

**Project Title:** Using Information Technology to Improve Medication Safety for Rural Elders

**Principal Investigator:** Gorman, Paul, M.D.

**Organization:** North Lincoln Hospital

**Mechanism:** HS04-011: Transforming Health Care Quality through Information Technology (THQIT)

**Grant Number:** UC1 HS 014928

**Project Period:** 09/04 – 09/08, Including No-Cost Extension

**AHRQ Funding Amount:** \$1,496,748

**Summary Status as of:** September 2008, Conclusion of Grant

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**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:** Synthesis and Dissemination

**Summary:** People with multiple chronic conditions typically receive care from many physicians, nurses, pharmacists, and other clinicians practicing in diverse settings such as primary care clinics, specialty clinics, hospitals, nursing homes, home health agencies, and various pharmacies. Each of these clinicians or organizations generally maintains a medication list, in many cases electronic, designed to support a specialized role such as prescribing, dispensing, administering, or monitoring medications. These medication systems also are designed to support related business practices of the organizations, such as inventory and quality control. However, the medication management work practices of these historically independent organizations are rarely integrated, and their medication information systems are not designed to interact or exchange information electronically. Traditionally, this medication information moves, as one clinician put it, “by foot, phone, or fax.” As a result, the medication lists that these organizations maintain do not match, and discrepancies between these lists are a threat to patient safety and the quality of care.

The clinical setting for the project was long-term care of elders with multiple chronic conditions in assisted living and skilled nursing facilities in a rural community on the Oregon coast. This project was essentially an attempt to build a mini-regional health information organization (RHIO) focused on medication management. The project involved developing a novel technology, RxSafe, which brings together the medication information contained in the diverse and isolated information systems of multiple independent organizations (clinics, hospital, pharmacies). This enables authorized clinician users to obtain a more complete picture of each patient’s medications and to use this information for clinical tasks.

Formative evaluation of the prototype application was conducted in fall 2005 using qualitative methods approximately 1 year after initial deployment. In general terms, the intended outcome was to provide a medication management tool that clinical users would adopt into work practices and that would be sustainable on the basis of the preferences of clinical users and commitment from the local organization. Though this Agency for Healthcare Research and Quality-funded technology implementation project concluded as of September 2008, the technology remains in local use, and refinement of the system continues. Further development of the technology is underway as part of a subsequent project, with plans to make selected functionality available as Web-based application services that can be used to support medication management technologies under development by others.

## Specific Aims

- Create and maintain an organizational structure that would permit secure sharing of patient data across disparate institutions. **(Achieved)**
- Design and implement a technical architecture that could enable clinicians to view medication list information from multiple sites at the same time. **(Achieved)**
- Create a useful and usable prototype application integrated into clinical workflow that could take advantage of this shared medication list system. **(Achieved)**
- Conduct a formative evaluation of the impact of this system on clinical users. **(Achieved)**

**2008 Activities:** The project achieved each of its aims during 2008, including:

- Maintaining the organizational structure for the project through: 1) ongoing meetings with the local Chronic Care Committee, which served as a Community Advisory Board to the project; 2) regular contact between project staff and clinician users; and 3) responding to change in ownership of the main pharmacy collaborator to the project, requiring reestablishment of the agreements necessary to share patient medication information.
- Continuing development of the technical architecture that connects participating medication information systems, including: 1) continuing work on parsing medication information in text output from some participating organizations; 2) revising the integration of hospital discharge medication information in concert with revised hospital discharge work process; and 3) expansion of the patient coverage to include a broader population of patients cared for by providers in participating clinics.
- Expansion of the usability and usefulness of the prototype application through: 1) installation of the prototype, at the request of nursing staff and management, in additional nursing units such as day surgery; 2) modification of the report format to match changing requirements determined by changes in hospital medication reconciliation procedures; and 3) providing ongoing technical support to maintain system stability and respond to user concerns.
- Formative evaluation was conducted in the form of interviews with nurses, physicians, management, and support personnel to identify perceived benefits, limitations, and impacts of the system. Analysis of these data was performed. Final reporting of these findings is underway at the end of the grant period.

**Impact and Findings:** The RxSafe project was essentially an attempt to build a mini-RHIO focused on medication management. As such, like so many projects that attempt to create a health information exchange, the RxSafe project had both successes and failures. The project team failed to successfully engage the entire group of organizations that would need to participate in order to achieve the vision of a shared medication management system. In addition, they also failed to achieve the complete technical integration of the medication information into existing information systems that had been part of their original vision. On the other hand they were successful at: 1) engaging active community involvement, 2) forming a core group of participating organizations that actively contributed both data and expertise to the project, 3) successfully implementing a prototype application which clinical users found useful and usable in common clinical tasks, and 4) conducting formative evaluation of the impact of the system. The RxSafe project demonstrated the feasibility and usefulness to clinicians of a shared medication management technology. The project also identified two formidable barriers to progress: 1) the absence of universally adhered to technical standards for exchange of health data (*technical interoperability*) and 2) the absence of a health care policy and regulatory environment that ensures true portability of each patient's health information (*organizational interoperability*).

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## Selected Outputs

Bhupatiraju RT, Gorman P. "Doing the yellows" -- analysis of medication review processes by different clinicians in long term care. AMIA Annu Symp Proc; 2008 Nov 6:879.

Available at: Oregon Health and Science University. Welcome to RxSafe.  
<http://www.ohsu.edu/RxSafe/index.html>.

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**Grantee's Most Recent Self-Reported Quarterly Status:** The project concluded in September 2008, having met major milestones established in a revised project plan formulated midway through year 2 of the project.

**Milestones:** Progress is on track in some respects but not others.

**Budget:** On target.