

Veterans Administration Integrated Medication Manager

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Organization:	Western Institute for Biomedical Research
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Summary: Computerized clinical decision support (CDS) research often focuses on improving technology, but more research is needed on how CDS can improve patient outcomes in the context of the process of clinical care. The Veterans Administration (VA) has implemented CDS to assist clinicians in reaching quality goals. However, in 2006, 25 percent of hypertensive patients did not reach the performance standards. To better support providers in reaching quality goals for more hypertensive patients, this project funded the development and evaluation of a new health information technology application called the Integrated Medication Manager (IMM). The IMM facilitates clinicians' decisionmaking by helping them consider relevant data when planning patient care. In a departure from the traditional medical record, a major feature of this system is the explicit linking of patient problems, therapies, and goals. This project compared IMM to a standard electronic health record (EHR), thereby generating new knowledge about medication management.

Design guidelines for the IMM were determined by analyzing providers' cognitive processing of information and how and what information is shared among a clinical team. In the first phase of the project, physicians, mid-level providers, and pharmacists were followed during clinical visits. Between patients, they were asked to "think aloud" and describe their thought processes as they worked through decisionmaking for a patient using the EHR. The findings of the observations were shared with the development team to guide them as they refined the IMM software.

The second phase of the project evaluated the IMM software using test cases in simulation studies. The simulation studies provide insight into how providers integrate information and further support evaluation of the IMM.

Specific Aims:

- Identify cognitive components of providers' therapeutic decisionmaking in the field. **(Achieved)**
- Refine and evaluate the IMM using simulation studies. **(Achieved)**

2011 Activities: Fifty-eight providers were recruited to test the IMM through simulations. The IMM organizes information around the core concepts of interventions, observations, and conditions. IMM presents this information in a manner that reduces the cognitive effort to consider data across time, relationships among concepts, and decisionmaking strategies. Standard and VA-specific terminologies and knowledge bases are used to relate concepts and provide the basis for cognitive support and documentation. Participants were asked to review 10 patient cases and write assessments and plans for each patient. The patient's information was presented in either the new IMM EHR or the generic EHR patterned after the VA's EHR. Participants were randomly assigned to use only one of the programs for the task. Throughout the test cases, the complexity,

time horizon, and saliency of the available information differed. The focus disease was more evident or less evident, important information was located further back in time in the patient's medical history or was more recent, and patients' problems were highly complex or less so. Finally, in certain test cases, the provider was interrupted while the complexity of the case was manipulated to see how quickly the provider could recover and return to what s/he was doing.

As last self-reported in the AHRQ Research Reporting System, project progress and activities were mostly on track and project budget spending was roughly on target. During the 6-month no-cost extension period that extended the project-end date to March 2011, the research team continued analysis and developed manuscripts.

Impact and Findings: The translation of the theory "Hollnagel's Contextual Control Model" to analyze clinicians' cognitive processing of information is promising. In this project, it was applied to targeting characteristics that predict higher levels of performance on tasks related to chronic disease management. Close attention to the design of electronic records can improve quality of care by presenting data that supports clinician decisionmaking. With only a few minutes of instruction, providers were significantly faster using the completely unfamiliar medical record. The largest improvement in time was the case of interruptions in considering complex patients. The data is presented such that relationships between data elements are explicit and the provider is not required to link the data as part of his/her analytical process.

Target Population: Adults, Veterans

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