



The Public Health Informatics Institute's goal is to tip the public health belief system from its perception that the business of public health is unique in each locale, to a belief that the public health enterprise can succeed only if it defines tomorrow's information systems together. In most respects, public health agencies are not independent islands in need of tailor-made solutions.

The rationale can be summed up with a straightforward question: Why develop multiple, similar systems when our problem and information needs are similar?

This topic brief provides an overview of the Institute's and NASCIO's "big picture" enterprise approach to developing comprehensive, cohesive public health information systems. This planning—putting the logical before the physical—starts with stakeholder consensus and understanding of the problem and business processes and drives toward defining common requirements for the systems that will do the work.

Topics In Public Health Informatics



The Big Picture

Developing an Enterprise View of Public Health Information Systems

Unlike medical or laboratory equipment, which wears out and loses value with use, information becomes more valuable the more it is used. Information does not grow in value, however, merely by residing in a database. The more it is made accessible to increasing numbers of people and used in more ways, the better it serves society.

It stands to reason, then, that an enterprise view of health information, in which information is shared among many partners, would be valued. But for all of its technical advances, the world of health care has been slow to transition from a largely paper-based industry to one that fully embraces information systems that enable broad exchange of health information.

In the last year, the concept of a national health information network has been gaining ground, principally because it holds promise for reducing medical errors. Such a network would electronically link disparate health care information systems—allowing patients, physicians, hospitals, payers, public health agencies, and other authorized users across the nation to share clinical information in real-time. All network systems and participants would operate under stringent poli-

cies on access, security, privacy, and other protection provisions.

This enterprise view of clinical health care information exchange—that is, information about individual patients—is becoming a reality in a few model programs. Numerous regional collaborations, known as health information exchanges or Regional Health Information Organizations (RHIOs), are under development across the country. When fully realized—although it could take a decade or longer—these health information exchanges will enable hospitals, health care providers, payers, and public health agencies to send and receive individual patient information securely using Web-based technology.

A number of complex, thorny issues remain to be resolved, however, before such large-scale enterprise-wide interconnectivity becomes reality in more than a few forward-thinking locales. These include issues of governance, technology architecture, data use agreements, and financial and business models that ensure sustainability. It is important to note that no single, national system is planned; rather, the vision is of a network of interoperable health information exchanges that use a common architecture.

To act as an enterprise, public health agencies must first reach consensus on the health problem to be solved, conceptualize the public health needs and goals, and understand how information systems can improve health outcomes.

Public health agencies—agencies whose work focuses on the health of populations rather than individuals—also have a role in these health information enterprises. Data from public health information systems can provide clinicians with individuals' immunization records, for example, or case management information at the point of service.

Private health care providers can also benefit from aggregate population-level data to establish risks and trends (e.g., infectious disease outbreaks) and expert guidance for management of public health problems (e.g., smoking cessation, lead screening, infection control).

Overcoming barriers

The barriers to public health acting as part of the national health information network, or enterprise, are great. In fact, barriers to an enterprise view of public health, in which information is shared across and among public health agencies themselves, are also formidable.

Barriers to an enterprise view of public health are related in large measure to funding. The federal government funds much of public health at the state and local levels. As federal funding has increased, states have cut their contributions. However, the legal authority—and spending authority—for public health resides at the state and local level. The typical sequence for public health funding begins with lobbying activities at the federal level to convince Congress to fund very specific public health programs. Funds are allocated to states and disseminated with strict spending timelines.

When the program involves information technology, often little guidance is given to help effec-

tively apply the funds. State and local public health offices receive the money through a grant process, and the accompanying instructions for building applications to tackle specific public health problems range from detailed to non-specific. Requirements are typically not provided. At the same time, a ticking clock mandates that the money be spent quickly. In many cases, the funds are spent at the discretion of individuals within public health who have little or no background in information technology, business process improvement, information architecture, or enterprise architecture.

As a result, progress toward interoperable health information systems among public health agencies has been slow, and anecdotal evidence points to limited positive impact on desired health outcomes. Health information systems projects are often narrow in focus, poorly defined, or driven by consultants from a wide spectrum of expertise and experience in developing specifications and implementing requirements. Consultants also vary in their knowledge and experience in enterprise architecture.

All together now

So what's needed to overcome these challenges, to create the conditions for public health to act as an enterprise, take an enterprise view of its information systems, and share information in a way that serves public health goals?

The Public Health Informatics Institute's goal is to tip the public health belief system from its perception that the business of public health is unique in each locale, to a belief that the public health enterprise can succeed only if it defines

tomorrow's information systems together. Public health agencies need to understand that, in most respects, they are not independent islands in need of tailor-made solutions. The rationale can be summed up with a straightforward question: *Why develop multiple, similar systems when our problem and information needs are similar?*

Aligning information infrastructure with information needs requires group action and group adherence to a new operational model:

- To act as an enterprise, public health agencies must first reach consensus on the health problem to be solved, conceptualize the public health needs and goals, and understand how information systems can improve health outcomes.
- They must develop the social will to create real change, that is, they must be willing to work together for the common good, and to put aside individual agency agendas and turf control. They must be willing to come to the table as collaborators, not competitors. They must be willing to develop one-on-one relationships and trust among one another. This constitutes the "social glue" that makes collaborations work.
- They must develop a common understanding of their business processes: how their work is done. Through this exercise, participants invariably discover that despite their different circumstances (e.g., geography, size, budgets, etc.), they are all in the business of public health, perform the same basic functions, and thus have more business processes in common than not.
- With the discovery that business processes are principally the same, public health agencies that define requirements together find that the requirements for the systems

to do the work (business processes) also are more common than unique.

Health agencies that take an enterprise view by collaboratively defining the health problem, the business processes, and requirements can get ahead of the funding curve. When funding for information systems becomes available through a federal initiative, the health organization can respond quickly and effectively, with requirements already in place. Information technology investments can solve real problems and add long-term value.

Shared understanding, shared architecture

Once public health agencies understand their common purpose and have social will to act as an enterprise in defining business processes and requirements together, the architecture is the most easily accomplished piece of the process. The elements of the architecture—data standards, code sets, and vocabulary—are being actively developed by standards organizations and the Centers for Disease Control and Prevention through its Public Health Information Network (PHIN) initiative. Shared architecture makes information shareable, but the collaborative group first must define the infrastructure. The result is a seamless interoperable enterprise.

Labs collaborate on a national scale

In 2002, the Institute had an opportunity to demonstrate on a large scale that greater benefit can be gained through collaboration. In response to the bioterror events following 9/11, federal funding was appropriated to "modernize" public

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health laboratories at the state and county levels. In conversations with members of the Association of Public Health Laboratories (APHL), the Institute learned that most public health laboratory directors were not sure what their laboratory information management systems (LIMS) needs were. As is often the case with federal funding, they needed to spend the money within a tight timeline.

The Institute and APHL agreed to collaborate to solve the problem. Supported by funding from The Robert Wood Johnson Foundation, the Institute, APHL, and 16 public health laboratories, (i.e., 14 states, one county, and one city) set out to collaboratively develop the business processes and requirements for public health LIMS.

The first challenge was to convince the participating lab directors that their business processes had more in common than they realized. At the start of the project, the lab directors believed that their laboratories' information systems were unique because the laboratories are organized differently from state to state, and they vary greatly in size and services provided. The Institute, however, found that laboratory processes are largely the same. For example, they all collect specimens. Specimens are processed. Results are reported. They all manage inventories of equipment and supplies. They all have standard laboratory procedures and testing protocols. Their few real differences were not in critical areas.

Over time, project participants experienced a number of *aha!* moments, dramatically changing their mutual perception from "We're all different" to "Hey, we're not so different after all." Once this prem-

ise was accepted, project participants, guided by the Institute, produced a business process framework for all public health LIMS. Next, a comprehensive requirements document was developed. Within six months, public health LIMS business processes and requirements were developed—by public health laboratories for public health laboratories.

With this information in hand, public health laboratories are now ready to "visit the showroom" of solutions and evaluate alternative solutions in the marketplace. They have the option of creating their own LIMS applications or using the requirements to develop RFPs for purchasing commercial off-the-shelf (COTS) LIMS. Perhaps the most valuable outcome is that public health laboratories now understand their common business processes, speak the same language, and can more easily interconnect and integrate their LIMS.

Now, public health laboratories can avoid "reinventing the wheel" when launching a project. They have the information they need to build a better system. Developing requirements through a multi-state collaborative consortium led to a more comprehensive product (better) in a rapid process (faster) and at lower cost. These requirements also more accurately reflect interoperability needs. The collaboration produced requirements with lasting shelf life that allow for expansion and upgrades, and offer widespread cost efficiencies for future participants.

An even taller order

The Institute offers an example of an even broader collaboration in its work with state and federal agen-

cies to integrate child health information systems. This initiative focuses on linking the results of newborn dried blood spot screening with immunization records, vital records, lead screening, and hearing screening to provide a much more complete picture of the child, the environment, and the various at-risk populations in a community.

Integrated child health information systems are in many ways more complex than LIMS because the boundaries are very broad and not as crisply defined. Participants in the initiative represent many aspects of child health and are program-focused and data-oriented, rather than process or technology-driven, as the public health LIMS participants were.

Fortunately, this collaboration has a vision of a comprehensive child health profile that can become a child's "electronic health record." With guidance from the Institute, state and federal health agencies are collaboratively developing a common understanding of the need for a child health profile (what is the business case?), the business processes (how does the work get done?), and the requirements (what does the system need to do?) for information systems that make a child's information available when and where it's needed.

Conclusion

In the world of health information systems, a shared enterprise view of information is critical to improving the health of individuals and populations. A shared architecture makes information shareable, but a collaborative approach to defining the health problems and developing information systems is equally

essential to the goal of information sharing.

For the fields of public health and health care, the language of information enterprises, business process, and systems architecture is sometimes foreign and can create a conceptual barrier to understanding. The Institute seeks support of and collaboration with organizations such as NASCIO and its member CIOs to communicate and incorporate best practices in enterprise information systems projects undertaken by public health agencies.

About NASCIO

The National Association of State Chief Information Officers (NASCIO) is a non-profit 501(c)(3) organization comprised of the chief information officers of the fifty states, five U.S. territories and the District of Columbia. In addition, NASCIO represents government officials from all levels of state, local, and federal governments who have direct responsibility for implementing information technology management and policy initiatives. Private companies serving the state and local government IT market also participate in NASCIO as corporate members. Non-profit organizations are eligible to join as associate members.

NASCIO's mission is to foster government excellence through quality business practices, information management, and technology policy. NASCIO helps shape national IT policy through collaborative partnerships, information sharing and knowledge transfer across jurisdictional and functional boundaries.

For more information, visit www.nascio.org

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Resources

All Kids Count. (2003). *Integration of Newborn Screening and Genetic Service Systems with Other Maternal & Child Health Systems: A Sourcebook for Planning and Development*. Decatur, GA: Public Health Informatics Institute. www.phii.org

All Kids Count. (2003). *Integration of Newborn Screening and Genetic Service Systems with Other Maternal & Child Health Systems: A Tool for Assessment and Planning*. Decatur, GA: Public Health Informatics Institute. www.phii.org

Public Health Informatics Institute. (2005). *A Collaboration to Develop a Logical Design for Public Health Laboratory Information Management Systems*. Decatur, GA: Public Health Informatics Institute. www.phii.org

Public Health Informatics Institute. (2004). *A Collaboration to Develop Laboratory Information Management System Requirements*. Decatur, GA: Public Health Informatics Institute. www.phii.org

Public Health Informatics Institute. (2004). *Developing a Charter for a Collaborative Requirements Project*. Decatur, GA: Public Health Informatics Institute. www.phii.org

Public Health Informatics Institute. (2004). *Guiding Principles for Effective Health Information Systems*. Decatur, GA: Public Health Informatics Institute. www.phii.org

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About Public Health Informatics Institute

The Public Health Informatics Institute is dedicated to advancing public health practitioners' ability to strategically apply and manage information systems.

The Institute assists federal, state, and local public health agencies and other public health stakeholders that are grappling with information systems challenges.

Our services provide clarity about the information systems problems to be solved and identify the solutions to those problems.

The Public Health Informatics Institute is a component of The Task Force for Child Survival and Development.

For more information visit www.phii.org, call toll-free (866) 815.9704, or e-mail info@phii.org.

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