

## Context-Aware Knowledge Delivery into Electronic Health Records

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<b>Organization:</b>	University of Utah
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**Summary:** A main cause of errors in the health care system is gaps in information available to providers. The provision of just-in-time access to relevant knowledge is essential for the implementation of new care models. Immediately available information helps patients and providers make better decisions. It helps providers explain patient care options and retrieve and manage the best, up-to-date knowledge available at the point of care.

Dr. Del Fiol is developing, implementing, and evaluating 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.”

A systematic literature review in combination with focus groups is documenting provider knowledge needs and informing 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 drive the development of the knowledge broker to guarantee its scalability and deployability: 1) the architecture must 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 info buttons; and 4) the knowledge broker will be able to account for the needs of and deliver knowledge to providers and patients. This approach will help the dashboard be a potential national model for knowledge delivery at the point of need.

As part of this Mentored Research Grant, Dr. Del Fiol is investigating 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, he 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)**

**2012 Activities:** The data abstraction was finalized for three of the study questions. The systematic review was completed and Dr. Del Fiol began writing the final results. The clinician observations study has been completed at all three sites. The analysis has been completed and Dr. Del Fiol is preparing a manuscript of the publication.

The first pilot project, which focused on depression and Alzheimer's treatment, has been completed. The pilot indicated that the information needs could be narrowed to publications that include comparative effectiveness studies only. The second pilot, which focused on automatic summarization of comparative-effectiveness studies, was also completed. The focus of the second pilot is to automatically summarize study results from PubMed citations of comparative effectiveness studies on specific topics with a focus on depression. Analysis of the results of the system against widely accepted standards was begun.

The HL7 Infobutton Standard has been included as a required criterion in the proposed Centers for Medicare & Medicaid Services Meaningful Use Stage 2 Standards Certification Criteria. Dr. Del Fiol was the lead author of this standard and has been developing and promoting its dissemination since 2003.

**Preliminary Impact and Findings:** The findings of the systematic review indicate that clinicians decide not to pursue more than 60 percent of their information needs. The clinician observations show that information need is four times greater than the literature has previously reported, which is primarily on non-specific populations. With increasing complexity of health issues, clinicians did not look for additional information if they were time constrained. It appears that clinicians under time pressure avoid complexity by focusing not on overall health issues, but on individual-specific issues, thus prioritizing their information needs.

The systematic review of literature is showing significant recall bias among physicians on information not related to specific patient encounters. This recall bias results in a general underestimation of the number of questions that they have about patient care. Real-time observation is the most accurate way to understand information needs further. As a result, the project will take that approach.

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**Target Population:** Adults

**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

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