

PERSPECTIVE

Health Information Exchange: ‘Lex Parsimoniae’

HIE developers must resist the temptation to overspecify, instead allowing local flexibility with some oversight to maintain consistency.

by J. Marc Overhage

ABSTRACT: The country has identified health information exchange (HIE) as an essential strategy to address our crisis of cost, quality, and safety in health care. The Nationwide Health Information Network (NHIN) will consist of a “network of networks”—interconnected local or regional HIEs. We must create policy and technical interfaces that allow these local exchanges to share data with each other. More importantly, we must create nationwide exchanges that are consistent across the country. They should be parsimonious—not overly constraining how the exchanges operate and maintaining separation between the applications that provide functionality and the network that supports HIE. [*Health Affairs* 26, no. 5 (2007): w595–w597 (published online 1 August 2007; 10.1377/hlthaff.26.5.w595)]

THE NATIONWIDE Health Information Network (NHIN) that we create will almost certainly consist of a “network of networks”—a collection of interconnected, interoperable health information exchange (HIE) networks that are, in turn, a collection of interconnected, interoperable health information systems. To interconnect these HIEs, we need to establish consistency in the interfaces that transport data between the various subsystems. This consistency is required for both technology (what message formats will we use?) and policy (is it appropriate to make data available to this type of user in this specific setting?).

We must also, however, strive for parsimony and avoid overspecifying these interfaces. Defining consistent, parsimonious interfaces requires abstracting common requirements from HIEs to formulate general

concepts. There are examples of similar interfaces or abstractions from other domains: Currency between consumers and commodities; a computer operating system between application software and a diversity of computer hardware isolating the application software from differences in the underlying hardware while at the same time simplifying the application itself; and the Internet protocol (IP). Most Internet applications use abstractions layered on top of the IP, including hypertext transfer protocol (HTTP), which underpins most browser-based applications. Such interfaces provide a number of benefits including isolating complexity and providing adaptability. Once widely implemented, they can evolve but may be difficult to change. They can also result in cascade failures in the large, complex systems built around them, which is one reason that parsimony is so important.

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The Bottom-Up Perspective

The “bottom-up” perspective, sometimes described as “letting a thousand flowers bloom,” is essential for several reasons, including the local character of health care, our need for innovation, and the fact that if the NHIN is to be built as a network of networks, then that network will need local nodes.

■ **Trust between entities in the health care marketplace.** The operational, policy, and technical aspects of the NHIN need to be informed by the local experience. The paper by Robert Miller and Bradley Miller identifies the lack of community leadership as a roadblock to progress in developing the Santa Barbara County Care Data Exchange.¹ The authors of the eHealth Initiative’s recent report on value and sustainability models for HIEs came to a similar conclusion, identifying social capital as the key driver for marketing risk for HIEs.²

■ **Need for innovation.** We are breaking new ground as we work toward the NHIN, and the optimal approaches are not clear. We desperately need, efficiently and expeditiously, to learn what works and what doesn’t. We can gain that experience only by trying different approaches in different markets. As David Brailer highlights, there are many lessons to be learned from each HIE effort.³

The Top-Down Perspective

Likewise, the “top-down” perspective is critical, because of the absolute requirement for policy, procedural, and technical coherence; the need to move forward quickly; and the involvement of nationwide organizations such as the Veterans Health Administration, pharmacy chains, and national laboratories.

A common framework addressing policy, procedure, and technology (for example, the Connecting for Health common framework) is essential to enable the NHIN to function—particularly as a network of networks.⁴ One approach to achieving the necessary level of coherence is for a committee, perhaps based on use cases or other considerations, to select standards and develop implementation guides. This approach is unlikely to lead to a framework that can be broadly implemented while

providing the flexibility that local markets require. The Office of the National Coordinator for Health Information Technology (ONCHIT) has emphasized the importance of local markets in developing a framework for the NHIN. Its recent request for proposals (RFP) for trial implementations, for example, requires the HIEs to actively participate in a collective process to define the policies and technical approaches to interoperability and then implement that framework.⁵ This is important work and should inform the work that the Health Information Technology Standards Panel (HITSP) is doing. ONCHIT established HITSP to achieve widely accepted and readily-implemented consensus-based standards that will enable and support widespread interoperability among health information technology. Unfortunately, the HITSP has been mandated to choose standards for interoperability before we have even obtained this minimal level of experience.

A well-developed policy and technology framework would accelerate HIEs’ development. Without a framework to build on, HIEs must develop these approaches, which requires time, expense, and specialized expertise. The MidSouth eHealth Alliance in Memphis, Tennessee, is a good example of this effect. By adopting technology and policies approaches from an established framework, it saved hundreds of thousands of dollars and six to twelve months in developing its HIE.

The other significant driver for a top-down approach is large nationwide or regional organizations. While not often considered HIEs, these entities need to integrate with HIEs that are local or geographically based using a common approach. They are critical to HIEs’ success because they represent important sources of data and may have a local care delivery presence. The Veterans Health Administration, for example, has medical centers located in many communities. They need a consistent approach to integrate with these HIEs.

Local Flexibility Is Key

We will be able to create the NHIN only if we empower flexibility at the local market

level. As Gartner points out in its summary of the NHIN prototype contract findings:

Each approach was based on the principle of the “narrow waist” or “middle-out” design. The apparent paradox of this approach is that the best way to support heterogeneity and evolutionary innovation across a wide variety of participants in a large network is to enforce homogeneity for a small, well-chosen set of interfaces at the center.⁶

This was also the conclusion reached by Connecting for Health in creating its common framework.⁷ This same “small, well-chosen set of interfaces” may serve to interconnect legacy health care information systems within an HIE, creating the NHIN to consist of interfaces repeated at ever smaller scales. However, this is not the only option. As long as an HIE implements a few critical policies, it should be able to participate in the NHIN.

We should avoid the temptation to specify what services each HIE provides, how it delivers them, or how it pays for them. Practically, it will be essential for an HIE to accommodate a certain level of standardization needed by stakeholders who participate in more than one exchange, such as clinical information system vendors. In practice, HIEs will have to accommodate considerable variation in these standards to make progress without waiting many years for systems that implement these standard interfaces to be purchased and deployed. Specifying a large range of services that an HIE must provide will force an unnecessary degree of uniformity, perhaps reducing innovation and likely delaying implementation of the NHIN. Requiring the exchange to provide an unused service will waste valuable resources, add complexity, and require the exchange to adopt certain practices or policies that are inconsistent with its overall approach.

No one can doubt the critical role that health information technology and HIE will play in enabling our nation to address challenges in the quality, safety, and efficiency of health care. We need to critically evaluate which aspects of the NHIN are most important to advance. We all want it all, right now—every provider using an electronic med-

ical record, most clinical results encoded, privacy and security, instantaneous data access, and more. We have to weigh the costs and risks along with the benefits and choose those elements that provide the best balance. It is more important that we execute steps that move us forward than that we achieve our end in one giant leap. However, we must take those steps. As the Santa Barbara Project illustrated, it is important to maintain momentum.

Although the need is great, time is short, and energy is high, we must not succumb to the “easy” but risky path. We must have the discipline to progress methodically, to gather data, analyze them, and take the next step.

NOTES

1. R.H. Miller and B.S. Miller, “The Santa Barbara County Care Data Exchange: What Happened?” *Health Affairs* 26, no. 5 (2007): w568–w580 (published online 1 August 2007; 10.1377/hlthaff.26.5.w568).
2. eHealth Initiative, “Summary of the eHI Value and Sustainability Model and Tool Suite,” June 2007, http://ehr.medigent.com/assets/collaborate/2007/06/15/eHI_VSM_Tool_Suite_Summary.doc (accessed 27 June 2007).
3. D.J. Brailer, “From Santa Barbara to Washington: A Person’s and a Nation’s Journey toward Portable Health Information,” *Health Affairs* 26, no. 5 (2007): w581–w588 (published online 1 August 2007; 10.1377/hlthaff.26.5.w581).
4. See Connecting for Health, “The Connecting for Health Common Framework,” <http://www.connectingforhealth.org/commonframework> (accessed 20 July 2007).
5. U.S. Department of Health and Human Services, Business Opportunities, “Title: D—Nationwide Health Information Network Trial Implementations,” <http://www.fbo.gov/spg/HHS/PSC/DAM/O7EASRT070057/listing.html> (accessed 23 July 2007).
6. Gartner Inc., *Summary of the NHIN Prototype Architecture Contracts*, 31 May 2007, http://www.hhs.gov/healthit/healthnetwork/resources/summary_report_on_nhin_Prototype_architectures.pdf (accessed 27 June 2007).
7. Connecting for Health, “Achieving Electronic Connectivity in Healthcare: A Preliminary Roadmap from the Nation’s Public and Private-Sector Healthcare Leaders,” July 2004, http://www.connectingforhealth.org/resources/aech_exec_summary.pdf (accessed 19 July 2007).