

***Grant Final Report***

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**Developing Shared EHR Infrastructure in Wisconsin**

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## Structured Abstract

**Purpose:** The purpose of our project was to assemble multiple healthcare providers within a 180-mile radius of Madison, Wisconsin, and plan for the implementation of a common infrastructure for an integrated electronic health record (EHR) that would enhance access to clinical data and lead to measurable and sustainable improvements in patient safety and quality of care.

**Scope:** The key potential early adopters involved include 12 rural Wisconsin hospitals, the 4 main Madison healthcare providers, and physician clinics associated with these entities. The rural, acute care hospitals participating in the project are all members of the Rural Wisconsin Health Cooperative (RWHC), a cooperative network of 29 non-profit hospitals that serve small, rural communities.

**Methods:** The planning group's general work plan was to (1) specify clinical and organizational needs that could be met through EHR, (2) assess participants' readiness for EHR implementation, (3) determine the feasibility of a shared EHR system, (4) develop an implementation plan, and (5) specify project sustainability and evaluation.

**Results:** The planning group determined that applications to originate and receive data (providing positive value for adopters) and a data exchange infrastructure (bringing us closer to the ultimate goal of regional connectivity) needed to be implemented in coordinated steps, with the initial focus being on a shared integrated hospital information system (extended EHR). Planning related to the shared single-vendor system is moving on to a detailed second phase that will include a vendor selection process and governance determination.

**Key Words:** EHR; electronic health record; integrated hospital information system; data exchange

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# Final Report

## Purpose

The purpose of our project (as represented in our planning grant application) was to assemble multiple healthcare providers within a 180-mile radius of Madison, Wisconsin, and plan for the implementation of a common infrastructure for an integrated electronic health record (EHR) that would enhance access to clinical data and lead to measurable and sustainable improvements in patient safety and quality of care.

Related objectives included:

1. Specify clinical and organizational needs that could be met through HER;
2. Assess participants' readiness for EHR implementation and data exchange;
3. Determine feasibility of a shared EHR system;
4. Develop a workable model/plan for standards based data sharing that would allow multiple providers using disparate information systems to access patient information via a common platform; and
5. Specify project sustainability and evaluation .

Once the taskforce participants began to discuss their strategic interests related to the above objectives, it became clear that the project would add the following objectives:

1. Determine the group's role in the development of a vendor-neutral data exchange infrastructure in Wisconsin; and
2. Determine a course of action that would help build the local EHR capacity of the participating rural providers in a way that would be consistent with an eventual data exchange infrastructure.

## Scope

Several IOM committees and other expert groups have called for increased use of Information Technologies in health care for quite some time. As early as 1991, the IOM recommended that the health sector transition from paper-based to computer-based patient records within 10 years (IOM, 1997). In 2000, the IOM Committee on the Quality of Health Care in America concluded that IT "must play a central role in the redesign of the health care system" to achieve a significant improvement in quality (IOM, 2001a, p. 16). Numerous government panels, including the National Committee on Vital and Health Statistics (2001) and

the President's Information Technology Advisory Committee (2001) have called for the development of a National Health Information Infrastructure (NHII). The Connecting for Health initiative of the Markle Foundation has engaged hundreds of public- and private-sector stakeholders in efforts to advance interconnectivity and the use of EHRs (Markle Foundation, 2003). Recently during his State of the Union address, President Bush announced a commitment to ensuring that all Americans have EHRs within 10 years (WH, 2004a).

The healthcare sector is undergoing two critical information technology transitions that will have a profound impact on care delivery, patient safety, and patient empowerment. On the acute and ambulatory care organization level, the rapid development of integrated EHR systems with error detection and decision support modules—including but not limited to CPOE, medication verification through barcoding, and customizable physician portals—is driving a transition from paper based environments to safer, more efficient, paperless environments that depend on interconnected modules communicating with and querying one another in increasingly complex ways.

On the regional level, healthcare is transitioning from a delivery system aimed at providing episodic institutional care for the treatment of illness to an emphasis on information systems that support community-based care, with greater consumer involvement in the prevention and management of illness across the life span.

The development of both (1) local EHR systems that are consistent with a common framework for data exchange; and (2) a health information technology data exchange infrastructure, are critical elements of these transitions.

In October of 2004, AHRQ awarded a "THQIT" (Transforming Healthcare Quality Through Health Information Technology) one year planning grant to our collaborative of 19 Wisconsin healthcare organizations, both rural and urban, whose goal was to begin work toward applying existing technology to health care to reap rewards in improving the quality of care and efficiency of the delivery system in Wisconsin.

The key potential early adopters involved include 29 rural Wisconsin hospitals, the 4 main Madison healthcare providers, and physician clinics associated with these entities. The rural, acute care hospitals participating in the project are all members of the Rural Wisconsin Health Cooperative (RWHC), a cooperative network of 29 non-profit hospitals that serve small, rural communities.

Twelve of the twenty-nine members have been involved in the planning phase of this project; others may participate during the implementation phase. The rural hospitals have also served as a bridge to rural primary care clinics as part of the planning process. The urban providers have been represented by the Madison Patient Safety Collaborative (MPSC), a coalition that was established in 2000 to develop and implement solutions that are designed to improve the quality and safety of patient care in southern Wisconsin. The MPSC members are all located in Madison, the state capital. All of the rural hospitals/clinics refer patients to one or more of the urban hospitals.

RWHC has already begun preparing for the collaborative application and data exchange effort by establishing the RWHC Wide Area Network (WAN), a frame relay network that was developed in response to the significant challenges and cost inequities rural providers face when trying to connect to the Internet and other facilities. By pooling resources and partnering with an established, regional telecommunications carrier, RWHC has been able to create a robust and secure telecommunications infrastructure. Currently, over 25 hospitals, clinics, regional providers, and service vendors are connected to the network, including the rural hospitals

participating in this initiative. Most of these “early adopters” were attracted to the greatly reduced rates for the basic services available through the WAN, including: high-speed Internet access, e-mail services, video conferencing capabilities, secure data storage, and scalable bandwidth for existing connections to regional providers. This was made possible by aggregating the volumes of the participating entities and bringing economies of scale to bear.

The RWHC hospitals’ commitment to information technology, as evidenced by the building of the WAN infrastructure, and their long and rich history of collaboration in the areas of education, networking, and shared staffing, make them excellent candidates for investment in healthcare information technology.

Indeed, the WAN was sanctioned by the RWHC Board—the CEOs of the member hospitals—to eventually be used just for this purpose. In addition, in August, 2005, the Board approved the hiring of a RWHC HIT Director to spearhead the development of shared EHR applications. Now that the infrastructure and some staffing are in place, the members are poised to apply the shared service model to collaborative healthcare applications and data connectivity.

Activities during the planning phase included initial identification of stakeholders and interested parties, consensus building through monthly meetings and discussions about institutional needs and desires, education sessions related to EHR implementation and data exchange, and a survey of group readiness to implement EHR applications, as well as electronic exchange itself at different levels.

One of the early challenges was dealing with the issue that in general the urban and rural facilities had distinctive strategic interests: in general, the urban facilities in the collaborative had a strategic interest in data exchange, and the rural participants a strategic interest in developing their internal EHR systems in preparation for data exchange. This distinction in participant strategic needs shaped the course and results of the planning effort.

## **Methods**

The planning group’s general work plan was to accomplish their objectives through:

1. Assessments and discussion
2. Educational opportunities
3. Site visits
4. The development of an implementation and evaluation framework

## **Assessments and Discussion**

In order to specify clinical and organizational needs and assess participant readiness, the planning group developed a detailed assessment tool that helped us to collect a variety of information related to needs and readiness, including: (1) facility and facility service description; (2) the degree to which organizations relied on technology; (3) technology use and vendor detail; (4) internal and external network infrastructure description; (5) information system security

detail; (6) perceived readiness by stakeholder; (7) strategic and IT acquisition plans; and (8) questions related to perceived benefits of a Wisconsin data exchange environment.

Compiled assessment results were then used, in conjunction with a variety of educational opportunities, as the basis for detailed discussion regarding how the planning group should proceed given the results.

## Education

In order to educate participants on the issues related to EHR implementation and data exchange, and to determine the feasibility of developing an integrated EHR environment, the planning group participants engaged in a variety of education sessions throughout the planning period. These included:

1. A review of EHR implementation and data exchange literature, including (1) the Markle Foundation “Achieving Electronic Connectivity in Healthcare” (2004) and other Markle Foundation studies; (2) the Santa Barbara Data Exchange “Moving Toward Electronic Health Information Exchange Interim Report” (2003); (3) a review of the material available on other vendor neutral data exchange efforts around the country (Taconic, Massachusetts, Indianapolis); (4) a review of materials and presentations of the “Capitol Hill Steering Committee on Telehealth and Healthcare Informatics”; and (5) review and consideration of presentations by a number of emerging and leading programs as made available at various national conferences and on web sites of leading healthcare IT related organizations.
2. On-site presentations by two integrated EHR system vendors (Epic and Meditech) with a focus on the issues of data exchange standards and interoperability between disparate vendor systems.
3. A symposium organized by the planning group, in partnership with Wisconsin’s QIO, Metastar. The symposium speakers covered the following topics: (1) a case study on physician clinic EHR implementation; (2) an overview of national issues related to data exchange and EHR implementation; (3) EHR interoperability; (4) the challenges of EHR implementation for small rural providers; and (5) Metastar’s DOQ-IT project to promote the use of EHRs in physician clinics.
4. Presentations by 2 open source EHR advocates, who discussed Open Vista—the open source offering for physician clinic practices—and the open source movement in general.
5. Participation in the “Connecting Communities for Better Health” conference, convened by the eHealth Initiative and the American Health Quality Association, May 25 – May 26, 2005, Renaissance Hotel, Washington, D.C.
6. Participation in the AHRQ “2005 Annual Patient Safety and Health Information Technology Conference”, Monday, June 6 – Friday June 10<sup>th</sup>, 2005, Washington Convention Center.

7. Participation in technical assistance calls and webinars produced and/or sponsored by the Agency for Healthcare Research and Quality (AHRQ) and its' National Health Information Technology Research Center.

## **Site visits**

A task force composed of planning group representatives visited three entities (Inland Northwest Health Services in Spokane, Washington, SISU in Minnesota, and Kalispell Regional Medical Center in Montana) that have a history of collaboration on the areas of shared IT services and EHRs.

## **Implementation and Evaluation Framework**

The results of the group's work has been recorded in an Implementation Framework document, which reflects the group's consensus position on how to proceed beyond the initial planning phase. The Implementation Framework contains: (1) the group's vision for moving forward; (2) detailed goals and objectives for an implementation phase; (3) detailed discussion on the range of governance models to be considered; (4) discussion on the common barriers to EHR and data exchange implementations; (5) implementation recommendations, including discussion of potential implementation projects; and (6) a proposed evaluation strategy, with possible measures and data collection methods.

# **Results**

## **Assessment Results**

### **1. Needs:**

Top identified unmet HIT needs of taskforce participants included (in the order of prevalence): (1) Nurse documentation, (2) CPOE, (3) PACS and Radiology systems, (4) EHR implementation in general, (5) Barcoding systems, and (6) ER charting systems.

### **2. Barriers:**

Identified barriers to meeting participant needs included (in the order of prevalence): (1) lack of financing; (2) physician acceptance; (3) staff acceptance in general; (4) lack of leadership; (5) lack of technical support; (6) lack of interface development resources; and (6) security issues.

### **3. Readiness:**

Participants were asked to assess their organization's "readiness" to adopt a networked EHR and related tools. The majority of respondents categorized themselves as "Partially Ready," across the spectrum of stakeholders listed. A smaller number of participants categorized themselves as "Fully Ready."

## Education Results

Key takeaways that influenced the planning group's decision-making regarding EHR and data exchange implementation:

- Data exchange is expensive
  - Santa Barbara (\$10 million in seed money)
  - NHIN (estimated \$156 billion, and \$48 billion annually to operate)
- Data exchange and interoperability are two different things
  - Waiting on data exchange standards to get past primarily “view-only” exchange
- Rural and urban hospitals have distinctive strategic interests
  - Urban hospitals have a strategic interest in data exchange
  - Rural hospitals have a strategic interest in developing their internal EHR systems in preparation for data exchange.
- Benefits of data exchange infrastructure accrue to larger communities
  - Santa Barbara Data Exchange: *Moving Toward Electronic Health Information Exchange: Interim Report* (2003) “The analysis shows that there are positive returns to health information exchange in all except small communities (e.g., one hospital and less than 100 physicians)...”
- Benefits not aligned with those who shoulder the cost
  - According to the Advisory Board NIHIT Briefing, “hospitals and providers foot 97% of the ongoing costs, yet receive just 56% of the potential benefits. The remaining benefits are dispersed among payers and other stakeholders.
- Markle Foundation: *Achieving Electronic Connectivity in Healthcare* (2004)
  - “Our recommendation is that both applications and (health information exchange) infrastructure should be developed and adopted simultaneously, in incremental steps that always bring us closer to the ultimate goal, and that deliver positive value for adopters at every stage.”
  - Positive value to ensure sustainability

## Feasibility Evaluation

Information technologies constitute powerful tools with great potential to enhance health and health care in rural communities, and yet the challenges are immense. According to Markle's *Achieving Electronic Connectivity in Healthcare*, because of the structure of the healthcare payment system, for many providers (especially those in small rural communities) the acquisition and use of IT can result in a financial loss. Addressing the specific issue of data exchange in this regard, the Interim Report on the Santa Barbara County Data Exchange

concludes that in small community markets (with one hospital and less than 100 physicians) “there is little difference between enterprise-data access and regional data sharing, so it is not surprising that these markets do not have a business case for sharing data beyond the enterprise.” The Markle foundation recommends that this challenge be addressed by implementing on the one hand applications to originate and receive data (providing positive value for adopters) and on the other hand data exchange infrastructure (bringing us closer to the ultimate goal of regional connectivity) in coordinated incremental steps.

In keeping with this recommendation, the planning group’s consensus position was to (1) implement collaborative EHR applications that are in the participating hospitals’ strategic interests; (2) work to make sure the implementations are consistent with an eventual data exchange infrastructure; and (3) play a role in the planning of the infrastructure.

In any discussion of the proposed National Health Information Infrastructure and the “RHIO” movement, it is important to distinguish between data exchange facilitated by application sharing, as when multiple facilities share a single-vendor integrated EHR system, and vendor independent data exchange infrastructures that concern themselves with identifying and exchanging data via systems that sit outside the EHR vendor space (such as the Santa Barbara County Data Exchange). The former systems offer data exchange with robust integration, at the cost of organizational flexibility to select distinctive vendors. The latter systems offer strictly limited integration (at present, the Santa Barbara model exchanges information in “view only” mode), and await clinical data exchange standards for useful data interoperability. It is significant to note that the Santa Barbara County Data Exchange considered the single-vendor application sharing alternative as a desirable option early in their planning process, but members couldn’t agree on a single vendor (Moving Toward Electronic Health Information Exchange: Interim Report on the Santa Barbara County Data Exchange, 2003).

The Wisconsin THQIT planning group found value in both of these cooperative models. Application sharing was seen as a local EHR building (and a data exchange platform between application sharing participants), and the data exchange infrastructure was seen as a long term solution that would connect hospitals and clinics with disparate clinical information systems once data exchange standards are finalized and adopted.

But given the results of our assessments (with the vast majority of respondents indicating needs in the area of EHR type systems), and the group’s education takeaways (including that EHR implementation projects must provide positive value to ensure sustainability) it was decided to focus our initial implementation efforts on implementing a shared single-vendor integrated hospital EHR system.

## Site Visit Results

One of the first places to look for an understanding of the issues related to implementing a shared single-vendor extended EHR system is to existing functioning models. In May, 2005, with the support of AHRQ grant funds, RWHC representatives visited three such shared extended EHR system organizations: Inland Northwest Health Services in Washington; Kalispell Regional Medical Center in Montana; and SISU Medical Systems in Minnesota.

**Inland Northwest Health Services.** INHS is the oldest and largest of the shared extended EHR collaboratives. A 501(c) 3 organization, INHS serves 32 hospitals and more than 400 physician practices, and is staffed by nearly 200 IT professionals. INHS provides complete IT services, including Internet, e-mail, helpdesk, and data center, along with the shared Meditech system. It also manages a shared PACS system, a dictation system, a physician practice system,

and several telemedicine applications. The shared EHR allows patients' medical records to be securely accessed by staff at other facilities within the system. Because of its size and its data exchange capabilities, many consider INHS to be one of very few existing regional health information organizations (RHIOs).

**Kalispell Regional Medical Center.** Kalispell is the smallest of the collaboratives we visited. A staff of 10 FTEs provides extended EHR and data exchange services to a small number of hospitals. Unlike INHS and SISU, Kalispell does not provide full IT utility services.

**SISU Medical Systems.** SISU is a 501(c) 3 organization owned and operated by 13 Minnesota hospitals. Like INHS, SISU provides complete IT services for its member hospitals (Internet, e-mail, Active Directory, helpdesk, data center, etc.), as well as the shared Meditech extended EHR, with a staff of roughly 40 FTEs. The major difference between SISU and both INHS and Kalispell is that SISU doesn't share any information between hospitals. The goal of the organization is to create an efficient cost-effective EHR platform for each participant, not to exchange data.

**HIT Collaborative Scope of Services.** The above organizations service between 3 and 32 hospitals. Their general levels of service range from:

1. Shared hospital extended EHR application (exclusively)
2. Physician practice EHR supplementing the shared hospital extended EHR
3. Additional shared systems (time & attendance, PACS, dictation, telemedicine, etc.) supplementing the extended EHR
4. IT utility services, such as Internet, e-mail, networking, comprehensive IT helpdesk, and shared staffing (both INHS and SISU hire and train staff that then provide in-house IT support to member facilities) supplementing the extended EHR
5. Data exchange between facilities

#### **HIT Collaborative Benefits**

- Contained implementation costs with common established procedures
- Contained capital costs with a shared data center and server model
- Contained operating costs with shared system administration, help desk, etc.
- On-going purchasing and negotiating power
- Patient safety tools
- Data exchange capabilities between participating providers, if applicable

## **HIT Collaborative Challenges**

- Concern about loss of existing investments, and timing of opportunities
- Even with cost containment benefits of shared model, top-tier EHRs will require significant commitment, both capital & operating, of organizational resources to IT
- Integration means standardizing for the benefit of the organization. This can be threatening to departmental stakeholders, especially if they are accustomed to best of breed departmental systems
- EHR implementation is an inherently disruptive activity, which requires steadfast leadership through an extended period of great change
- Governance issue: Initial commitment requires a true collaborative spirit, trust, and flexibility

## **HIT Collaborative Success Factors**

- Commitment of organizational resources to IT
- Commitment of organizational over departmental causes
- Commitment to stay the course
- Commitment to collaboration, since the more organizations do collaboratively, the more value is derived. (Organizations will ideally exhaust collaborative options before investing in their own HIT solution)

**Implementation project planning.** The next phase of implementation planning is scheduled to kick off in January, 2006. A shared integrated EHR taskforce is being organized to decide on the specific scope and characteristics of the shared system, and to seek implementation commitments. The taskforce proposal and related materials have just been distributed.

## **List of Publications and Products**

Not applicable.