

Improving Otitis Media Care with Electronic Health Record-Based Clinical Decision Support and Feedback

Principal Investigator:	Forrest, Christopher, M.D.
Organization:	Children's Hospital of Philadelphia
Mechanism:	RFA: HS07-006: Ambulatory and Safety Quality Program: Improving Quality Through Clinician Use of Health Information Technology (IQHIT)
Grant Number:	R18 HS 017042
Project Period:	September 2007 – February 2011, Including No-Cost Extension
AHRQ Funding Amount:	\$877,011
Summary Status as of:	December 2010

Target Population: Otitis Media, Pediatric*

Summary: Several problems in the treatment of otitis media (OM) in children arise from physicians' lack of awareness of national guidelines on judicious use of antibiotics and the overuse of antibiotics in OM treatment. This issue can be addressed through health information technology (IT). The goal of this project is to develop, test, and disseminate a health IT intervention that improves the quality of OM care while reducing the amount of resources used in its treatment.

The intervention uses the Children's Hospital of Philadelphia's (CHOP's) electronic health record (EHR) to integrate care over time and to supply physicians with the knowledge they need at the point of care. The full intervention consists of: 1) a method for linking all services a patient receives from any physician into clinically logical clusters called episodes-of-care, 2) clinical decision support (CDS) for medications and referrals to specialists based on the best available scientific evidence, 3) feedback on past performance of OM care provided by physicians, and 4) physician training on use of tools. The study randomly assigned 24 primary care practices into groups for usual care (control), usual care without feedback, full intervention without feedback, and full intervention with feedback.

The project is being conducted in the CHOP Pediatric Research Consortium, which includes all primary care practices in the CHOP network. It utilizes the Epic ambulatory electronic record system, EpicCare 2007, a Certification Commission for Health Information Technology-certified ambulatory EHR that affords immediate, secure electronic access to clinical information, and communication at the point of care. Because OM is a common condition in children, the widespread adoption of the intervention from this project has the potential to affect the lives of millions of children.

Specific Aims:

- Develop and pilot test the OM health IT intervention. **(Achieved)**
- Examine overall effect of health IT intervention and the independent contribution of physician feedback on quality of care (the primary outcome). **(Ongoing)**
- Assess the effects of the intervention on the secondary outcomes of resource use and clinician adoption of the technology. **(Ongoing)**
- Upon project completion, the study team will work with members of their advisory board, including

the American Board of Pediatrics, National Committee for Quality Assurance, and the Child Health Corporation of America to disseminate the work to child health professionals nationally. **(Upcoming)**

2010 Activities: Following a pilot conducted in 2009, the research team implemented an 18-month intervention from March 2009 through August 2010 to examine the use and impact of CDS on the quality of care of OM. The central component of the CDS tool is the “episode grouper,” which summarizes prior care and presents a coherent overview, including recommendations for therapy and links to educational resources. Throughout the project, the research team refined and improved the grouper, adding the functionality to follow the grouper’s “thinking” in more detail as it constructs episodes. This allows the team to determine why a certain encounter was included in a particular episode. For example, the grouper’s “thinking” might include such things as “defined OM based on ICD-9 code” or “noted OM-related condition based on visit reason text.”

Throughout the intervention several quality measures were tracked as measures of the impact of CDS. The performance on these measures was compared across the intervention and control groups. The project team provided six rounds of feedback reports on four OM quality indicators directly to physicians in the feedback arm through in-person site visits. The measures include: 1) appropriate use of amoxicillin as a first-line antibiotic, 2) appropriate use of high-dose amoxicillin when amoxicillin was prescribed, 3) appropriate pain assessment, and 4) appropriate use of analgesics. Feedback reports to physicians serve a dual purpose of performance feedback and encouraging physician use of the CDS tool. This included learning how the CDS did or did not fit in with existing workflow.

The original approach was to give feedback through a report in the EHR; however, the project team found that setting aside a time explicitly to review the report and discussing it with the study physicians was helpful. The feedback report includes quality adherence information such as the proportion of patients with acute otitis media (AOM) who were prescribed narrow spectrum antibiotics when indicated. The report also includes the performance of providers with the highest (top 10 percent) adherence to guidelines, to demonstrate an achievable benchmark to providers with lower guideline adherence. The first quality indicator selected was the measurement of appropriate prescription of amoxicillin as first line antibiotic for AOM. Feedback was analyzed at the physician, practice, and network levels and given to both intervention and control sites.

In 2011, the research team will complete analysis of the data and develop several papers on different components of the research and results.

Grantee’s Most Recent Self-Reported Quarterly Status (as of December 2010): The project is meeting 80 to 99 percent of the project milestones on time, and is approximately five to 20 percent under budget. The underspending is due to the fact that they are behind schedule in the implementation of the intervention which is a result of building a more robust CDS system.

Preliminary Impact and Findings: Preliminary research for the study described physician use of the EHR during pediatric clinical encounters and the physician interactions with the patient. This research was published in the article [“Electronic Medical Record Use in Pediatric Primary Care”](#) in the Journal of the American Medical Informatics Association. Through observation, the team measured that communication with the family was simultaneous to 70 percent of the EHR use during the visit. This research contributed to understanding physician workflow as a relevant consideration in the development of CDS for pediatricians.

Measuring the impact of the CDS on quality of care is the primary outcome of the project. The project team began to analyze data on the differences in the quality of care between the control sites and sites with the CDS tool before and after the intervention. The quality data presented at the end of the intervention will be for five AOM metrics, four OM with effusion metrics, and two metrics for OM as a whole.

At a qualitative level, many lessons have been learned on how to give feedback to providers. Physicians expect scientific evidence, so data returned in feedback must be solid and defensible if it is to create behavior change. High data quality is imperative, and the team has been working to improve data in the feedback reports. Usage of the CDS tool was low (approximately 20 percent), which is being addressed through the incorporation of feedback solicited from care providers.

Initial analysis of data to demonstrate the impact of the CDS on quality is positive. Analysis of preliminary pre-intervention quality data found that pre-intervention amoxicillin was appropriately prescribed 73 percent of the time at the network level. Preliminary intervention site analysis indicates that use of the CDS increases the frequency of appropriate prescribing by five percent.

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*