Improving Post-Hospital Transitions and Ambulatory Care for Children with Asthma

Principal Investigator: Nkoy, Flory, M.D., M.S., M.P.H.
Organization: University of Utah
Mechanism: PAR: HS08-270: Utilizing Health Information Technology (IT) to Improve Health Care Quality (R18)
Grant Number: R18 HS 018678
Project Period: April 2011 - March 2014
AHRQ Funding Amount: $1,191,501

Summary: Asthma is the most common chronic illness in children and can have a significant impact on quality of life for both children and their families. Asthma is also the most frequent reason for preventable hospital and emergency department (ED) admissions among children in the United States. Children hospitalized for asthma are at increased risk for readmission for several reasons, including; 1) hospital provider's non-compliance with evidence-based asthma preventive measures at patient discharge; 2) poorly-managed care transitions from the hospital to the ambulatory setting; 3) failure of primary care providers (PCPs) to monitor and manage chronic asthma; 4) patient non-compliance with asthma home therapy; and 5) failure to establish ongoing monitoring of asthma chronic symptoms in the ambulatory setting. Preventing asthma-related hospitalization and ED use can improve quality of life and reduce health care-related costs among children with chronic asthma.

This project is developing and evaluating two applications of health information technology (IT) intended to improve care transitions from the hospital to the ambulatory and home settings for children with asthma. The first application, an asthma-specific Reminder and Decision Support (RADS) system, has been developed and implemented to help hospital providers accomplish the following at discharge: 1) comply with evidence-based asthma preventive measures; 2) determine the patient's chronic asthma severity level; 3) determine severity-appropriate asthma preventive medications; and 4) establish effective care transitions to PCPs in the ambulatory setting. The second application, a Web-based Asthma Home Monitoring System (AHMS), also called the electronic Asthma Symptom Tracking and Exacerbation Reduction (e-ASTER), is being finalized to enable care continuity through continuous at-home self-assessment of patients' chronic asthma control, and support of PCPs in monitoring and managing chronic asthma symptoms.

The RADS system was built from an existing electronic discharge order and discharge instruction (DOADI) tool. The DOADI is currently used throughout Primary Children's Medical Center (PCMC) in Salt Lake City, Utah, by health care providers for all patients discharged with a medical diagnosis. The DOADI automatically transfers discharge information to PCPs in an accurate and timely manner. The RADS system was designed to automate the multiple functions of the paper-based discharge process. It uses the DOADI as a platform and automatically faxes asthma discharge information to the patient's identified PCP, including the patient's asthma action plan and preventive medications recommended by the hospital provider based on asthma guidelines.

The e-ASTER application was designed to: 1) engage patients in self-monitoring and self-management

of chronic asthma control by prompting compliance with therapy and appropriate and timely physician visits and; 2) support physicians with longitudinal data to assess the effectiveness of asthma therapy and prompt adjustments. The application includes an active real-time feedback and alerting system for patients and their parents to prompt early response to deteriorations in asthma control status. For patients without Internet access, an interactive voice response system will be used. These patients will receive real-time feedback upon entering information on their level of asthma control over the phone.

The e-ASTER application has been developed, programmed, and pilot-tested. Children admitted to PCMC for asthma between the ages of 2 and 18 will be invited to participate in a study to evaluate the utility of e-ASTER for ongoing asthma self-monitoring and self-management. Surveys will be administered to hospital providers who care for children admitted to PCMC during the project period, PCPs whose patients are enrolled in the study, and patients enrolled in the study and their caregivers to evaluate the attitudes, acceptability, and use of the both the RADS and the e-ASTER applications. Qualitative questionnaires and quantitative data (e.g., Web page views, log-in, and log-out times) will be used to determine factors associated with effective use of the health IT applications. Readmission rates within 6 months of the index hospitalization discharge will be determined for the overall study population and compared to results after implementation of the two health IT applications using time series analysis.

These health IT applications and the study findings will promote effective care transitions and continuity post-hospital discharge, and will enhance the quality of care for children with asthma.

Specific Aims:

- Develop two IT applications to improve post-hospital care transitions and ambulatory care. **(Ongoing)**
- Evaluate the attitudes, acceptability, and use of the new IT applications. **(Ongoing)**
- Determine factors associated with effective use of new IT applications by hospital providers, PCPs, and patients. **(Upcoming)**
- Determine the effect of implementing new IT applications by measuring specific process measures at the hospital provider, PCP, and patient levels, and on readmissions. **(Upcoming)**

2011 Activities: Development of the RADS system was completed and all major components of the system have been implemented at PCMC. The RADS system is now being used as part of the standardized asthma discharge process, and is successfully auto-generating and auto-faxing the patient's action plan, discharge instruction, and discharge summary to the PCP.

The AHMS was developed in a paper-based version (Asthma Symptom Tracker [AST]) and a Web-based version (e-ASTER). The AST was pilot-tested and determined valid and reliable. Two iterative usability testing sessions were conducted for the e-ASTER application and changes are being made based on feedback received to finalize the application. Development of the patient interface of the e-ASTER application is complete, while the clinic (PCP office) interface is in progress. The research team anticipates launching e-ASTER by March 2012 upon completing the security test of the Web site server.

As last self-reported in the AHRQ Research Reporting System, project progress and activities are mostly on track. The project budget funds are somewhat underspent because the study team is not fully staffed and outstanding subcontract invoices have yet to be received and processed.

Preliminary Impact and Findings: The research team pilot-tested the paper-based version of the AHMS, and determined it to be valid and reliable for monitoring asthma control. A manuscript is being written to publish preliminary findings.

Target Population: Asthma, Chronic Care*, Pediatric*

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: Synthesis and Dissemination

** This target population is one of AHRQ's priority populations.*