



## Clinical Decision Support for Fall Risk Assessment and Plan of Care

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## Capstone Committee

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## Objectives

- Discuss variations in process outcomes for falls documentation of a quality improvement project using clinical decision support.
- Compare the clinical outcomes for falls-related quality improvement project using clinical decision support.
- Discuss lessons learned in implementation and evaluation of clinical decision support tools

## Project Background

- Falls: most frequently reported adverse event
- Length of Stay: ↑ ~6.3 days per patient fall
- Mortality: 50% higher
- Morbidity: injury and increased costs
- *Falls with injury* 0.527 per 1000 patient days\*
  - Range per hospital 0 – 11.628 per 1000 patient days
- CMS no longer reimburses for *falls with injury*
- Fall rate is a nurse-sensitive indicator

\* National data from *Hospital Compare*

## Fall Risk Assessment and Plan of Care

- *Fall risk assessment* standard part of hospital admission per clinical practice guidelines
- Indicates when *fall prevention plan of care* needed
- Policy at local facility for RN to:
  - Complete *fall risk assessment* on admission
  - Implement *plan of care* if at high risk
  - Re-assess every 12 hour shift

## Project Aims

1. Improve documentation of *fall risk assessment* on admission and every 12 hour nursing work shift
2. Improve documentation of *fall prevention plan of care* for high risk patients
3. Assess nursing staff satisfaction to determine acceptance of the computerized fall risk program
4. Improve clinical outcomes by reducing patient falls and patient falls with injury

## Clinical Decision Support (CDS) Evidence

- Systematic reviews demonstrate reminders improved clinician adherence to clinical practice guidelines
- Cochrane review evaluated on-screen computer reminders and reported process improvements of 4.2%
- Systematic reviews demonstrate improved practitioner performance and improved patient outcomes

## CDS Evidence: Nursing and Falls




- CDS nursing benefits:
  - improved interprofessional communication
  - access to best practice information
  - increased quality of care
- Nurses used CDS at 4 case sites for recording information, monitoring patients' progress, and confirming the accuracy of decisions
- Falls specific:
  - Improves documentation of fall risk assessment
  - Improves documentation of fall prevention plan of care for at risk patients
  - Reduces overall fall rates
  - Reduces fall rate in patients aged 65 and older

## Methods: Setting and Timeline

- Setting: 938 bed Academic Medical Center
  - 16 adult medical/surgical units
  - 1 medical and 1 surgical unit below 90% documentation compliance targets for fall assessment and fall plan of care
- Implemented EHR June 2013
- Timeline:
  - Pre-CDS October 2012 to May 2013
  - Post-CDS August 2013 to January 2014
  - Vary some by data source
- Approved by IRB as exempt

## Methods: Intervention

Implement clinical decision support tools for falls prevention including:

-  **“Admission incomplete”** fall risk assessment indicator
-  **“Shift documentation incomplete”** indicator for fall risk assessment
-  **“Rules-based alert”** for patients at high risk for falls and not on a fall prevention plan of care

## Methods: Design

- Pre/post quasi-experimental study design
- Data collection methods
  - Quarterly audit data
  - Retrospective chart review
  - Alert action data
  - Fall safety reports
  - Fall and falls with injury rates, and
  - Focus groups

## Quarterly Audits

### **16 adult medical/surgical units**

- Fall reduction champions complete quarterly point prevalence audit to monitor fall risk assessments and plans of care
  - Target: 90% or better
- *Falls risk assessment* completed every shift
  - Range 73-100% with 3 units < 90%
- *Fall Prevention Plan of Care* completed
  - Range 70-100% with 5 units < 90%
- Pre-CDS: Oct 2012, Jan 2013 and April 2013
- Post-CDS: Aug 2013, Oct 2013 and Jan 2013

## Results: Quarterly Audit Data

### 16 adult medical/surgical units

- *Fall risk assessment* completion increased from 95.3% to 97.25% (median 96.5 to 100) ( $p = .05$ )
- *Plan of care* compliance increased from 92.33% to 92.58% (median 93.3 to 100) ( $p = .18$ )
- Pre-selected medical and surgical units:
  - *Fall risk assessment* increased from 88.95% to 98.27% (median 90 to 100) ( $p = .03$ )
  - *Plan of care* increased from 82.35% to 93.45 (median 82.7 to 100) ( $p = .09$ )

## Retrospective Chart Review

### Pre-selected medical and surgical unit

- 60 patients per unit pre-CDS (April and May 2013)
- 60 patients per unit post-CDS (Nov and Dec 2013)
- Random selection from patients on unit
- Documentation reviewed:
  - Fall risk assessment on admission if admitted to study unit
  - Fall plan of care on admission for patients at high risk
  - Shift fall risk assessment and associated plan of care for up to 9 shifts

## Results: Retrospective Chart Review

### Pre-selected medical and surgical unit

- Admission *fall risk assessment*
  - 55 patients pre-CDS and 88 patients post-CDS
  - Compliance increased from 92.73% to 98.86%  
( $\chi^2$  [1, N = 143] = 3.77,  $p = .05$ )
- Admission *plan of care*
  - 35 patients high risk pre-CDS and 65 patients post-CDS
  - Compliance decreased from 77.1% to 61.5%  
( $\chi^2$  [1, N = 100] = 2.51,  $p = .11$ )
  - Medical unit compliance decreased from 75% to 32.1% ( $\chi^2$  (1, N = 48) = 8.57,  $p = .00$ )

## Results: Retrospective Chart Review

### Pre-selected medical and surgical unit

- Shift *fall risk assessment*
  - Compliance increased from 93.25% to 94.69%  
(median 100 to 100) ( $p = .23$ )
- Shift *plan of care*
  - Compliance decreased from 75.22% to 60.35%  
(median 100 to 100) ( $p = .01$ )



## Alert Action Data

### Pre-selected medical and surgical unit

- Plan of care alert
- Post-CDS: Nov and Dec 2013
- No data available for action on fall risk assessment reminders

## Results: Alert Action Data

### Pre-selected medical and surgical unit

- Data reflects the *plan of care* alert only
- November 2013
  - Alert triggered 1,982 times
  - Care plan template applied 42 times (2%)
    - 19 times on the medical unit
    - 23 times on the surgical unit
- December 2013
  - Alert triggered 1,671 times
  - Care plan template applied 42 times (2.5%)
    - 20 times on the medical unit
    - 22 times on the surgical unit

## Fall Safety Reports

### 16 adult medical/surgical units

- Completed by staff nurse caring for affected patient via electronic system
- Three components:
  1. Documentation compliance for fall risk assessment
  2. Time since last fall risk assessment
  3. Documentation of fall plan of care for high risk patients
- Pre-CDS: Dec 2012 through May 2013
- Post-CDS: Aug 2013 through Jan 2014

## Results: Fall Safety Reports

### 16 adult medical/surgical units

- 39 fall reports pre-CDS and 45 post-CDS
- All patients pre and post had a *fall risk assessment*
- No differences in time since last fall risk assessment ( $\chi^2 [2, N = 84] = 1.78, p = .41$ )
- No differences in documentation of *plan of care* for patients at high risk ( $\chi^2 [1, N = 66] = 1.08, p = .30$ )

## Falls and Falls with Injury

### 16 adult medical/surgical units

- Patient falls per 1000 patient days
- Patient falls with injury per 1000 patient days
- Pre-CDS: Dec 2012 through May 2013
- Post-CDS: Aug 2013 through Jan 2014

## Results: Falls and Falls with Injury

### 16 adult medical/surgical units

- Falls per 1000 patient days increased from 3.13 to 3.35 (median 2.53 to 2.97) ( $p = .54$ ).
- Falls with injury per 1000 patient days increased from .447 to .490 (median .0 to .0) ( $p = .33$ ).

## Focus Groups

### Pre-selected medical and surgical unit

- Participation voluntary with flyers and staff meeting announcement
- Semi-structured and 30 minutes
- Facilitated questions about satisfaction with CDS components
- Handouts with screenshots of 3 features
- Held May 7 and 13, 2014

## Results: Focus Groups

**Attendance:** Medical unit 15 of 45 RNs

Surgical unit 3 of 55 RNs

- Shift *fall risk assessment* reminder was viewed as most helpful
- Admission *fall risk assessment* reminder was somewhat helpful
- Several staff had not seen the alert for fall *plan of care*
- Recommendations for changes to the CDS tools and the EHR:
  - Have *fall risk assessment* question specific to admission (fall within 3 months prior to admission) display only on admission
  - Add a row for documentation of “bed exit alarms”
  - Redundancy between *fall plan of care* and patient education topics
- Medical unit RNs confused about definition of “high risk”

## Discussion: Aim 1

### *Aim 1: Documentation of Fall Risk Assessments*

- Improved on admission and every 12 hour nursing shift on 16 units according to quarterly audit data ( $p = .05$ ) and on 2 pre-selected units ( $p = .03$ )
- Pre-selected units had improvement on admission according to retrospective chart review ( $p = .05$ )
- Fall safety reports founds all patients had fall risk assessment and no differences in the time since last assessment

## Discussion: Aim 2

### *Aim 2: Documentation of Fall Prevention Plans of Care*

- Documentation for high risk patients did not improve according to quarterly audit data
- Retrospective chart review indicated decreased compliance on admission for medical unit ( $p = .00$ ) and for shift plan of care on both units ( $p = .01$ )
- Action on plan of care alert only 2-2.5%
- No differences plans of care according to safety reports

## Discussion: Aim 2 Continued

### *Aim 2: Documentation of Fall Prevention Plans of Care*

- Quarterly audit data had higher starting compliance rates for 16 units, with ranges from 70 to 100%
- Decrease in documentation of care plans on two units could be related to change from paper to electronic
- Primary shift documentation was flowsheet based

## Discussion: Aim 3

### *Aim 3: Nursing Staff Satisfaction*

- Satisfaction with fall CDS tools was adequate
- Reminders viewed favorably
- Some staff had not seen or benefited from care plan alert in line with low alert action data of 2-2.5% and low care plan documentation compliance
- Staff suggestions for EHR and CDS tools changes sent to DUHS IT governance for approval and prioritization

## Discussion: Aim 4

### *Aim 4: Clinical Outcomes*

- Unchanged with no change in patient falls and falls with injury rates
- Dowding, Turley & Garrido reported EHR and no change in fall rates
- Furukawa, Raghu & Shao found higher rate of falls in year one of EHR implementation (4.6% to 6.3%,  $p < .001$ ) and injury falls increased by 16.4% ( $p < .05$ )
- Studies reflect more change in process outcomes than clinical outcomes

## Discussion: Changes

- *Fall risk assessment* had flowsheet row to indicate if *plan of care* implemented changed to patient at high risk with yes/no
- *Fall plan of care* alert in admission navigator but not in flowsheets where shift assessment charted ..... pop-up alert added
- Alert data exceedingly low and question if other alerts had similar action percentages

## Discussion: Considerations

- Retrospective chart review anecdotal notes showed fall risk assessment changed from positive to negative and back multiple times
- Large EHR deployment with 54 retiring applications and many new features and workflows for RNs
- EHR with CDS as a sociotechnical system
  - Technology, people, process, organization and external environment

## Limitations of the Project

- Falls in other areas of hospital not included
- No consideration to seasonality of patient falls
- No consideration given to patient age
- Quarterly audit data
  - Collected by various staff across units
  - Point in time collection
- Retrospective chart review included 4.5 days of patient stay
- Documentation of plan of care focused on planned interventions only



## Conclusions

- Improvements seen in documentation of *fall risk assessment*
- Clinical outcomes were unchanged.
- Overall implementation of reminders and alerts had mixed results
- Further investigation needed for CDS use by nurses and differences across sites
- Placement of alerts in EHR workflow important to design and use by clinicians

## References

- Anderson, J. A., & Willson, P. (2008). Clinical decision support systems in nursing: Synthesis of the science for evidence-based practice. *Computers, Informatics, Nursing*, 26(3), 151-158. doi: 10.1097/01.NCN.0000304783.72811.8e.
- Boushon, B., Nielsen, G., Quigley, P., Rutherford, P., Taylor, J., Shannon, D., & Rita, S. (2012). *How-to guide: Reducing patient injuries from falls*. Cambridge, MA: Institute for Healthcare Improvement.
- Carroll, D. L., Dykes, P. C., & Hurley, A. C. (2012). An electronic fall prevention toolkit: Effect on documentation quality. *Nursing Research*, 61(4), 309-313. doi: 10.1097/NNR.0b013e31825569de.
- Centers for Medicare & Medicaid Services, 2012. *Evidence-based guidelines for selected and previously considered hospital-acquired conditions: Report update*. Research Triangle Park, NC: RTI International. Retrieved from <http://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/HospitalAcqCond/Downloads/Evidence-Based-Guidelines.pdf>.
- Centers for Medicare & Medicaid Services, 2013. *Hospital compare: Hospital acquired conditions – National measures and Measures*. Retrieved from <https://data.medicare.gov/browse?tags=hospital+compare>.
- Committee on Data Standards for Patient Safety, Board on Health Care Services, Institute of Medicine, 2003. *Key capabilities of an electronic health record system: Letter report*. Washington, DC: The National Academies Press. Retrieved from [http://www.nap.edu/catalog.php?record\\_id=10781](http://www.nap.edu/catalog.php?record_id=10781).
- Currie, L. M. (2008). Fall and injury prevention in *Patient safety and quality: An evidence-based handbook for nurses* (AHRQ Publication No. 08-0043). Rockville, MD: Agency for Healthcare Research and Quality. Retrieved from: [http://www.ahrq.gov/qual/nursesfdbk/docs/CurrieL\\_FIP.pdf](http://www.ahrq.gov/qual/nursesfdbk/docs/CurrieL_FIP.pdf).
- Currie, L. M., Bakken, S., Bufe, G., & Mellino, L. V. (2006). Compliance with use of automated fall-injury risk assessment in three clinical information systems. *AMIA Annual Symposium Proceedings*, 900.

## References

- Degelau, J., Belz, M., Bungum, L., Flavin, P. L., Harper, C., Leys, K., Lundquist, L., Webb, B. (2012). *Institute for Clinical Systems Improvement: Prevention of falls (Acute care)*. Retrieved from [https://www.icsi.org/\\_asset/dcn15z/Falls-Interactive0412.pdf](https://www.icsi.org/_asset/dcn15z/Falls-Interactive0412.pdf).
- Dowding, D., Mitchell, N., Randell, R., Foster, R., Lattimer, V., & Thompson, C. (2009). Nurses' use of computerised clinical decision support systems: A case site analysis. *Journal of Clinical Nursing, 18*(8), 1159-1167. doi: 10.1111/j.1365-2702.2008.02607.x
- Dowding, D. W., Turley, M., & Garrido, T. (2012). The impact of an electronic health record on nurse sensitive patient outcomes: An interrupted time series analysis. *Journal of the American Medical Informatics Association, 19*(4), 615-620. doi: 10.1136/amiajnl-2011-000504.
- Dykes, P. C., Carroll, D. L., Hurley, A., Gersh-Zaremski, R., Kennedy, A., Kurowski, J., . . . Middleton, B. (2009). Fall TIPS: Strategies to promote adoption and use of a fall prevention toolkit. AMIA Annual Symposium Proceedings, 2009, 153-157.
- Dykes, P. C., Carroll, D. L., Hurley, A., Lipsitz, S., Benoit, A., Chang, F., . . . Middleton, B. (2010). Fall prevention in acute care hospitals: A randomized trial. *JAMA, 304*(17), 1912-1918. doi: 10.1001/jama.2010.1567.
- Falen, T., Unruh, L., & Segal, D. (2011). Electronic fall surveillance system model. *Health Care Manager, 30*(4), 342-351. doi: 10.1097/HCM.0b013e3182351384.
- Furukawa, M. F., Raghu, T. S., & Shao, B. B. (2011). Electronic medical records, nurse staffing, and nurse-sensitive patient outcomes: evidence from the national database of nursing quality indicators. *Medical Care Research and Review, 68*(3), 311-331. doi: 10.1177/1077558710384877.
- Ganz, D. A., Huang, C., Saliba, D. et al. (2013). *Preventing falls in hospitals: A toolkit for improving quality of care* (AHRQ Publication No. 13-0015-EF). Rockville, MD: Agency for Healthcare Research and Quality.

## References

- Garg, A. X., Adhikari, N. K., McDonald, H., Rosas-Arellano, M. P., Devereaux, P. J., Beyene, J., . . . Haynes, R. B. (2005). Effects of computerized clinical decision support systems on practitioner performance and patient outcomes: A systematic review. *JAMA, 293*(10), 1223-1238. doi: 10.1001/jama.293.10.1223.
- Institute of Medicine (2012). *Health IT and patient safety: Building safer systems for better care*. Washington, DC: The National Academies Press.
- Lau, F., Kuziemyk, C., Price, M., & Gardner, J. (2010). A review on systematic reviews of health information system studies. *Journal of the American Medical Informatics Association, 17*(6), 637-645. doi: 10.1136/jamia.2010.004838.
- Lobach, D., Sanders, G. D., Bright, T. J., Wong, A., Dhurjati, R., Bristow, E., . . . Kendrick, A. S. (2012). *Enabling health care decisionmaking through clinical decision support and knowledge management*. Evidence Report Technology Assessment (Full Report)(203), 1-784. AHRQ Publication No. 12-E001-EF. Rockville, MD: Agency for Healthcare Research and Quality.
- National Database of Nursing Quality Indicators (NDNQI) (2012, October 25). Retrieved from <https://www.nursingquality.org/data.aspx>.
- National Quality Forum (NQF) (2012, October 25). *Quality positioning system*. Retrieved from <http://www.qualityforum.org/QPS/>.
- Osheroff, J. A., Teach, J. M., Middleton, B. F., Steen, E. B., Wright, A. & Detmer, D. E. (2006). *A roadmap for national action on clinical decision support*. Retrieved from <http://www.amia.org/sites/amia.org/files/A-Roadmap-for-National-Action-on-Clinical-Decision-Support-June132006.pdf>
- Shojania, K. G., Jennings, A., Mayhew, A., Ramsay, C. R., Eccles, M. P. & Grimshaw, J. (2011). The effects of on-screen point of care computer reminders on processes and outcomes of care. *Cochrane Review, 1*.
- Wong, C. A., Recktenwald, A. J., Jones, M. L., Waterman, B. M., Bollini, M. L., & Dunagan, W. C. (2011). The cost of serious fall-related injuries at three Midwestern hospitals. *Joint Commission Journal on Quality*

## Questions and Answers

