

# Mission-Driven Priorities: Public Health in Health Information Exchange

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## Abstract

*Developing state- and nationwide health information exchange (HIE) is one of the health priorities defined in the American Recovery and Reinvestment Act. States are expected to take leadership in statewide planning and implementation. To balance limited resources among mandated responsibilities and emerging HIE accountability, we maintain that state public health practitioners must integrate HIE into our mission-driven practice in five priority areas: 1) connecting real-time disease surveillance and notifiable case reporting through HIE to better **protect** citizens; 2) sharing public health-managed clinical information through HIE for **preventive** services, 3) conduct health education for targeted populations via HIE to **promote** healthy lifestyles; 4) leverage public health informatics with Medicaid information system to **provide** quality healthcare; and 5) serve as a regulator for standardized HIT to **participate** in healthcare reform. We summarize public health's broad practice into "Five P's" and link each domain's historical foundation, current and proposed practices to sustain success.*

## Introduction

Today, public health informatics is given primary importance as a critical building block of public health infrastructure. Past assessments of public health information systems have focused almost entirely on biosurveillance and interagency communications.<sup>1,2</sup> By contrast, the 2009 American Recovery and Reinvestment Act/Health Information Technology for Economic and Clinical Health (HITECH) Act views the role of state health departments in developing state- and nationwide health information exchange (HIE) much more broadly. States are expected to take leadership in statewide HIE planning and implementation. The HITECH Act has provided new opportunities, expanded responsibilities and challenges to states. To strategically allocate scarce resources among mandated responsibilities and emerging HIE accountability, we, as public health practitioners, maintain that public health agencies must continue to define the scope and priority of their HIE activities that to be contained within the public health mission. We summarize public health mission and its diverse practice into the "Five P's" that include:

- **P**rotecting citizens from harm due to natural or manmade disasters

- **P**reventing unnecessary injury, illness and death through health education
- **P**romoting healthy lifestyles and offering information that encourages healthy choices
- **P**roviding basic primary and preventive health services to disadvantaged and vulnerable populations
- **P**articipating in healthcare reform

Applications of public health informatics exist at all levels of government in each of the above "P's," but the use of informatics applications in public health is inconsistent across public health domains as well as geographic jurisdictions. Public health is concerned with the health of populations, not individuals. Initial goals of using HIE are to improve patient care. Public health needs to identify the areas where HIE can be utilized to improve the public's health. Thereafter, public health can effectively integrate the HIE efforts into public health informatics practice. To illustrate the prioritizing process, we review each P's historical foundation of public health informatics and identify the priorities for participating in HIE to support the public health mission in following sections.

## Protecting

Mortality surveillance and notifiable disease reporting systems constitute the core epidemiologic surveillance infrastructure in the U.S. public health system for the purpose of protecting the public's health. The disease reporting system is driven to a great extent from the federal level by mandatory reporting to the Centers for Disease Control and Prevention (CDC) of 62 notifiable diseases as well as the states' various additional requirements for reporting communicable diseases. For example, the state of Utah requires reporting on a total of 74 communicable diseases. Physicians, hospitals, and laboratories are required to report cases of these diseases to local health departments, who report the cases to the state and ultimately the federal agency. Early in this decade the CDC launched the National Electronic Disease Surveillance System (NEDSS) to automate this process. NEDSS is far from complete nationwide, but many states and localities have replaced cumbersome paper and pencil reporting systems with electronic reporting based on national standards for exchange of notifiable disease data. Electronic death registration systems are currently functioning in most states, permitting detection of patterns of mortality much more rapidly than was possible with paper-based death certificates. Utah employs the Electronic Death

Entry Network for near-real-time influenza surveillance and has been developing interoperability with one of HIE applications managed by the Utah Health Information Network (UHIN).

Other new surveillance systems are under development as well. CDC has undertaken a major initiative to establish the nation's real-time electronic biosurveillance system- BioSense, which is designed to detect and monitor disease outbreaks and bioterrorism events via communicating with hospitals and other healthcare settings. Several states also conduct electronic syndromic surveillance. For example, Pennsylvania, Utah and Ohio employ the Remote Outbreak Detection and Surveillance (RODS) software that monitors chief-complaint in 76 hospitals and also serves as the user interface for the National Retail Data Monitor, which collects and analyzes daily sales data for over-the-counter medication sales.<sup>3</sup>

*From a state's perspective and in the context of HIE development, improving timeliness and completeness of notifiable disease reporting and communication among federal, state, local health agencies and healthcare organizations should be an informatics priority for better protection of the public's health. An intervention study in Philadelphia demonstrated that Internet-based information exchange methods can significantly increase clinicians' reporting on notifiable diseases.<sup>4</sup> The Massachusetts Department of Public Health piloted an Electronic Medical Records (EMR)-based surveillance system that showed increases of 39% to 53% in reported chlamydia and gonorrhea respectively.<sup>8</sup> The Utah Center for Excellence in Public Health Informatics has developed electronic capacity to transmit notifiable disease reports daily from the Intermountain Healthcare's inpatient EMR system to Utah Department of Health (UDOH). Pilot projects, such as these, should not be developed independently from current state HIE initiatives among clinicians and laboratories. The local health department in Grand Junction, Colorado, receives case reports and has sent public health alerts to clinicians through their HIE system-Quality Health Network since 2005. This demonstrates that standards-based HIE development in the private sector can provide opportunities for public health to conduct new forms of electronic disease surveillance and communication with the HIE participating organizations.*

### **Preventing**

Public health prevention activities are targeted at populations across the life cycle, but historically, prevention measures have been especially effective in the area of improved maternal, infant and child health.<sup>6</sup> High quality public health data, such as vital statistics, have been available to practitioners in this area for over

100 years, so that now a number of mature informatics applications support reproductive and child health programs. Both CDC and the Health Resources and Services Administration (HRSA) have sponsored the development in state health departments of key registries, such as Newborn Heelstick Screening for detection of metabolic and other inherited disorders, Early Hearing Detection and Intervention (EHDI), immunization and birth defects registries, etc.. These programs rely on high levels of automation to efficiently monitor the health of entire birth cohorts.

Limited HIE to promote child health has occurred among public health programs already. The Public Health Informatics Institute has fostered the integration of child health information systems within states through their *Connections* program. Utah's participation in the *Connections* community has accelerated the development of the Child Health Advanced Records Management (CHARM) system, which makes data from several child health programs and birth certificates available to any single prevention effort. For example, the CHARM multi-system integration makes it possible to detect when the family of a child who needs hearing screening follow-up applies for the child's birth certificate. The vital records order processing system alerts staff to the child's potential hearing loss, and the family is given instructions on how to obtain additional hearing testing.

Computerized disease registries maintained by states represent crucial informatics infrastructure for prevention-oriented research and practice. Forty-five states have cancer registries supported either by the CDC National Program of Cancer Registries or the National Institutes of Health Surveillance, Epidemiology and End Results (SEER) programs. As with child health data systems, cancer registry data are typically linked with other information sources to enrich the data available to researchers.

Public health registries contain population-based clinical information, which can and should be provided to clinicians for preventive health service. For example, Utah's immunization registry connects with 100% of public clinics and two-thirds of the primary care clinics, providing immunization forecasts for patients based on the consolidated immunization record. *Statewide HIE initiatives provide additional venues to connect private clinicians to public health-managed, population-based clinical information systems. Since many, if not most, states already have immunization registries, immunization coordination is a shovel-ready public health program primed for integration with HIE.*

### **Promoting**

Health promotion programs have operated for decades in an information-rich environment. Such programs seek interventions with quantifiable prevention effectiveness. Public health informatics provides crucial support for assessment and policy development in health promotion.

Since 1992 the CDC has cooperatively worked with 19 states on the Assessment Initiative by supporting states in developing web-based dissemination of data on health status and risk in communities. Along with the technology, part of the Assessment Initiative has been the dissemination of standard indicators of chronic disease and environmental health growing out of the Healthy People 2000 and 2010 frameworks. One example is Utah's Indicator-Based Information System (IBIS) for Public Health.<sup>7</sup> These systems are frequently referenced in health-related stories published in newspapers and have played a vital role in raising the general public's level of sophistication when it comes to behaviors that carry health risks. Assessment informatics has greatly increased the efficiency of public health data management, analysis, visualization, dissemination and use. The Healthy People 2020 Advisory Committee has proposed to examine and visualize the relationship among different sets of indicators. This will challenge the current assessment informatics to use new technology such as grid analytical services to upgrade the current single indicator query system to multi-indicator and/or multi-state analytical systems.

The essential companions to health promotion data dissemination are the information systems used to gather various behavioral and other health risk data, especially the Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS is the world's largest ongoing telephone survey system. In addition many states have their own state level health surveys focusing on special topics, at-risk sub-populations, or emergency preparedness that leverage the CATI technology developed to support the BRFSS.

Currently, public health programs are major users of the above informatics applications for population-based health promotion. To disseminate health promotion information directly to targeted subpopulations, internet-based Personal Health Record (PHR) may provide a new communication channel for public health. PHR is a relatively new informatics practice among innovative health systems, plans or consumer health informatics companies. The Commonwealth Fund's 2007 state e-health survey reported that eight states (Alabama, Georgia, Iowa, Massachusetts, Louisiana, Oregon, Texas, and West Virginia) implemented PHRs.<sup>8</sup> Public health spends considerable resources to promote healthy behavior and preventive

care in the general population. *We envision that with appropriate policy-guidance, PHR could be used as a cost-effective tool for direct-disseminating health education and promotion information to at-risk populations by the public health chronic disease programs.*

### **Providing**

Public health in many states also functions as a personal healthcare provider and a payer for disadvantaged populations. Federal and state governments have jointly funded large scale programs to provide personal health services or health insurance coverage to Children with Special Health Care Needs, Medicaid clients, and uninsured children through the Children Health Insurance Program. On a smaller scale, public health programs directly serve refugees, migrant workers, low-income uninsured individuals, and various special populations. Public-funded safety net clinics are an essential component of healthcare systems in the nation as well. As a provider or payer for needy populations, these programs use similar informatics applications to manage healthcare as do their counterparts in the private sector.

States has taken limited initiatives in direct service areas. The 2007 Commonwealth Fund survey found that all participating states reported that e-health activities were significant in their states. However, the largest number of reported state activities was in the area of public health (e.g. registry development) more so than Medicaid (e.g. telehealth, electronic health record (EHR) and decision-support tools).<sup>8</sup>

Since 2004, the Centers for Medicaid and Medicare Services (CMS), in partnership with the Quality Improvement Organizations (QIO), has promoted EHR adoption in physician practice through the Doctor's Office Quality – Information Technology (DOQ-IT) project in Arkansas, California, Massachusetts, and Utah and its Medicaid Transformation Grants in 16 states. In 2007, CMS launched the Medicare Care Management Performance (MCMP) Demonstration, a new initiative to pay physicians for the quality of the care they provide to seniors and disabled beneficiaries with chronic conditions, within its DOQ-IT pilot states. During this period, CMS has also funded a number of pilot projects to encourage Medicare beneficiaries to utilize Personal Health Records.

The HITHEC act allocates funds for state public health agencies to actively join the federal initiatives and help accelerate EHR adoption in the private sector. To assure sustainability of the state effort, public health should prioritize our strategies in line with our mission.

First, the EHR/HIE promotion can target public-health service-related providers-primary care clinicians, who

have the broadest impact on population health. For example, the Utah state legislature appropriated funds twice, to provide technical assistance to primary care providers, who serve Medicaid clients, to adopt EHR. Utah's EHR adoption rate among primary care practices approached 61% in June 2009.

Second, increasing integration between public health and Medicaid information systems can better support both Medicaid and public health's mission. After the EHR is in place, decision-support applications can enhance the use and value of the EHR for its investors. In 2007, state public health agencies reported 14 decision-support tool developments out of 234 reported e-health activities in 41 states and the District of Columbia.<sup>8</sup> The Medicaid Management Information System (MMIS) is the foundation for any decision-support tool to function as a value-added component for Medicaid. Currently many states, including Utah, are in the planning stage to update or replace their outdated MMIS. An EHR repository or data warehouse is a key source for deploying decision-support tools. State health departments' data warehouses in Michigan and Utah contain both Medicaid eligibility and claims data and public health vital records. The readily available death certificates enable Medicaid program to timely identify deceased beneficiaries to prevent benefit fraud. Linkage between birth records and Medicaid data allow the Maternal and Child Health program to monitor Medicaid birth outcomes and provide consultation to Medicaid for improving maternal and child health. Funded by a CMS Transformation Grant, Utah health informatics researchers have developed an electronic pharmacotherapy risk management system based on the information in the data warehouse for the Utah Medicaid program. Inappropriate use or prescribing medications will trigger interventions to targeted prescribers and patients. These decision-support tools demonstrate promising potential for improving quality and reducing the cost of care.

Third, public health's population-based assessment can assist Medicaid to identify potential problem areas. For example, statewide online assessment of emergency department utilization (ED) revealed the Medicaid patients had the highest rate of using the ED for non-emergent care among all populations.<sup>7</sup> The Utah Medicaid program used these findings to develop interventions to reduce non-emergent ED uses.

*While promoting EHR/HIE in both public and private sectors, it is essential that state public health work with Medicaid programs to develop connectivity and interoperability between public health and Medicaid information systems, to ensure the maximum benefit for*

*both public health and Medicaid agencies to achieve their respective responsibilities.*

### **Participating in Healthcare Reform**

Our nation is at a crossroads in reforming healthcare systems. To ensure that healthcare reform leads to better health, as well as better quality care, public health has to actively participate in efforts to reform the healthcare system. While waiting for a nationwide reform, states have been active in implementing their own incremental reform initiatives, mostly focused on increased coverage of the uninsured, transparency of care quality and cost, and better use of information technology to transform healthcare practice. Policymakers are challenged to be accountable for linking HIE investment with healthcare reform and better health outcome.<sup>9</sup>

*The key accountabilities for public health in reform-related HIE activities are as a regulator and developer of interoperability between public health information infrastructure and the healthcare industry.* For example, transparency of healthcare cost and quality information for consumers are federal-state and public-private joint initiatives. Eighteen states have published online consumer reports on hospital quality, safety, and charges in inpatient care and health plan performance measures more than a decade.<sup>10</sup> The state of Maine was the pioneer in developing the statewide all payers claim-database for health reform uses. The states of New Hampshire, Massachusetts, Vermont, and Utah have similar initiatives as well. Expanded data sources enable the states to expand their public reporting to involve consumers in healthcare system reform and also post technical challenges to states to manage the data efficiently and reduce reporting burden for the private sector. To address these challenges, Utah Department of Health reached an agreement with the Utah Health Information Network, a statewide HIE community, and public health data suppliers to accept data reporting through the UHIN's communication channel.

It is widely acknowledged that standardized HIE will reduce healthcare cost. While waiting for national implementation guidelines, the Utah legislature has empowered public health to adopt standards for the exchange of electronic clinical health information within the state of Utah in 2008. This approach was modeled on the Health Insurance Portability and Accountability Act (HIPAA), which defines the standards for exchange of electronic claims and other administrative transactions between health care providers and payers. Most people are familiar with the HIPAA privacy provisions, but it was the codification by the federal government of standards for electronic data interchange that provided the platform for

widespread electronic claims processing in the US healthcare industry.<sup>11</sup> By establishing standards for the exchange of clinical electronic data, perhaps public health can be a similar catalyst to encourage interoperable exchange of clinical data among providers using EHRs and between those providers and electronic public health surveillance systems. Both developments promise to reform the healthcare system in the direction of reduced cost and improved quality. As the Regional Health Information Organizations begin to exchange clinical data based on national data standards (such as Health Level Seven (HL7)), it is essential for an HIE to reach a certain level of standardization among its stakeholders who participate in more than one exchange.<sup>12</sup> State public health can contribute to the development by adopting those standards as mandates within jurisdictions. For example, Utah has adopted by the administrative rule, the standard implementation guide for clinical laboratory results for the statewide HIE. Utah Public Health Laboratory has been developing the capacity to transmit HL7 messages via the statewide HIE. Implementing EHR and HIE will transform the healthcare industry as well as public health practice.

### Discussion

Whether the comparison is to the healthcare industries of other rich countries, or to other American industries, healthcare in this country is way behind in use of information technology. A lot of money has been spent in recent years to jump start EHR/HIE in the United States. The HITECH allocates an additional \$2 billion into the investment. As we enter a period of greater competition for public resources it will be important to focus on what works and what is sustainable. The most effective public health leaders and partners in HIE will likely be those agencies that stick to the essential core areas of public health, the "Five P's" described here, and integrate HIE into public health practice.

With such a large volume of public resources being drawn into the health care sector to promote EHR and HIE, it is tempting for the public officials through which those funds flow to think expansively about the government's role in these areas. We recommend that public health be an engaged partner of the health care industry when it comes to HIE. In general, the state public health agency should be accountable for using HIE to enhance public health infrastructure for better implementing the public health mission, participating in HIE to improve population health, and promulgating appropriate law and regulation to protect the interests of the public.

Limited by the space, we kept the discussion at the public health enterprise level. Public health practitioners often have to synthesize overwhelming

and competing demands with limited resources into timely actions. This paper illustrates our reasoning process of strategic prioritization. We intend to stimulate more discussion among federal and state agencies, public and private partners of HIE to share perspectives and align strategies.

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