therefore, they set out a plan to transition from the grant funded initiative, tailored through Vanderbilt's efforts, to a commercially available product with expanded reach and functionality capabilities. The process included two major steps. First, Vanderbilt Regional Informatics contracted with ICA to convert the existing technical infrastructure to its commercially available back-end processing, storage and hosting capabilities. This was accomplished over a six month period beginning in summer of 2008. The next step was to convert the custom-developed, grant-funded front end application to the commercially available CareAlign™ product as the grant period expired in 2010.

As of this writing, MSeHA has over five years of patient data and seven million encounters covering over 2.8 million patients with a database containing nearly 42 million chart documents. The comprehensiveness of the exchange is impressive in that it facilitates the sharing of demographics, laboratory results, encounter data, medications, allergies and care summaries from history and physicals, operative reports, emergency department, discharges, cardiology, imaging and ambulatory encounters. The initiative has been shown to reduce hospitalizations and diagnostics tests providing a positive return on investment over the grant years.¹⁰

As part of its sustainability vision, the MSeHA board consciously selected a solution with an infrastructure supporting multi-community expandability and optional functionality to reduce ongoing operational costs and increase adoption respectively. The first part of the Board's vision was realized when the Middle Tennessee eHealth Connect (MTeHC) based in Nashville extended MSeHA's capabilities in a multi-community effort to provide better clinical information at a lower cost that ultimately leads to higher quality health care for patients in these communities. This strategy will reduce overhead and administrative costs while distributing infrastructure expense. This MSeHA/MTeHC HIE alliance is one of the first multi-community HIEs in the country and in its early stages shows remarkable promise in lowering costs, increasing efficiencies, improving clinical data flow, and improving patient care.

As the new solution is fully deployed in both Memphis and Nashville, the communities will take advantage of the following additional functionality with its associated benefits:

- Secure clinical communication – to support better coordination and transitions of care
- Bi-directional integration – to both contribute and populate participant source systems

- EHR Lite – to expand participation of providers lack basic technology
- NHIN Enterprise capabilities – to share with other HIEs, state and federal entities
- NHIN Direct – to collaborate with individual providers not within the HIE

Combining the infrastructure and functionality with MTeHC will give this Tennessee region one of the most comprehensive, sophisticated and sustainable HIEs in the country and a pivotal opportunity for others to study the strengths and benefits of multi-community HIEs.



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About Informatics Corporation of America (ICA)

Informatics Corporation of America's (ICA) health information exchange (HIE) solutions, originally envisioned by practicing physicians at Vanderbilt Medical Center, capture, integrate and provide comprehensive patient data from numerous and disparate installed systems. ICA adapts and deploys this pioneering technology to design and deliver comprehensive HIE solutions to hospitals, IDNs, communities and states generating cost efficiencies and improving patient care and outcomes. ICA's solutions align with physician workflow empowering caregivers to make informed decisions at the point-of-care with standards-based interoperability to help health care enterprises achieve operational efficiencies across multiple providers and settings. Visit www.icainformatics.com, follow us on Twitter at www.twitter.com/icainformatics, and Facebook at www.facebook.com.

¹ Rishel, Wes; U.S. Health Information Exchange: Hyperrevolution or Mayhem?; September 29, 2010; http://www.gartner.com/DisplayDocument?id=1442341&ref=g_sitelink&ref=g_SiteLink; accessed October 5, 2010.

² Byers, Jeff; HIEs: Specialize, Adapt & Survive; CMIO, September 29, 2010; http://www.cmio.net/index.php?option=com_articles&view=article&id=24344:hies-specialize-adapt-a-survive; accessed October 7, 2010.

³ Rishel; September 29, 2010.

⁴ Dunbrack, Lynne; HIT Connect interview; October 6, 2010.

⁵ Rishel; September 29, 2010.

⁶ Informatics Corporation of America; RFI RESPONSE; Arkansas Healthcare Information Exchange (HIE); May 7, 2010; <http://recovery.arkansas.gov/hie/files/non-meeting/Apr%208%202010%20RFI%20Responses/Informatics%20Corp%20-%20AR%20HIE%20RFI%20Response.pdf>; accessed October 7, 2010.

⁷ Informatics Corporation of America; May 7, 2010.

⁸ Informatics Corporation of America; May 7, 2010.

⁹ Informatics Corporation of America; May 7, 2010.

¹⁰"The Memphis Project: A brief overview or the history and transition strategy to sustainability" AMIA, October 2010