

Using Evidence-Based Nursing Practices and Electronic Health Record Decision Support to Reduce Fall-Related Patient Injuries in Acute Care

Principal Investigator: Hook, Mary, Ph.D., R.N, P.H.C.N.S.-B.C.
Organization: Aurora Health Care System Nursing Research
Contract Number: 290-06-0016-2
Project Period: June 2009 – January 2011
AHRQ Funding Amount: \$387,369
Summary Status as of: December 2010

Target Population: Adults

Summary: Advances in health information technology (IT), particularly the use of clinical decision support systems (CDSS) in an electronic health record (EHR), hold great promise for enhancing the safety, quality, effectiveness, and efficiency of patient care. However, limited use of these advances by nurses has been reported. Many nurses continue to develop, implement, and document their care plans on paper with little automation, limited access to CDSS, and manual abstraction for quality reporting. Research on how, when, and where CDSS can be used to increase quality and patient safety for acute-care nurses is needed.

This project, a joint collaboration between investigators at the Aurora Health Care System Nursing Research, the University of Wisconsin-Milwaukee Colleges of Nursing and Health Sciences, and Cerner Corporation, added new tools to an existing CDSS within an EHR to help nurses individualize care for groups of patients and improve fall and injury prevention processes and outcomes. The team used evidenced-based recommendations and input from academic partners, fall prevention, technology acceptance, and cost-benefit analysis experts to develop a data dictionary, qualitative and quantitative assessment measures, and CDS design.

The project was implemented with nurses who worked on two medical or telemetry magnet-recognized nursing care units in one large urban medical center in the Midwest. The facility had a pre-existing EHR with nurse-sensitive fall prevention and injury management data elements, electronic care planning functionality, and CDS that identified fall and fall-related injury risks using data entered during patient care. This CDSS project involved the creation of two new electronic reports for nurses. One report displayed selected patient risk factors and planned interventions to support nurses to evaluate and adjust their care plans (CP) for individuals and groups of patients at a key point in their workflow. The other report displayed retrospective data about fall prevention care and fall event details that unit-based nurse leaders can use to tailor quality improvement (QI) efforts. In addition to creating the reports, the team developed patient and family education (ED) materials, staff and nurse leader education materials, and a dictionary of standardized terminology. A pre-post mixed-methods design, including data queries, direct unit observation, focus groups, surveys, and usability testing was used. Qualitative and quantitative measures were used to identify recommended tool content and logistical design and evaluate post-implementation outcomes.

Evaluation results were disseminated to key clinical and informatics leaders to influence future work in this area. The data dictionary, support tools, findings, and lessons learned will contribute to the available knowledge of improvements in patient safety and quality of IT-supported nursing care and help reduce CDSS development and implementation costs. It also will serve as a prototype for future development.

Project Objective:

- Design, build, and implement CDS tools that were populated with data extracted from the EHR and to evaluate if the CDS tools could support nurses to improve care planning and quality improvement activities, and patient or family education related to fall prevention in acute care. **(Achieved)**

2010 Activities: The team reviewed the baseline findings to inform the content and logistics of tool design and establish the following goals for the design of each CDS tool:

1. The CP-CDS tool needed to be accessible in nursing workflow and able to display information about all assigned patients, with a visual display (quick and easy to see without reading) of risks, risk-based interventions, and fall events.
2. The QI-CDS tool needed to provide electronic access to data currently gathered manually from multiple sources, near-real time, with accurate and complete data capture.
3. The Fall Prevention ED tool needed to be easy to read with pictures to help nurses teach patient-specific risks and talk through prevention strategies to address risks.

The CDS tools were populated with valid and reliable near-real time EHR-based data to support CP and QI related to fall prevention. The CP, QI, and ED CDS tools were made available to clinicians and nurse leaders.

A metadata dictionary of the standardized, defined, and coded data elements used in constructing the tools was created and imported into the United States Health Information Knowledgebase with the technical specifications to support interoperability and use of the tools by other organizations.

Preliminary Impact and Findings: Despite providing input into design, the nurses and nurse leaders were slow to adopt the tools. The CP-CDS tool was available in the EHR with a single click but staff perceived this to be outside the workflow. Slow load time and insufficient assessment and intervention details contributed to limited CP-CDS adoption. QI-CDS tool usability testing showed that leaders could access the tool and believed the tool brought disparate data together, saving time and improving data quality, but leaders found no time to use the tool. Similarly, staff nurses provided positive feedback about the Fall Prevention ED tool, but there was limited evidence of use during the post-implementation period. Sociotechnical issues, such as competing EHR implementations and resource reduction, were observed during training, go-live, and adoption periods and may have influenced adoption.

This study demonstrated that nurse-sensitive data, embedded in the EHR can be captured and extracted from the data repository to create tools that support decisionmaking during patient care and to populate CDS tools for aggregate analysis and quality improvement. The CDS tools were not adopted as well as expected, possibly due to the presence of sociotechnical issues that are not typically captured in CDS research. Transitioning to data-driven processes may require more time, knowledge, and skills in order for nurses to effectively use tools to support decisionmaking. Despite limitations, this study sheds light on the complexities of nursing workflow, the need to better understand sociotechnical contexts, and how CDS tools can support nurse decisionmaking.

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