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| **Project Title:** | The Bettering Lives Utilizing Electronic Systems (BLUES) Project: Improving Diabetes Outcomes in Mississippi with Health Information Technology |
| **Principal Investigator:** | Fox, Karen, Ph.D. |
| **Organization:** | Delta Health Alliance, Inc. |
| **Mechanism:** | RFA: HS07-006: Ambulatory Safety and Quality Program: Improving Quality through Clinician Use of Health IT (IQHIT) |
| **Grant Number:** | R18 HS 017233 |
| **Project Period:** | 09/07 – 09/10 |
| **AHRQ Funding Amount:** | $1,163,573 |
| **Summary Status as of:** | December 2008 |

**Strategic Goal:** Develop and disseminate health IT evidence and evidence-based tools to improve health care decisionmaking through the use of integrated data and knowledge management.

**Business Goal:** Implementation and Use

**Summary:** This project was initiated in September 2007 and has completed the first third of the grant period. The Delta Health Alliance (DHA) project will demonstrate, at several ambulatory clinics throughout Mississippi, the effects of diabetes management practices when using well-designed, comprehensive health information technology (health IT). The project uses TouchWorks Analytics (Analytics), a research and measurement module of the Allscripts Electronic Health Record (EHR) Version 11 that enables users to easily query patient records to review key clinical performance indicators. The Allscripts EHR is currently certified by the Certification Commission for Healthcare Information Technology (CCHIT) for: functionality (the ability to create and manage electronic records for all patients, as well as automating workflow in a physician's office); interoperability (the ability to receive and send electronic data to other entities such as laboratories); and security (the ability to keep patient information safe). Additionally, the EHR currently supports interoperability standards including the Continuity of Care Record (CCR) preliminary schema, CCR version 1.0, Clinical Document Architecture/Care Record Summary—better known as Medical Summary, the Health Level 7-specified format for referrals and encounter summary information—through several different Integrating the Healthcare Enterprise (IHE) profiles including both the Cross-Enterprise Document Sharing and point-to-point protocols.

This EHR system combines databases such as patient demographics and clinical outcomes, reported lab values, and prescription fill history across patient "dimensions," thereby centralizing and standardizing data analysis and reporting methodologies. It can be used to create and automate a variety of business functions, including pay-for-performance measures, clinical findings, care planning statistics, and population disease management. Another important contribution of the EHR to this project is the system's ability to integrate and maximize the effectiveness of third-party technologies that aid diabetic care. This capability is provided by a Universal Application Integrator within the EHR that allows third-party providers of applications and medical devices to easily develop software interfaces for the EHR.

The Bettering Lives Utilizing Electronic Systems (BLUES) Project will determine whether use of health IT in diabetes management enhances delivery of health care and improves health outcomes among patients. Four diabetes management clinics that employ the same model of diabetes care are participating in this study: two are located in an urban setting (one of which utilizes the health IT system), and two in a

rural setting (one of which utilizes the health IT system). The timing of this project coincides with independent plans to implement EHRs at these sites, which provides an invaluable opportunity to compare similar practices of health care providers and health outcomes of their patients with and without use of a comprehensive health IT system. The research design for the BLUES Project includes three specific aims and an overall evaluation to determine the effectiveness of the study and assess its impact. Finally, the following methods of data analysis will be used to measure the success of the three aims: 1) clinician use of the various components of the EHR will be modeled as a continuous measure (percent or proportion) rather than a strict yes/no type measure, and a mixed model analysis of covariance (ANCOVA) approach will be used to analyze the continuous measures, controlling for fixed (clinic, time) and random (patient) effects; 2) individual generalized estimating equations (GEE) analyses will be used to model changes over time in the proportions of patients accessing the various components of the Patients Interactive Module; and 3) a multivariate model will be built to investigate changes from baseline to end-of-study for the three measures combined.

**Specific Aims**

- Implement an EHR system in two existing diabetes management clinics, focusing on integration of the EHR into clinician workflows. **(Ongoing)**
- Evaluate the impact of the EHR system on clinical processes of care and patient outcomes. **(Ongoing)**
- Produce and distribute a generalizable, replicable model of care for implementing an integrated health IT system for diabetes management care throughout the United States. **(Upcoming)**

**2008 Activities:** The DHA continues its legal, administrative, and technical work with their various partners. The project evaluation plan was created in cooperation with partners located at the School of Health Related Professions and external evaluators located at the University of Chicago. Additionally, project staff worked with Mathematica Policy Research, Inc., to develop a comprehensive logic model for the project, which identifies inputs, outputs, and outcomes that will serve as the foundation for a generalizable, replicable model to be used for dissemination once the project measures are evaluated. From a technology perspective, efforts were initiated to plan specific interface protocols for message and information transfer. One of the clinics has been "live" with the EHR system since June 2008; however, DHA staff continue to work with them to increase system use. An additional site went live with the EHR system during the fifth quarter of the grant (9/30/08 – 12/30/08). The DHA BLUES Project staff is also gathering baseline data prior to implementation, as well as comparison data with the sites. As of December 31, 2008, there were 151 EHR users, including 113 physicians. The project has continued to expand its staff by hiring experts in areas such as data collection and health information management.

Baseline data collection tools were created, which resulted in data collection from 200 manual chart reviews from 2 sites by the end of 2008. In addition, the Consumer Assessment of Healthcare Providers and Systems (CAHPS) surveys had been administered to more than 75 patients by the end of the December 2008. Project staff have convened meetings with all grant partners to continually ascertain project outcomes and to determine their ability to measure the project outcomes. Staff also consulted with the evaluation team and statisticians to ensure that comprehensive measures were instituted for this project. A database for baseline data was created, which will serve as a repository for all BLUES Project and relevant EHR data collection efforts. Additionally, researchers will enter patient satisfaction surveys via a secure Web site survey tool.

Going forward, the project staff will continue to monitor project activities and gather the necessary process and outcomes measures for evaluation purposes. Project staff also implemented processes to address any deviations from the project plan. Over the 2008 calendar year, there have been two modifications in test sites, due to the closure of sites originally chosen, as well as hiring of additional staff to aid in data collection and entry.

**Preliminary Impact and Findings:** The project staff anticipate being able to measure the impact of the EHR system on clinical process of care and patient outcomes within the next year.

**Selected Outputs**

The project has developed data collection tools for baseline data for the BLUES Project, as well as measures of impact and outcomes measures.

The project submitted two abstracts for consideration at national conferences including the 81st Annual American Health Information Management Association (AHIMA) Convention and Exhibit (October 3-8, 2009), and the AHIMA Faculty Development Institute and Assembly on Education Symposium (July 25-29, 2009)**.**

The project also led an EHR conference for the Health Resources and Services Administration (HRSA), Office of Health Information Technology.

AHRQ 2008 Annual Conference presentation: The BLUES Project (PowerPoint® File, 550 KB; Web Version).

**Grantee's Most Recent Self-Reported Quarterly Status:** Project staff are currently implementing full use of funding. Additional staff have been hired to complete chart reviews, create a database, provide data entry services, and assist with evaluation and dissemination of results. Travel funding is being used in the current funding cycle to train the project manager in EHR systems and to provide dissemination of preliminary results and processes used in the BLUES Project.

**Milestones:** Project is mostly on track.

**Budget:** Somewhat under spent, approximately 5 to 20 percent.