

## Using Health Information Technology to Improve Ambulatory Chronic Disease Care

---

<b>Principal Investigator:</b>	Mehr, David, M.D., M.S.
<b>Organization:</b>	University of Missouri–Columbia
<b>Mechanism:</b>	RFA: HS07-006: Ambulatory Safety and Quality Program: Improving Quality Through Clinician Use of Health Information Technology (IQHIT)
<b>Grant Number:</b>	R18 HS 017035
<b>Project Period:</b>	September 2007 – August 2011, Including No-Cost Extension
<b>AHRQ Funding Amount:</b>	\$1,192,603
<b>Summary Status as of:</b>	December 2010

---

**Target Population:** Adults, Chronic Care\*, Elderly\*

**Summary:** Coordinating fragmented chronic disease care requires new systems to manage information between providers and enhance communication with patients. To improve patient care quality and safety, the Family Medicine and General Internal Medicine practices at the University of Missouri–Columbia (MU) are conducting a phased implementation of selected ambulatory care health information technology (IT) systems and functions. This project proposes a formative (in-process evaluation aimed at improvement) and summative (final overall) evaluation of health IT innovations designed to improve chronic disease care in the ambulatory primary care practices at MU. These innovations are the result of collaboration between MU clinicians from the Department of Family and Community Medicine and the Cerner Corporation, MU’s Certification Commission for Health Information Technology-certified medical record vendor.

Specific strategies in this health IT project include providing physicians with comparative performance reports in one of three formats, and providing patients with access to a Web-based, interactive software system that features secure messaging, in-home reconciliation of all medications, and use of in-home “smart” diagnostic devices to send patient data directly to the care team.

The project proposes a multi-method evaluation of health IT innovations designed to enhance the quality of primary care for chronic diseases, including qualitative interviews, surveys, and analysis of outcome data. The innovations are being implemented differently in various practices and with different associated care systems. This variation in care processes provides an extraordinary opportunity to evaluate factors that influence health IT innovations’ effects on performance-based quality improvement, care coordination, and patient self-management.

### Specific Aims:

- Evaluate the change in patient care processes and outcomes following introduction of health IT-generated clinician quality performance reports across differences in practices and peers. **(Ongoing)**
- Evaluate the effectiveness and changes associated with an interactive Web-based patient interface software system (IQ Health), including in-home medication reconciliation. **(Ongoing)**
- Evaluate the use of in-home “smart” diagnostic devices (e.g., blood pressure cuffs, glucometers) connecting patients with their care teams. **(Ongoing)**

- Disseminate information regarding the development and impact of the interventions through Web teleconferences, professional meetings, educational lectures, and peer-reviewed journals. **(Ongoing)**

**2010 Activities:** Preliminary analysis of the impact of access to reports on performance indicators, such as systolic blood pressure <140/90, was conducted in 2010 and is discussed in the findings section. In addition to measuring the impact on the performance indicators, the team interviewed and observed physicians to assess reactions to performance reports and the context within which physicians use them.

The development of summary screens is also part of the Cerner-MU collaboration. The summary screens allow the clinician to view multiple elements of a patient record, such as laboratory values and medications for a diabetic patient, on a single screen. They also provide quality indicator data on that specific patient. A survey was distributed to clinicians to evaluate the usability of the summary screens and the results were written into a manuscript that was submitted for publication in 2010.

The evaluation of the Web-based patient interface was completed through a survey of patients and providers who used IQ Health and the next generation health IT system, Healthe. The Web portal includes: secure messaging (including prescription requests), medical record review (including medication list), and appointment scheduling. This qualitative information will inform development of improved patient interface software. Two manuscripts have been prepared; one focusing on patients, the other on providers. In addition, this evaluation includes assessment of the medication verification feature of the Web-based systems. Pharmacists visited participating patients and coached them on reviewing their medication list. Patients were asked to review their medication list and generate a message to their provider through Healthe (preferably) or regular e-mail to notify them of any changes or additions. This message did not include an all-inclusive list of patient medications, only the changes patients felt the provider needed in order to update the patients' medical record. The team then evaluated the information the patient sent, the nature of problems identified (e.g., incorrect listing of medications in the electronic medical record), and the response of providers to these messages.

To understand the uptake and use of Healthe, the project evaluated patterns of enrollment or non-enrollment and use of the Web portal. A manuscript that addresses patient expectations, perceptions, and use of the Web portal is under development.

The evaluation of the use of in-home "smart" diagnostic devices (home blood pressure and blood glucose monitors) continued throughout 2010 and will be completed early in 2011. There were delays due to incompatibility between patients' diagnostic equipment and computers during software releases, and the shift to upgrade telephone lines to digital cable. Patients were given a survey at enrollment and intervention patients received an additional survey at the conclusion of their participation in the study (3 months). Data collection continued for actively-participating patients through December 2010. Qualitative interviews with nurses and physicians regarding their perceptions of the smart devices began at the end of August and are expected to be completed early in 2011.

---

**Grantee's Most Recent Self-Reported Quarterly Status (as of December 2010):** Progress is mostly on track and the project budget is somewhat underspent due to a delay in some project activities.

**Preliminary Impact and Findings:** The project team presented results on the use of the single-summary screens for summarizing diabetes care at the September 2009 Agency for Healthcare Research and Quality annual meeting. The evaluation of the summary screens determined that providers were able

to retrieve information more quickly, with fewer mouse clicks, and improved accuracy. Qualitatively, the providers embraced the new tool and agreed that rapid access to information is critical. If identifying data is too time consuming, providers may give up, ask the patient to recall information, and if necessary, repeat exams. Initial data on the summary screen indicate that this tool accelerates information retrieval.

In 2010, the project team began to analyze the data to measure the change in patient care processes and outcomes following introduction of health IT-generated performance and comparison reports on quality of care. Preliminary analysis suggests that overall performance is improving in most clinics on most measures. During the initial phase (through February 2010), when only some clinics received pull reports, it appeared that, over time, having access to pull reports was associated with improvement. However, there are differences between clinics that overlap differences in the kind of report that was received; analysis of this data continues.

---

**Strategic Goal:** 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

---

\* *AHRQ Priority Population*