

Grant Final Report

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**EQUIP (Enhancing Quality in Patient Care Utilizing
Information Technology in Patient Care)**

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Abstract

Purpose: The project aim was to implement advanced EHRS functionality, including decision support, care management and quality reporting of national performance measures in a replicable, scalable model across four safety net Health Centers.

Scope: The project was carried out in 4 multiple site HRSA funded Community Health Centers desiring to leverage Health Information Technology to support their application of the IHI Care Model. Partners in the project included the American Medical Association, Health Information Management Systems Society, and GE Medical Systems.

Methods: Methodology included working with vendor, measure developers and end users to define necessary data elements for incorporation into end user screens, report specifications in a data warehouse for national performance measure reporting and progressive refinement of replicable implementation methodology to drive standardized adoption and use through sequential pilots. A formal evaluation combined implementation monitoring with process and outcome measures.

Results: All major goals and objectives were achieved. The system is live in all four Health Centers. The Data Warehouse supports regular reporting on national performance measures and aspects of system use at network, site and individual provider level. An evaluation report was completed and submitted to AHRQ. System use is now being spread to other Health Centers.

Key Words: Electronic Health Record System, Decision Support, Clinical Data Warehouse, Clinical Performance Measurement, Community Health Centers, Performance Improvement, Health Disparities Collaboratives, HRSA

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Final Report

Purpose

The project had the overall aim of accomplishing a replicable Electronic Health Record System (EHRS) implementation incorporating evidence based practice recommendations and national performance measures in 4 safety net organizations, and demonstrating its ability to improve quality and safety. Rather than simply implementing basic EHRS functionality, the Alliance project strove to realize the full range of benefits envisioned by the Institute of Medicine letter report on EHRS capabilities. This meant focus on consistency of data capture and use and access to appropriate analysis and reporting technology.

The specific goals of the project included:

1. Implement EHRS in a network of Community Health Centers in a manner that ensures consistency and accuracy of health information across all practitioners, sites and populations.
2. Develop a data warehouse that will monitor, aggregate, and provide data to be used for clinical and system quality improvement.
3. Utilize the EHRS/data warehouse to facilitate and encourage the use of evidence-based practice measures at the point of care.
4. Utilize the EHRS/data warehouse to facilitate continuous improvement of health care quality and safety and develop its function as a patient registry.
5. Promote and support the realization of the full potential of EHRS use in ambulatory care settings, particularly among safety net providers, to improve health care quality and safety.

Scope

The project involved implementation of the EHRS across four Community Health Centers located in Chicago, described as follows: Erie Family Health Center is located in Chicago's West Region Community Safety Net Site. This site is the second most populous of Chicago's seven Safety Net sites with over half a million residents. In 2000, approximately 50% of the population in this site was African American and 37% were Hispanic; about 20% were foreign born, and nearly 40% were non-English speaking. Over 50% of residents lived 200% below the Federal Poverty Line.

Howard Brown Health Center is located in the Chicago North Region Community Safety net site, home to nearly 500,000 residents. The population in this region is predominately White (58%) with 17% Hispanic, 12% African American, and 10% Asian (2000 data).

A little over a quarter of the residents were foreign born, but approximately 35% are non-English speaking. Roughly 30% live 200% or more below the poverty line. Howard Brown Health Center's client population is primarily lesbian, gay, bisexual, and transgender persons

Heartland Health Outreach is also located in the Chicago North Region Community Safety Net Site and serves Uptown, Edgewater, Rogers Park, and Albany Park communities, targeting homeless, immigrant, refugee, HIV positive, and working poor populations. These communities are the most established ports of entry for immigrant populations, with a concentration of immigrants larger than 10,000 per square mile. The percentage of foreign born population within the service area varies from 33 percent in Uptown, to 52 percent in Albany Park. Between 1990 and 2002, the North service region experienced a 12% growth in the percentage of Chicagoans who do not speak English at home. Furthermore, a large economically disadvantaged population resides within these community areas. For example, 36% of the Edgewater population, 42% of the Albany Park population, and 46% of the Rogers Park and Uptown population lives below 200 percent of the federal poverty level.

Near North Health Service Corporation (NNHSC) is a 501(c) (3) non-profit Federally Qualified Health Center (FQHC). It is one of the largest providers of community-based primary care in Chicago. Services provided include health care, social services and nutrition education to the medically indigent and uninsured residents of the Near North side (Cabrini Green), West Town, Humboldt Park, West Garfield Park, Austin, Kenwood/Oakland, Douglas and Grand Boulevard. NNHSC targets a primary service area that is spread across many of Chicago's 77 community areas, encompassing a population of more than 1,500,000. While disparate, NNHSC communities are characterized by large concentrations of CHA high rise apartments, abandoned residential buildings, blighted commercial properties, and an utter absence of basic services and health care resources.

The Alliance partners together provide more than 350,000 medical visits to close to 100,000 patients from 38 sites including primary care, dental, school based, drop in and homeless shelter sites. We promote a holistic model of community primary care including behavioral health, health education, nutrition, case management, and health promoter programs. Total clinical staff number 580. The aim was for EHRS to be used for all clinical care at all sites.

Several important partnerships were involved. These included the American Medical Association, who provided evidence quality measures and expertise in specifying these in an Electronic Health Record System, the Health Information Management Systems Society who provided technical assistance in Information Technology and dissemination, GE Medical Systems, who developed the data warehouse and helped with report specifications and First Consulting Group who carried out the evaluation.

Methods

The typical approach to utilizing EHRs for decision support and quality reporting typically defers work in these areas until the system has been implemented and is in use. Furthermore, many EHRs implementations that phase in functionality “stall” and fall short of significant aspects of use including physician order entry and lab interfaces. The Alliance and member Centers shared a conviction that this conventional approach to EHRs implementation was one reason many EHRs implementations had not yielded the desired levels of adoption and improvements in care processes. Instead the approach to be used incorporated the requirements for evidence-based care into system design and workflow redesign prior to implementation, with close attention to the specification and quality of data needed for quality management and reporting.

The plan was to build in relevant decision support/evidence-based guidelines into end user screens, so that data could be captured by and presented to caregivers at the point of care. The plan also focused on promoting consistent and structured data definitions and capture methods required for decision support and population quality reporting.

Standard electronic software also is designed mainly for use at the individual patient level and therefore lacks sufficient analysis and reporting capabilities necessary for the intended population care management and reporting uses. Therefore, development of a Clinical Data Warehouse with more robust analytic capability was incorporated into the project to provide this capacity.

A description of methods utilized/steps followed by specific project goal follows:

Goal I: Implement EHRs in a network of Community Health Centers in a manner that ensures consistency and accuracy of health information across all practitioners, sites and populations.

- Extensive education of clinical and other key staff on EHRs capabilities and functionality; development of consensus on goals and requirements to support relevant functionality.
- Extensive participatory product selection process (GE Centricity) including site visits.
- Software purchased and supportive contracts executed.
- Clinical leadership consensus in key implementation decisions for set up laid out by vendor
- Core IT & Clinical staff recruited and hired at network level
- Detailed replicable site implementation plan including change management strategy developed, including workflow engineering, preload of data, and training.
- Web based training infrastructure and training lab developed

- Change management training for leaders, key sponsors and implementation teams conducted
- Network architecture (centralized hosting at level III facility, TI communications lines to Center hubs, edge routers at sites configured with security monitoring and intrusion detection)
- Interface engine secured to construct interfaces with major lab vendors and practice management systems. Functional electronic interfaces built to 3 different practice management systems and 3 different laboratory systems
- End user devices selected procured and deployed

Goal II Milestones: Develop a data warehouse that will monitor, aggregate, and provide data to be used for clinical and system quality improvement.

- Contracted with GE Clinical Data Systems to build a data warehouse, and to build customized reports mapped to specific data elements in the record. Reports are based on the BPHC Health Disparities and the AMA Consensus Clinical practice measures.
- Developed format for a “data dictionary” cataloging standardized data terminology used in the system (based upon UMLS)
- Completed data mapping/reporting specifications - Diabetes, Cardiovascular disease and HIV

Goal III Milestones: Utilize the EHRS/data warehouse to facilitate and encourage the use of evidence-based practice measures at the point of care.

- Developed necessary consensus among clinical leadership on models of care, performance improvement and practice guidelines to support evidence based practice decision support;
- Developed strategic partnership with AMA to utilize their consensus measures (these form the basis for CMS developing prep measures)
- Developed needed forms, with clinical protocols embedded in form user friendly at point of patient care (Includes Decision support both active and passive, and standardized data elements)

Goal IV Milestones: Utilize the EHRS/data warehouse to facilitate continuous improvement of health care quality and safety and develop its function as a patient registry.

- Articulated network wide vision for use of data and quality improvement based on care model.
- Prioritized conditions for reporting and quality improvement work
- Conducted training on Quality Improvement and Joint Commission readiness
- Developed templates for Individual Center and Network level performance dashboards
- Trained health center staff to run reports and inquiries.
- Trained staff on more consistent and accurate race ethnicity data collection at registration.
- Introduced more granular race ethnicity data categories to data.

Goal V: Promote and support the realization of the full potential of EHRS use in ambulatory care settings, particularly among safety net providers, to improve health care quality and safety. Milestones:

- Negotiated vendor contract which allows “reselling” licenses to other CHCs
- Purchased interface engine which allow management of interfaces with other electronic data sources (PMS, laboratory, etc.)
- Developed central hosting architecture which supports application for any site
- Developed web based training platform, training manuals and materials
- Utilized a knowledge transfer approach to implementation; Network developed capacity to support implementation at future Health Centers independent of vendor at below market costs
- Presentations given at National and Statewide meetings, including AMA Physician Consortium for Performance Improvement, HCAP annual meeting, AHRQ HIT meeting, NACHC, AHIMA, AMIA, HIMSS and the GE Clinical User Group meeting.

Results

The project achieved all of its aims. Status/Outcomes by objective are briefly indicated below:

Goal I: Implement EHRS in a network of Community Health Centers in a manner that ensures consistency and accuracy of health information across all practitioners, sites and populations.

- Systems currently live at five Health Centers with feeds from 3 practice management systems and 6 reference laboratories.
- All sites live on the system are utilizing standardized data capture forms.
- An end user survey conducted indicated high acceptance and satisfaction with the system. System use measures indicate completed electronic note in 99% of encounters at sites live on the system and high degree of use of decision support screens

Goal II Milestones: Develop a data warehouse that will monitor, aggregate, and provide data to be used for clinical and system quality improvement.

- Currently generating system, health center and provider level reports on performance measures from AMA and HRSA through the Data Warehouse in dashboard format for diabetes, cardiovascular disease, HIV and preventive care.

Goal III Milestones: Utilize the EHRS/data warehouse to facilitate and encourage the use of evidence-based practice measures at the point of care.

- Forms completed and reviewed by clinical staff, and now in active use and continually refined
- End user request and review process in place to guide ongoing development
- Currently tracking use of decision support and outcome measures; find significant use upon go live, with increasing rates over time.

Goal IV Milestones: Utilize the EHRS/data warehouse to facilitate continuous improvement of health care quality and safety and develop its function as a patient registry.

- Provide monthly dashboard reporting on clinical indicators for Health Disparities Collaboratives, Preventive Services, and AMA Physician Consortium measures
- Provide additional dashboards on Patient Satisfaction, EHRS System use, and Access to Care.

- Able to produce population based status reports from the warehouse, re-identify data at individual patient level where necessary, and produce reports for specific population management tasks from the warehouse and directly from the EHRS.

Goal V: Promote and support the realization of the full potential of EHRS use in ambulatory care settings, particularly among safety net providers, to improve health care quality and safety. Milestones:

- Currently provide assistance to other CHCs in planning for EMR implementation.
- Currently in implementation at an additional 3 Health Centers, and about to launch in 4th funded through a HRSA High Impact grant.

Some key observations include the following:

- Principles adopted by the Alliance members for the EHRS effort overall provided a clear direction for many subsequent decisions and simplified the process considerably with a strong commitment to common goals and standardization:
 - Use Chronic Care Model to manage disease and populations of patients
 - Adopt and implement network-wide clinical data standards
 - Use standardized templates/forms and structured data collection
 - Look to national experts and evidence-based protocols as the basis for standards of care
 - Include all health care services delivered by the Centers, including Behavioral Health and
 - Rely on cross-Center subject matter experts and teams to review standards and support development of EHRS
- Experience gained during the pilot in particular (but also borne out in subsequent sites), showed that in order to be successful (without bogging down and slipping milestones), the following had to be in place at individual sites for successful implementation:
 - EHRS implementation had to be the priority project for the year. Centers and clinics sites did not have the luxury of adding staff and key people needed to focus on one large-scale effort. This truth became apparent in one pilot site that had 22 ambitious projects going on at the same time.
 - A key role was the local implementation team leader who, in addition to spending one-half of their time on the project for 6-8 months, needed to possess the following personal characteristics:

- Widely respected, though not necessarily in a leadership role at the site. Several very successful team leads were already informal leaders among their peers.
- Demonstrated ability to manage a project with many moving parts according to a work plan. Prior experience was a plus, though not an absolute requirement in every case.
- Extensive people skills, including consensus building, coaching, and listening. Many individuals and groups needed to be consulted, and both decision-making and coordination were done by a local implementation team.
- An engaged clinician champion, typically a physician, but sometimes a nurse practitioner, served as a vital member of the implementation team, acting as both decision-maker and advocate, taking advantage of a peer relationship with other clinicians to manage expectations and elicit cooperation. In one case, the medical director was a key member of the implementation team and became the team leader mid-project and was particularly effective because he had clinical and authority to make change.
- Several steps within the process built a high degree of site readiness that aided in the smooth and rapid transition for staff at the point of care who continued to see patients and conduct the routine work of the clinic as the EHRs was implemented:
 - A significant investment was made to pre-load patient data, including medications, problems, allergies, most recent vital signs, preventive care dates, HIV testing, and immunization dates. This meant that even on the first day of EHRs use, staff found useful information in the EHRs and began to receive assistance from clinical decision support.
 - Staff was trained in how they would do their work, once they had mastered basic navigation within the EHRs.
 - Just before go-live, a full rehearsal of the EHRs-supported workflow provided not only a final check on all of the details, but also gave staff a working model to observe.
- Development of performance measurement specifications presented many challenges.
 - Multiple measurement sets with unaligned measures for the same aspect of care. One example is that the measures addressed for diabetes and HIV care treated the lipid profile differently. Another very common situation in current measure sets from different organizations is differing definitions of inclusion and exclusion criteria employed to calculate numerators and denominators for what otherwise may appear to be the same measure.

- Lack of both commonly used clinical data concepts and standards for many concepts employed in measures. These include foot examination for signs of circulation problems in patient with diabetes, for which there is no CPT code and SNOMED has possible codes but no way to represent the type of examination performed (visual, pulse, monofilament) and result.

These differing definitions and ambiguities are very common in even the initial measurement set addressed in EQUIP. They added to the time and complexity for any organization seeking to use an EHRS as part of delivering evidence-based care and to employ nationally recognized quality measures as the foundation. The EQUIP team used national data standards where available and mapped EHRS data elements to national data standards when possible. However, in many cases, decisions were required to adopt a locally defined solution. This required direct involvement of the EHRS vendor, measure developer and clinical users. Clearly, this means that the much-discussed goal of external reporting of comparable information from ambulatory care sites is highly labor intensive and therefore not practical for widespread adoption until there is one uniform and unambiguously specified set of measures for ambulatory care sites to use, and commitment by vendors to provide appropriate data elements and capture methods in their products. Furthermore, until more sophisticated analysis and reporting functionality is incorporated into EMR software, use of a data warehouse is required.

List of Publications and Products

There are as yet no formal publications resulting from this work.

A formal evaluation report, including more specific findings and data collected, was completed by First Consulting Group and submitted separately to AHRQ. Following are the end user survey and sample dashboard extract.