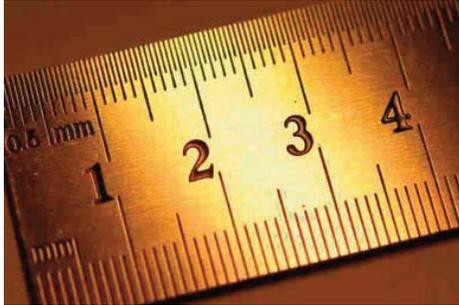


## Measuring Quality in Physicians' Practices in Southwestern Missouri Using an Electronic Health Record



Current efforts to improve the efficiency and quality of medical care while decreasing costs involve improving the availability of patient's health care information. Electronic health records (EHRs) are patient medical records that health care providers can access via computers to review and record clinical information during patient encounters. EHRs capture such information as patient health histories, current medication lists, and test results. Quality measures that quantify the appropriateness and quality of care provided by a clinician or health care organization can be generated from

information contained across many records in an EHR system. Monitoring of quality measures as part of quality improvement process has been shown to improve clinicians' and organizations' compliance with clinical guidelines. While EHRs have great potential for assisting in the measurement of health care quality, data on quality of care are not automatically generated from these systems.

This project sought to establish the foundation for measuring quality of care using EHR technology in a group of ambulatory practices in southwestern Missouri. This was done by: 1) standardizing the EHR to collect the clinical patient data required for measuring quality of care and 2) evaluating the efficiency and accuracy of automated data coding (i.e., by EHR software) compared to manual coding (i.e., by an individual) of health data to measure quality of care.

The study involved 15 practices affiliated with Citizens Memorial Healthcare (CMH) in Bolivar, Missouri, with assistance from the Institute for Health Metrics and LSS Data Systems, Inc. These practices use the MEDITECH EHR system and deliver an average of 70,000 patient encounters per year combined. Demographically, CMH's patient population is older and poorer than the Nation's average.

In evaluating the project, automated EHR data extractions were found to be more complete (100 percent) compared to manual coding (less than 25 percent), better at identifying the eligible population, and more exact in reporting results from the EHR. One challenge was getting physicians to fully document all of the relevant information about a specific patient or visit in the EHR system that was necessary to measure quality. Based on findings from the project, incentives and performance feedback for physicians, further revisions to the EHR, targeted physician feedback, and training can be used to improve use of the EHR for quality measurement.

A toolkit was developed to help the CMH EHR vendor's other clients implement quality measures, and it will become publicly available in the near future. Findings from the project have been presented to stakeholders, including medical providers and clinical researchers.

*The Challenge: False impression that implementing an EHR will cause quality measurement and reporting to happen by osmosis.*  
- Denni McColm, Principal Investigator



## *Using Electronic Health Records to Measure and Report on Quality of Clinical Care*

A quality measure is a standardized assessment that quantifies the extent to which an individual unit within a population (person in a clinic, individual clinic among all clinics in a region) meets some criterion for quality of care. Quality measures use patient clinical data to quantify the appropriateness and quality of care provided by a physician or health care organization. Providing timely data to physicians on their performance on quality measures has been shown to improve their compliance with clinical guidelines. EHR systems have great potential for assisting in quality measurement by providing reliable, valid clinical data for quality measurements. Automating the extraction and reporting of measurement data through an EHR system should reduce staff and physician time and improve accuracy and timeliness of reporting quality performance data for external and internal purposes.

However, there are challenges to this. First, documentation occurs in many places within the EHR, complicating search algorithms and confusing results. For example, the result of a hemoglobin A1c laboratory test may be recorded in one place if completed in the clinic, another if completed by an outside laboratory that has an interface to the EHR, and another if received from a non-interfaced laboratory. In addition, clinical documentation is often not standardized or is unstructured (e.g., text).

The Centers for Medicare and Medicaid Services (CMS) administers a pay-for-reporting program called the Physician Quality Reporting Initiative (PQRI). This program offers incentive payments to eligible physicians and mid-level providers (nurse practitioners and physician assistants) who measure and report on the quality of care and services provided to Medicare patients. In 2009, physicians could choose from 153 PQRI quality measures in a variety of care settings and specialties. Reporting could be done through a PQRI-qualified registry, a qualified EHR system, or claims coding. In this study, automated data extraction of PQRI quality measures from the organization's EHR was developed and compared to claims coding.

The aim of this project was to use pre-existing EHR technology to facilitate quality measurement. All 15 physician practices were already using the ambulatory MEDITECH EHR, which was linked to a community-wide EHR called Infocare. More specifically, the objectives were to:

- Standardize the EHR to capture data elements needed to measure the quality of clinical care;
- Develop an automated data extraction system to provide feedback reports to physicians on their clinical quality performance;
- Demonstrate the efficiency and accuracy of automated data extraction and reporting; and
- Address technical, organizational, and workflow issues associated with measuring clinical quality.

### **Study Participants:**

- Citizens Memorial Hospital is a public hospital district in southwestern Missouri.
- Institute for Health Metrics is a non-profit organization that assists health care facilities use their electronic data to improve quality.
- LSS Data Systems, Inc. is the Citizens Memorial Hospital EHR vendor that is certified by the Certification Commission for Health Information Technology.



The project was split into two phases. During Phase I (October 2007 through September 2008), the project team standardized the documentation systems and processes within the EHR (e.g., documentation templates, electronic prescribing, and documentation of allergies) so quality data could be extracted without interrupting physician workflow. Also, CMH established and implemented a manual claims-coding method for PQRI reporting to serve as a comparison. Since not all 62 PQRI quality measures selected for the purposes of this project could be manually coded, three quality measures related to diabetes care were coded for each physician. The three measures were blood pressure levels, hemoglobin A1C levels, and low-density lipoprotein levels. In Phase II (October 2008 through December 2009), the PQRI measures for ambulatory care were extracted from the EHR and reported using an automated data extraction tool. Automated coding from the EHR was compared to manual claims coding.

Data sources for the quality measures included patient demographics, billing data, medication lists, health maintenance items, immunization records, orders, vital signs, test results, and documentation queries from the EHRs. Documentation queries provided a large part of the data needed to evaluate PQRI compliance, such as tracking exclusions when patients refused the recommended therapy or tests.

Physicians, midlevel providers, and nurses were trained on the new documentation templates, tools, and queries using online learning, classroom training, and one-on-one training. Web-based reports were created to demonstrate CMH compliance with PQRI indicators at the organizational level using relevant clinical data.

## *Key Results*

The automated data extraction of 62 PQRI quality measures from the EHR relied on documentation queries and existing data fields within the EHR to code results, exclusions, and additional requirements.

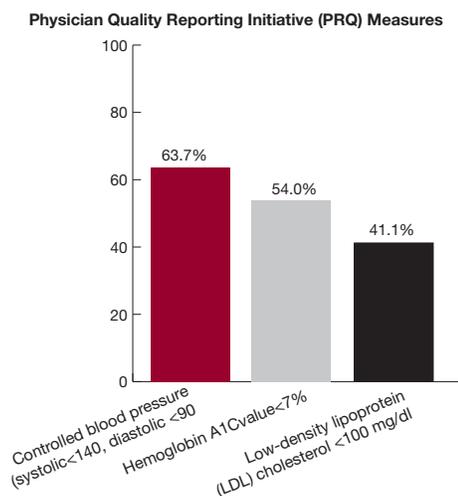
- For 50 measures, information to determine whether patients were eligible to be included in the PQRI measure (e.g., diabetic patients) was available in the demographic and diagnosis/procedure codes within the EHR.
- Twelve measures had additional eligibility requirements. For one measure, the additional requirement was found in the medication list; the other 11 measures required the development of documentation queries to determine eligibility.
- For eligible patients, half of the measurement results were found in existing fields of the EHR; queries were built to capture results for the other half of the measures.
- All of the quality measure exclusions were captured using queries.

Coding completeness was low for the manual coding; only 20 percent of the eligible cases for the diabetes measures were manually coded, and only 16 percent of the eligible codes were applied to those cases. Alternatively, automated data extraction achieved 100 percent coding completeness and did a better job identifying the eligible population. In addition, automated data extraction was more accurate in reporting results from the EHR than manual coding.

At this time, the PQRI program does not specify performance goals for controlling blood pressure, A1C, or LDL in diabetic patients. However, results from the current project demonstrated the following levels of performance at CMH using the automated data extraction.



**FIGURE 1: REPORTING RESULTS FROM THE AUTOMATED CODING OF THREE DIABETES-RELATED PQRI MEASURES: PERCENTAGE OF DIABETIC PATIENTS WITH CONTROLLED BLOOD PRESSURE, PERCENTAGE OF DIABETIC PATIENTS WITH A HEMOGLOBIN A1C VALUE OF <7%, AND PERCENTAGE OF DIABETIC PATIENTS WITH LOW-DENSITY LIPOPROTEIN CHOLESTEROL <100 MG/DL.**



Thus far, physicians at CMH-affiliated practices are not adequately documenting PQRI data elements, especially exclusions. By design, feedback was not provided to physicians during the project on their documentation in the EHR of PQRI data elements or on their performance on the 62 PQRI measures. Without incentives and feedback, physicians may not adequately document within the EHR all of the information that is needed to produce valid and reliable quality measures. Quality measurement can be done even without accurate documentation; however, it may not accurately reflect the quality of care that physicians are providing to their patients.

A number of strategies can be used to improve physicians' documentation within the EHR system. As part of the project, a Web-based report on aggregate organizational performance was developed for CMH. This report could be used to provide feedback on physician performance and thus increase compliance with quality reporting. Additional training could also be provided to physicians and their staff on quality measures and effective use of the EHR.

This project was specifically focused on standardizing and integrating data capture in an EHR system to automate coding of quality measures. In the future, feedback can be provided to clinicians on their performance on PQRI quality measures, which will ideally impact the quality of care they provide to their patients. A toolkit including the custom documentation queries was developed and will be made publicly available to other users of the EHR system in the future. The toolkit allows clients to use the queries with either manual coding or automated data extraction.

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**Principal Investigator:** Denni McColm, Bolivar, Missouri

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**AHRQ Final Report:** <http://healthit.ahrq.gov/R18HS017094McColmfinalreport2009>



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