Project Title:	Improving Health Information Technology Implementation in a Rural Health System
Principal Investigator:	Mingle, Daniel B., M.D.
Organization:	MaineGeneral Medical Center
Mechanism:	RFA: HS04-011: Transforming Health Care Quality through Information Technology (THQIT)
Grant Number:	UC1 HS 015337
Project Period:	09/04 – 03/08, Including No-Cost Extension
AHRQ Funding Amount:	$1,375,179
Summary Status as of:	March 2008, Conclusion of Grant

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: Through this completed grant, MaineGeneral Health (MGH) has pursued its longstanding commitment to the successful implementation of an outpatient electronic medical record (EMR). MGH serves 140,000 patients in rural central Maine and of the 104 affiliated practices, 29 are primary care practices, 59 are solo practitioners, and 33 are groups of five physicians or fewer. All are in communities classified as rural by the United States Department of Agriculture. In 2000, a process was launched to evaluate local providers' needs and to choose an EMR. In 2002, the Touchworks product from the vendor Allscripts was chosen for implementation as an enterprise-wide EMR for practices owned by MGH and independent practices affiliated with MGH. Seven primary care practices owned and operated by MGH were chosen as pilot sites, and a staged implementation began in January 2003. At the time of the Agency for Healthcare Research and Quality grant award, the first phase of EMR implementation had been completed at seven sites, which included electronic prescribing, allergy list, medication list, problem list, and tasking functionalities. It was intended to complete the installation of all modules, including clinical decision support (CDS) in the original seven pilot practices and add 12 new practices within the span of the grant, with the hope of emerging from the grant period with a plan to implement in all MGH - affiliated practices. Implementation of the EMR system and all of its functional modules was intended to improve patient safety, increase quality of care, and improve the efficiency of primary care, allowing doctors to serve more patients. Data were collected to show the effects of the EMR on health care quality, safety, access, cost, and practice finances. Where possible, comparison data from similar Maine non-participating practices were used to assess the impact of the implementation.

Specific Aims

- Complete installation of EMR modules at initial seven sites. **(Achieved)**
- Implement EMR system at 12 additional sites. **(Achieved)**
- Develop implementation procedures and a sustainability plan. **(Achieved)**
- Improve safety, quality, and accessibility of care. **(Achieved)**
- Implement CDS, data-sharing, and e-prescribing tools. **(Achieved)**

2008 Activities: Data have been collected on system performance and patient outcomes, although the sample size has been too small for conclusions to be drawn from statistical analyses. Also in 2008, MGH encountered significant budget challenges and chose to freeze efforts to expand EMR functionality and implementation. The remaining budget, though decreased, is sufficient to support current users and functionality, but no funds will be expended to advance functionality or to expand participation. There is

no evidence that deinstallation at current sites is likely, and advancement efforts are likely to resume when budget issues are resolved.

Impact and Findings: Implementation of the EMR system exceeded expectations, reaching 30 practices by the end of the grant term, with 12 more in queue. The community has been engaged by the project, and a reproducible process has been developed to implement the EMR in subsequent practices without significant loss of productivity. Despite budget cuts that required the postponement of expanding the EMR system, current use of the system is financially secure and sustainable. Evaluation metrics are still in development; although use of functions like e-prescription is being tracked, associated cost savings and patient safety improvement have proven more difficult to measure. Other metrics, including average per-patient costs, efficiency of office visits, and measures of quality improvement have not demonstrated trends toward improvement; in some cases, EMR-implementing sites performed worse than comparable practices that do not yet use the system. Cost to the patient was up 34 percent in participating practices, compared to 27 percent in control practices, over the measurement period. This difference appears to be primarily due to increases in emergency room (ER) and hospital use and in pharmaceutical expenditures. ER costs rose 93 percent, and hospitalization costs rose 16 percent in participating practices compared to 30 percent and nine percent, respectively, in control practices. Pharmaceutical costs are up 47 percent in participating practices compared to 42 percent in control practices. The rise in ER costs is a direct result of the implementation. Clinicians report that the EMR provided more accessible and more compelling data at each patient visit. They report that the EMR led them to provide more interventions for each patient at each visit. Each patient visit was more complex and more time consuming; consequently, they saw fewer patients overall. Cost data suggest that the displaced patients sought services in the ER instead. Increased pharmaceutical costs might reflect accelerated rates and intensity of treatment for poorly controlled chronic diseases, changes in prescribing patterns relating to increased ER use, or both. The project concludes that implementation of ambulatory EMR is a complex process—the project can be a technical success, and can achieve clinician participation, buy-in, and engagement, but it may still fail to deliver the expected performance or return on investment.

Selected Outputs

Mingle D. EHR Implementation and Adoption Ambulatory EHR at MaineGeneral Medical Center (PowerPoint® File; Web Version). Presentation at the Annual Conference of the Agency for Healthcare Research and Quality, 2008 September 8; Bethesda, MD.

Mingle D. The Role of Stark Reform in the Transformation of Healthcare in Rural Maine. Healthcare Information and Management Systems Society (HIMSS) Summit; June 2008; Washington, DC.

Mingle D. What to Consider When You are Considering ePrescribing. Brinkman Physicians in Rural Practice Symposium; March 2007; Farmington, ME. Farmington: Franklin Community Health Network.

Mingle D. The Foundational Role of EHR in a Successful RHIO, Lessons from Rural Maine. Annual Healthcare Information and Management Systems Society (HIMSS) Conference; February 2006; San Diego, CA.

Mingle D. Using the EHR, to Strengthen the Collaboration between Providers and Community Resources for Diabetes Care. Annual Meeting of the Maine Diabetes and Control Project; August 2005; Augusta, ME.

Mingle D. Electronic Health Record (EHR) Roll Out, Learning from the MaineGeneral Experience. Annual Patient Safety and Health Information Technology Conference; June 2005; Washington, DC.

Mingle D. Taking Care to the Community: Using the EMR to Initiate Health Practice Change. Annual Meeting of the Society of Teachers of Family Medicine; October 2004; Rye Brook, NY.

Grantee's Most Recent Self-Reported Quarterly Status: This grant has been completed. The EMR system has been successfully implemented in 30 practices, and the system has sufficient administrative, clinician, and financial support to be sustainable. Primary aims for the project were generally met on schedule. The EMR system was implemented at a larger number of practices, although financial difficulties left it less fully developed than had been planned. Data were collected, but analysis suffered from small sample sizes.

Milestones: Progress is mostly on track.

Budget: On target.