Regional Approach for Transforming Healthcare Quality Through Information Technology in Rural Settings

Principal Investigator:	Richards, Francis
Organization:	Weis Center for Research, Geisinger Health System
Mechanism:	RFA: HS05-013: Limited Competition for AHRQ Transforming Healthcare Quality through Information Technology (THQIT)
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Project Period:	September 2005 – September 2009, Including No-Cost Extension
AHRQ Funding Amount:	$1,499,999
Summary Status as of:	September 2009, Conclusion of Grant

Target Population: Rural Health[*]

Summary: This project addressed the relatively low adoption of health information technology (IT) in rural areas due to factors such as cost, culture, technical expertise, and regulatory concerns. As part of this project, Geisinger Health System joined with two local hospitals to develop the Keystone Health Information Exchange (KeyHIE), a regional HIE that provides health care providers with access to region-wide clinical information, including preexisting electronic health records (EHRs) and laboratory results. The implementation of KeyHIE is designed to expand health IT in rural areas, primarily by leveraging existing health IT investment to provide incremental but important functionality that supports wider access to information, communication, and demonstration of the value of health IT.

The goal of the regional HIE implementation is to lead to more effective triage in rural emergency departments, better informed clinicians, and better coordination and higher quality of care. The project included the following main objectives: 1) improve access to existing clinical information by rural health care providers, 2) improve communication between primary care providers and specialists, and 3) lay the foundation for a regional network that supports information sharing among rural hospitals and providers and creates an environment that encourages the adoption of health IT.

KeyHIE and other aspects of the regional HIE were evaluated using the following criteria: 1) number of users accessing the regional exchange system per participating organization, 2) number of patient records accessed through the regional exchange system, and 3) analysis of surveys completed by clinicians to identify system usability concerns and determine whether clinicians are as likely to access regional information for certain patient conditions.

With funding from the Pennsylvania Department of Health in 2007, a regional clinical document repository was implemented and four hospitals were added to the exchange. At the end of the grant period, the KeyHIE portal was implemented in emergency departments and clinics. The KeyHIE organization consists of several acute care facilities, primary care practices, home health, and long-term care facilities. More than 360,000 patients have authorized sharing information through the exchange that processes more than four million encounters annually from eight hospitals and 42 clinics. Additional stakeholders have been identified for subsequent broader adoption. The Geisinger Clinic employs five full time employees to operate this exchange on behalf of KeyHIE.

Specific Aims:

- Improve transparency and consistency across on-file medical records. **(Achieved)**
- Implement KeyHIE, the regional HIE that provides caregivers with access to region-wide clinical information. **(Achieved)**
- Implement community lab interfaces. **(Achieved)**
- Implement community portals. **(Achieved)**
- Administer surveys and measure use of the information by clinicians. **(Achieved)**

2009 Activities: The KeyHIE Governance team agreed to establish the KeyHIE as a corporate entity. The application for trademark of "Keystone Health Information Exchange" was approved and as part of the process, the application will be published for review and comment by third parties.

While not all participating hospitals were able to provide a laboratory interface, most hospitals send laboratory results electronically through the laboratory information system to their EHRs. Health information in the KeyHIE document repository continues to expand and now includes discharge summaries, history and physical documents, and radiology reports. A pilot was completed with two clinics to allow physicians to access KeyHIE as part of their EHR. Physician office personnel in this pilot were able to see within their EHR that the patient had activity at an out-of-network facility, and by clicking a "regional info" link, they launched the KeyHIE viewer that automatically signed them into the KeyHIE application and selected their patient for viewing. KeyHIE integration was expanded into the Epic Ambulatory Visit Navigator that supports access to regional information from within Geisinger's 42 clinic settings.

The laboratory interface delivered by one hospital vendor in October 2008 did not provide for cancellation messages. However, a planned new document interface would support labs and allow tests to be canceled, so the decision was made to wait for the new document interface. The interface delivered in April 2009 generated too many errors and could not be used. The vendor agreed to make corrections, but as of July 2009, the revised interface had not been delivered. The laboratory interface for the other hospital was successfully deployed in January 2007 with no issues. Physicians have reported high satisfaction with access to those laboratory results within the Epic EHR.

Grantee's Most Recent Self-Reported Quarterly Status (as of September 2009): The capabilities of the KeyHIE continue to expand with the addition of new members, the migration of the KeyHIE infrastructure to a new environment, the addition of new document types to the KeyHIE document store, integration with the Epic EHR, and the expansion of the community lab interface to additional facilities. All project milestones have been met at the completion of project and spending was roughly on target.

Impact and Findings: The formation of a qualified, trusted, and sustainable governance structure is required to address the highly complex and interrelated requirements of HIE, including recruitment of member health care organizations (HCOs), development of trust within the community by addressing patient privacy and security concerns, phased implementation of value-based technical architecture, ease of use by health care professionals across the continuum of care, and availability of resources to sustain and manage the HIE.

Because of a limited budget and uncertainty of a sustainable business model, it was determined that the HIE would be developed in an incremental approach built on existing technology wherever possible. The incremental approach decreased costs and enabled more rapid deployment of functionality but imposed critical usability and usefulness limitations.

A hybrid of a federated and centralized architectural model facilitated partner buy-in but proved unworkable in the long-term due to scalability (administrative and technical), data accessibility, and cost-related issues. The use of an unstructured, high-value clinical document repository (centralized model) provided substantial benefits to clinicians while minimizing privacy and security concerns because the data cannot be mined. As partner trust deepens, more structured information can be added to the data store. For those organizations with greater concerns about the use of their information, a local (federated) repository can also be connected. For the project partners it made sense to start with a more centralized approach to contain costs until a clear value proposition could be identified.

A downside of an incremental approach is an initial absence of a "critical mass" of information that rewards HIE use. The resulting low user satisfaction made it hard for HCOs to justify expenditures for HIE, particularly in the face of multiple competing needs in a difficult financial period. This is likely one reason for the relatively low success rate of deployed HIEs. In the second release, the KeyHIE clinical viewer had the ability to connect clinicians to all the clinical information each facility maintained, yet the fact that information was difficult to obtain made it less desirable.

Managing patient identity within an HIE has significant costs and proved to be one of the larger challenges of the project. Most HCOs use a medical record number (MRN) to identify patients within their facility. Because patients are registered in a variety of settings, the creation of duplicate MRNs is a common occurrence. Typically, health information management staff is employed to review potential duplicate records and correct them by merging duplicates, usually under the original MRN. The need for this service is compounded when MRNs from multiple organizations must be managed within an HIE. Health information management staff must be well trained and well supported through the governing body (policies and procedures) and through the HIE (patient matching functionality) to manage issues with patient linkage and de-duplication.

More detail on the project findings is included in Mr. Richards' final report: [Richards 2009 Final Report](#).

Strategic Goal: To develop and disseminate health IT evidence and evidence-based tools to support patient-centered care, the coordination of care across transitions in care settings, and the use of electronic exchange of health information to improve quality of care.

Business Goal: Implementation and Use

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* AHRQ Priority Population