

Implementing and Improving the Integration of Decision Support into Outpatient Clinical Workflow

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Target Population: Adults, Cancer

Summary: Computerized clinical decision support (CDS) and the use of electronic medical records (EMRs) can improve clinical decisions, adherence with evidence-based guidelines, and quality of care. However, the implementation of CDS into clinical settings is not well understood and poor integration can hinder its use and minimize its benefits. Common barriers to implementation include poor interface design, usability problems, and failure to accommodate the workflow of a clinical environment.

This project is a field study and controlled simulation analysis on integrating CDS for colorectal cancer screening into outpatient clinical workflow. The team used key informant interviews on site-specific best practices; direct observation of colorectal cancer screening CDS to identify barriers and facilitators to workflow integration; rapid prototyping of design alternatives based on findings from the direct observations; and controlled simulation to test the impact of design on efficiency, usability, and workload. The three study participants—the Regenstrief Institute, the Department of Veterans Affairs (VA), and Partners Healthcare System—use different EMRs but are all institutions that have improved quality and efficiency by using CDS.

During the first phase, the team conducted site visits to collect qualitative data on factors for effective integration of CDS into clinical workflow in different EMRs. In the second phase, measurable attributes from phase one, including efficiency, usability, and workload were used to develop and test alternatives for improved clinical workflow integration in a simulated setting with experienced users.

Project Objectives:

- Identify key approaches to CDS development for colorectal cancer screening at two VA Medical Center sites and two nationally recognized non-VA sites to obtain effective CDS integration into clinical workflow. **(Achieved)**
- Develop and test CDS design alternatives for improved integration into clinical workflow through a controlled simulation study and subsequent implementation. **(Achieved)**

2010 Activities: During 2010, the project team continued to analyze data from the first phase of the project and develop manuscripts. Additionally, the team conducted and analyzed data from experiments in the second phase. For this phase, the team developed prototyped design enhancements to the Veterans Health Administration's (VHA's) colorectal cancer (CRC) screening clinical reminder to compare with the VHA's current CRC reminder. These enhancements were based on barriers discovered during the field work in the first phase. In a controlled simulation experiment, 12 primary care providers used

prototypes of the current and redesigned CRC screening reminder in a within-subject comparison for four simulated patient encounters. Quantitative measurements were based on a usability survey, workload assessment instrument, and workflow integration survey. They also used ‘think aloud’ techniques during the scenarios and a debriefing session to collect qualitative data.

This work has resulted in numerous dissemination activities, including a poster titled, [“Impact of a Redesign for Colorectal Cancer Screening Computerized Decision Support”](#) and a presentation titled, [“Investigating Integration of Computerized Decision Support into Workflow at Three Benchmark Institutions”](#), which were presented for the Veterans Affairs Health Services Research and Development Service 28th Annual National Meeting in February 2011.

Preliminary Impact and Findings: The team found very different forms of EMRs and CDS across the sites. Despite design differences, there were common generalizable barriers. These barriers included: 1) lack of coordination among “outside” exam results, primary care, and specialty care; 2) poor data organization and presentation; 3) omission of provider and patient education in the decision support tool; 4) lack of interface flexibility; 5) the need for technological enhancements; 6) unclear role assignments; 7) organizational issues; and 8) disconnect between decision support and quality reporting.

Design enhancements to the VHA’s existing CRC screening clinical reminder positively impacted aspects of usability and workflow integration, but not workload. The qualitative analysis revealed broad support across participants for the design enhancements with specific suggestions for improving them even further. This type of lab-based human factors evaluation of CDS and other informatics tools is critical for testing design changes prior to implementation.

Overall, the team found that identifying effective strategies in the design, implementation, and integration of CDS into workflow is crucial for effective cognitive support. Despite the use of several different health systems, barriers were quite consistent. Effective design and integration of new technologies requires mindful iteration. New CDS prototypes are needed which: 1) improve data organization and presentation; 2) integrate outside results; and 3) provide just-in time education and cognitive support. Designing and testing prototypes using these features may help inform the next generation of cognitive support.

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: Implementation and Use