

RxSafe: Shared Medication Management and Decision Support for Rural Clinicians

Principal Investigator:	Gorman, Paul, M.D.
Organization:	Oregon Health & Science University
Mechanism:	RFA: HS07-006: Ambulatory Safety and Quality Program: Improving Quality Through Clinician Use of Health Information Technology (IQHIT)
Grant Number:	R18 HS 017102
Project Period:	September 2007 – August 2011
AHRQ Funding Amount:	\$1,200,000

Summary: It is widely recognized that health information technology (IT) can improve medical care and patient safety, but questions remain about how best to put health IT systems into practice. This project sought to provide important information about how to integrate decision support into clinical practices to improve the quality and safety of medication management for people with chronic illnesses. This project investigated the feasibility and impact of novel approaches to clinical decision support in multidisciplinary ambulatory care, emphasizing high-risk transitions of care. The project developed technology to support shared medication management for persons with chronic conditions. The health IT system, RxSafe, was used to facilitate clinician decisionmaking and improve outcomes for patients and providers in the management of chronic conditions. Ultimately, the project aimed to show improvements in medication management by: 1) providing the means to effectively share medication information; 2) making any corrections or improvements made by one team member to the regimen visible to all team members; and 3) providing clinicians using the system with access to evidence-based information at the time and place it is needed.

This project is a collaboration between community-based nurses and physicians providing ambulatory services in an Oregon coastal community, a multidisciplinary team of university-based investigators with expertise in medicine, nursing, medical informatics, and computer science, and the Oregon Rural Practice-based Research Network, which provided the infrastructure, coordination, and support. Clinical settings for the project were independent clinic practices in two coastal communities, local home health services, and transitions in care into and out of the sole community hospital and its emergency room. The patient focus was on community-dwelling persons with chronic conditions on multiple medications. The choice of these specific innovations was informed by experience with development and early deployment of RxSafe, a system that consolidates medication lists of patients in long-term care to integrate information for providers involved in prescribing, dispensing, administering, or monitoring medications.

Specific Aims:

- Enhance clinician cognitive performance in medication management tasks by exploiting the underlying semantics of medication lists to improve the organization and presentation of medication list information. **(Achieved)**
- Implement medication list management tools that are integrated into clinician-specific and task-specific workflows to support medication reconciliation at high-risk transitions as well as in ongoing

ambulatory care. **(Achieved)**

- Increase the effectiveness of medication management activities of clinicians in multiple roles by improving their coordination and communication using shared medication management tools. **(Achieved)**
- Employ evolving standards and architectures to link external, machine-actionable, evidence-based clinical information in context-appropriate and user-appropriate ways to support shared medication management by clinicians practicing in ambulatory settings. **(Achieved)**

2011 Activities: A 1-year no-cost extension allowed for the completion of final project activities including field observations of clinical medication management produced descriptions of cognitive resources and task models. The team evaluated medication management open-source software solutions including MyRxPad, MyMedicationList, and OpenMRS platform. The team configured these clients to interact through the versioning system (SyncRx) and explored the usefulness of this technology in prototype testing to determine the requirements and challenges to its development and deployment.

The team completed the “pipeline” prototype, demonstrating the Web-based clinical decision support model that would allow composition of independent medication information related services. The demonstration included services for parsing, identification using RxNorm, and classification using the National Drug File Reference Terminology of medication information, and a software harness to allow composition of these and other medication management services. Dr. Gorman did not submit a report in the AHRQ Research Reporting System during 2011 with a status of activities or project spending. The project was completed in August 2011.

Impact and Findings: The project found that arrangement of information is important to clinicians and may be an important form of cognitive support. Recall of medication list items corresponded to experience level, with attending physicians recalling a median of 14 of 20 medications overall, residents a median of 10.5 of 20 items, and preclinical students a median of 8.5 items. Student recall was greater with an organized medication list, but resident and attending physician recall was not affected by order, which contrasted with the teams’ expectation that the organization of medication information would improve recall yet found data to support this for novices only. However, it may be that processing of the list by the clinician is the more important factor. Recall by experts was high in either case, but subjectively they reported it was easier to recall the list items when they had to reorganize the lists themselves.

Medication reconciliation may occur as an isolated procedure designed to document compliance with regulations. However, medication management in long-term care was a richer, more robust, and more complex process, which is distributed, dynamic, collaborative, and continuous, involving multiple health professionals separately performing complementary tasks in different settings over time. The project was able to demonstrate the technical feasibility of a synchronization system using open-source tools, but further exploration of this prototype is limited to use of open-source tools, including OpenMRS, because of the difficulty of interacting with proprietary closed systems produced by electronic medical record vendors.

A prototype that demonstrated the feasibility of independent Web-based decision support services interacting in a service-oriented architecture over a network was developed. This prototype will allow further exploration of the technical issues encountered, such as differences in drug terminologies used in existing systems, speed or access constraints of Web-based knowledge services, inclusion of extraneous data in medication information fields of local systems, and agreement on useful common classification

schema for medication information.

Target Population: Adults, Chronic Care*

Strategic Goal: Develop and disseminate health IT evidence and evidence-based tools to improve the quality and safety of medication management via the integration and utilization of medication management systems and technologies.

Business Goal: Implementation and Use

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