

Context-Aware Knowledge Delivery into Electronic Health Records

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Organization:	University of Utah
Mechanism:	PAR: HS09-087: Mentored Research Scientist Research Career Development Award (K01)
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Target Population: Adults

Summary: The Institute of Medicine (IOM) report, [Crossing the Quality Chasm: A New Health System for the 21st Century](#), called for an overhaul of the U.S. health care system, declaring that new models of care should make health care more safe, effective, patient-centered, timely, efficient, and equitable. New models of care have been proposed that are in line with IOM's aims, such as the American Academy of Pediatrics' Medical Home and the Future of Family Medicine's project New Model.

A main cause of errors in the health care system is gaps in the information available to providers. The provision of just-in-time access to relevant knowledge is essential for the implementation of new models of care. Immediately-available information helps patients and providers make better decisions. Information delivered immediately helps providers explain patient care options and retrieve and manage the best, up-to-date knowledge available at the point of care.

The goal of the proposed research is to develop, implement, and evaluate a prototype for a scalable and widely-deployable knowledge delivery service, (the "knowledge broker"), that is capable of automatically delivering context-specific information from online resources into electronic health record (EHR) systems via a "knowledge dashboard." This will help providers address their knowledge gaps and will lead to better and more informed decisions.

A systematic literature review in combination with focus groups will document provider knowledge needs. This information will inform the development of the knowledge dashboard. Once developed, the knowledge dashboard will be integrated into an EHR for use by providers.

Four core design requirements will drive the development of the knowledge broker to guarantee its scalability and wide deployability: 1) the architecture will be open, independent, standards-based, and services-oriented; 2) the knowledge base will be expandable to accommodate additional knowledge needs in various contexts; 3) the knowledge broker will be able to deliver knowledge through mechanisms other than a knowledge dashboard, such as infobuttons; and 4) the knowledge broker will be able to account for the needs of and deliver knowledge to providers and patients. This will help the dashboard be a potential national model for knowledge delivery at the point of need.

This project will investigate why, how, and when users interact with the knowledge dashboard, as well as the effect of these interactions on the fulfillment of knowledge needs and decisionmaking. Finally, the

study will identify areas and opportunities for system enhancement and expansion. An exploratory data analysis will determine the feasibility and planning of a future large-scale quantitative investigation.

Specific Aims:

- Build a knowledge base of patients' and providers' knowledge needs. **(Ongoing)**
- Design, develop, and evaluate the usability of a scalable, widely deployable knowledge delivery service in a laboratory setting. **(Ongoing)**
- Conduct a mixed-method assessment of a pilot implementation of the knowledge broker in a real-world medical home environment. **(Upcoming)**

In addition, as part of his Mentored Research Scientist Research Career Development Award (K01), Dr. Del Fiol has completed additional training in clinical and health services research and leadership through the Duke University School of Medicine Clinical Research Training Program.

2010 Activities: A protocol for the systematic literature review was completed and the literature review initiated. A total of 8,800 abstracts were screened in the first round and yielded 718 full-text articles that met the criteria for the second phase. A second reviewer protocol was developed and reliability testing completed. Seventy eight full-text articles met the inclusion criteria; data from these will be abstracted.

The Dr. Del Fiol adapted work that was done with the Veteran's Administration ([OpenInfobutton](#)) to build some of the knowledge-delivery service infrastructure, and the project entered into a system testing phase. Institutional Review Board (IRB) approval for focus groups was granted. Dr. Del Fiol engaged in significant training in clinical and health services research as part of his educational objectives.

Dr. Del Fiol changed his employment to the University of Utah and transferred the project, including IRB approvals, with him. Collaborations were established with the Salt Lake Veterans Affairs Medical Center, Intermountain Healthcare, University of Utah Center on Aging, and the University of Utah Health Sciences Library.

Preliminary Impact and Findings: The project does not have any findings to date.

Strategic Goal: Develop and disseminate health IT evidence and evidence-based tools to improve health care decisionmaking through the use of integrated data and knowledge management.

Business Goal: Knowledge Creation