

Show Me the Delta: The Impact of an Evidence-Based Care Planning and Decision Support System on Professional Practice and Patient Outcomes


Mary L. Hook, PhD, PHCNS- BC

Show Me the Delta . . .

The Impact of an Evidence-based Electronic Care Planning & Decision Support System on Professional Practice & Patient Outcomes

Mary L. Hook, RN, PhD, PHCNS-BC

Summer Institute in Nursing Informatics (SINI-2009)



Participant Objectives:

- Describe the Knowledge-based Nursing Initiative (KBNI) and how evidence-based content is embedded into an electronic care planning and decision-support system to individualize patient care.
- Identify key strategies used to promote the adoption of evidence-based nursing practice.
- Examine the preliminary results and lessons learned.

Current State of the Patient Care Environment

- Health care costs continue to rise
- Increasing pressure to link health care reimbursement to quality indicators (using technology).
- Inefficient and ineffective use of our limited and most valuable resource: **Nurses**
- Nurses report spending too much time away from the bedside (“gathering” & documenting).




Since Last Year . . . State of the Patient Care Environment

- Competing demands . . .
 - 2008 - for standardization vs. individualization
 - 2009 - for EVERYTHING
- Clinical information system (CIS) “growing pains”
- Data “rich” – increasing need for interpretation
- Renewed focus on care planning

Return to the Basics of Professional Nursing Practice

- Improve patient care (right thing to do)
- Help nurses to focus on most important things
- Achieve legal & regulatory requirements
- American Nurses Association (2004) *Nursing: Scope & Standards of Practice**



*Registered Nurses & Advanced Practice RNs

American Nurses Association (ANA) Standards of Practice for Nurses

“The science of nursing is based on a critical thinking framework, known as the nursing process . . .

These steps serve as the foundation of clinical decision-making and are used to provide evidence-based practice.”



(ANA Scope & Standards, 2004, p. 11-12)

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The Knowledge-Based Nursing Initiative

A Partnership funded by:

- (A)  Aurora Health Care
- (C)  CERNER
- (W)  University of Wisconsin-Milwaukee College of Nursing (W)

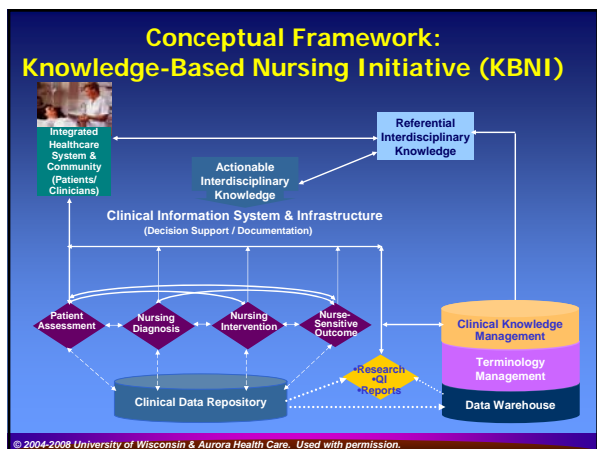
Knowledge-Based Nursing Initiative

Aurora	Cerner	UWM
Integrated health system, nursing results	Application solutions, knowledge tools	Education, research and practice college

Goal

To infuse research/evidence-based nursing content within the workflow to support clinical decision making, populate data repositories, conduct analyses, and improve patient care across all venues.


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What is Evidence-Based Practice?

Evidence-Based Practice (EBP) incorporates all the components for quality patient care:

- Best research evidence
- Clinical expertise
- Patient values



Institute of Medicine. *Crossing the Quality Chasm*, 2001, p. 47.

KBNI Knowledge Development Process: From Evidence to Recommendation

1. Identify what you want to know
2. Seek relevant evidence
3. Triage the evidence for relevance
4. Evaluate the evidence for quality
5. Use best evidence to develop recommendations for each step of the nursing process
6. Rate the strength of evidence supporting the recommendation

KBNI "Knowledge Development"

Choose Phenomenon "of Concern" to Nurses:

- What population? venue?
- What phenomena are most important – for what reason?

Locate evidence to support the nursing process:

- **Assessment:** Who is at risk? How do you recognize when the problem is present?
- **Diagnosis:** What tools are useful?
- **Interventions:** What interventions are effective – for you?
- **Outcomes:** Are there known benchmarks?

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The Dilemma . . .

Find the "best" referential evidence

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Sources of Evidence

- Synthesized evidence (research) reviews
- Research (systematic, new knowledge)
- Published consensus guidelines
- Expert opinion
- Practice-based evidence (quality improvement projects)

Key Points:

- All sources are evaluated for relevance, currency, & methodological quality (not judged only by design)
- Each practice guideline recommendation must be evaluated individually (vs. accepting all at a high level)

Evaluating the Evidence

- Use evaluation criteria specific to the evidence type
- How is the study designed? Are the measures valid and reliable? It is "powered" to see a difference?
- Review the strengths, threats, and limitations prior to inclusion

Gathering Referential Knowledge: Risk for Falls Evidence Table (Example)

Citation	Question / Topic, Sample, Setting	Type of Evidence	Key Findings related to Practice				Evidence Decision
			Patient Assessment	Nursing Diagnosis	Nursing Intervention	Nurse-Sensitive Outcome	
Mead, CM et al. 2006	AIM: to determine frequency of and reasons for call light use and the effects of Q1 & Q2 hr rounding on satisfaction & pt safety. 46 units started w/ 19 excluded	Quasi-experimental, non-random, non-equivalent groups (baseline for 2 wk and then either 1 or 2 hr rounding x 4 wks)	Study conducted at the unit level (medical, surgical & combined care units). Not designed to study or describe patient level data (no fall risk assessments).	Unable to determine if units evaluated in the study had patient populations who had a diagnosis of Risk for Falls/Injury	Rounding protocol by RN/CNA included multiple 12 items (pain assessment, toileting, positioning & environmental mgmt-6/12 = fall prev. strategies)	Fall outcomes were evaluated (post-hoc) based on fall counts over 6 week study period. Falls decreased w/ 1 hr rounding. (Short time for rare event; Not blinded; No accounting for # patient days)	Study not designed to study patient falls. Can't be used to support rounding to prevent falling in acute care.

System for Rating the Strength of Evidence Supporting Recommendations

Level I Systematic review, meta-analysis, or practice guideline based on RCTs

Level II Well-designed randomized clinical trial

Level III Well-designed controlled trials without randomization (single/reviews)

Level IV Well-designed case-control and cohort studies

Level V Systematic review or meta-analysis of descriptive or qualitative studies

Level VI Well-designed descriptive, qualitative, or psychometric studies

Level VII Opinion of authorities or experts

Level VIII Common practice (clinical articles or textbooks)

Modified from the rating system by Melnyk & Fineout-Overholt (2005) by E.C. Devine (2007)

KBNI: Synthesizing the Evidence

- Patient Assessments**
 - Fall risk factors (confirm with Tool)
 - Fall-related Injury risk factors
 - Special conditions
 - Patient able to participate in prevention
- Diagnosis**
 - Risk for Falls
 - Risk for Fall-related Injury
- Nursing Interventions**
 - Environmental management
 - Risk-specific interventions
 - Initiate consults (MD/Pharmacy/PT/OT)
- Nurse-Sensitive Outcomes**
 - Patient does not fall or injure
 - Patient verbalizes risks & takes action

Source: Hook, Devine, Lang (2008); Hook & Winchel, 2006

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Adopting the KBNI Process



Goal: Use technology to bring best evidence to support nurses at the point of care

Using KBNI as the Basis for Practice

Key Features:

- Evidence provides basis for assessment and intervention
- Assessments drive clinical decision-making (diagnosis) and support nurses to individualize care.

Transforming Patient Care by:

- Using evidence to create actionable recommendations (For whom . . . Do what?)
- Designing processes to fit nursing workflow
- Renewing the focus on planning patient care
- Removing unnecessary and duplicative work
- Creating fields & decision-support to focus care
- Constructing nurse-sensitive elements to support data retrieval for evaluation & research

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Establishing KBNI as Strategic Initiative

Making a Business Case:

- Benefits of investing in nurse-based information technology (IT) improvements
- KBNI is NOT an "IT" Project**
IT is the vehicle for achieving strategic clinical goals.
- Prototype design is used to "transform" nursing & patient care



Using Actionable Knowledge in Acute Care

Phenomena for the Initial Go-Live (July, 2008)

- Activity Intolerance*
- Risk for Medication Nonadherence**
- Risk for Falls* and Fall-related Injury
- Post-fall Management*
- Risk & Management of Venous Thromboembolism

Phenomena for the Second Go-Live (May, 2009)

- Risk & Management of Delirium
- Risk* & Management of Pressure Ulcers

*Replaced an existing "standardized" care plans

Facilitating Design Team Collaboration

Knowledge Developers (UWM & Aurora Scientists)

- Adherence to synthesis, creating reference text & links
- Design consistency across topics

IT Specialists (Cerner & Aurora)

- Clinical Documentation Build
- Decision-support Design

Clinical "Transformers" (Aurora)

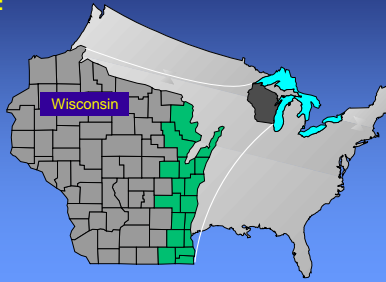
- Staff Nurses (varied expertise)
- "Early Adopter" mindset with communication skills
- Design content to fit into workflow



Deploying the Prototype within the Aurora Health Care System

Aurora Health Care:

- 14 Hospitals
- Over 7,000 Nurses
- 5 Magnet Hospitals
- From 40-600+ beds
- Rural, community & tertiary care
- Varied levels of "computerization"
- Services that span the health care continuum



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Deploying the Prototype as a Pilot

Criteria for Pilot Unit Selection:

- Medical patient populations
- "Ready" for innovation
- Must be invested in the work



Pilot Units*:

- Large urban tertiary medical center (Magnet)
- Two 36-bed Medical/Telemetry units
- 40+ RNs/unit; Tenure from new graduate to 37 years
- Unit-based Shared Governance Team (Manager, Clinical Nurse Specialist & Staff Leaders)

*Note: Pilot with some enhancements deployed system-wide.

Prototype Pilot Unit Descriptions

Characteristic	Unit A	Unit B
Unit Type & Specialty	Medical/Telemetry Acute Care for Elderly	Medical/Telemetry Heart Failure
Volume (2007)	2,325 Admits/Year 78% Admits 12% Transferred in 10% Observation	2,648 Admits/Year 75% Admits 9% Transferred in 16% Observation
Patients	Avg Age=67 yrs (±19) 61% ≥ 65 yrs	Avg Age=68 yrs (±17) 61% ≥ 65 yrs
Length of Stay	Avg LOS=5.0 Days (±5.3) 62% w/ LOS ≤4 days	Avg LOS=5.0 Days (±4.0) 62% w/ LOS ≤4 days
Disposition	Home=57%; Home Care=12% SNF=21%; Rehab 2%	Home=59%; Home Care=14% SNF=19%; Rehab=2%

Strategies for Pilot Unit Deployment

On-line course content (Unit & Float Pool Staff; n>100):

- KBNI Overview with focus on "Transforming Practice"
- Content for evidence-based phenomenon-specific care
- How IT supports them to individualize patient care

Computer-based training:

- Reinforce basic order entry & task management skills
- Validated competency prior to Go-Live.

Around the clock Clinical & IT Go-Live support:

- Provided immediate coaching and feedback
- Addressed unanticipated IT and clinical problems
- Enhanced communication, recognition, and food!

Results: Immediate Feedback

Staff provided positive feedback about:

- Appreciated coaching and feedback
- Reported benefit of using prior documentation to drive future decisions (screens & alerts)
- Access to concise reference text at key places in workflow
- Electronic patient education form provides link out to website for selected patient education materials
- "Notify" forms provided support for provider collaboration

Work in Progress:

- Individualizing care (not used making selections)
- Real time charting for optimal effectiveness
- Challenge of "bundling" phenomena. . . Adding/optimizing

Using EHR-Based Data for Evaluation

Evaluation: Comparing Before & After

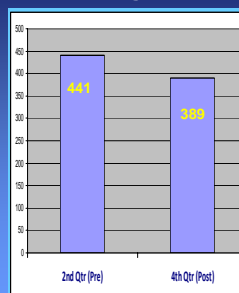
- 2008 Quarter 2 (April-June) vs. 2008 Quarter 4 (Oct-December)
- Isolating "pilot" from transfer-in patients

Considerations:

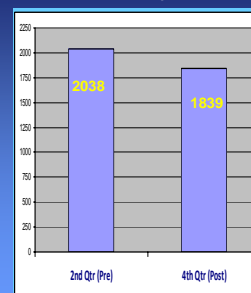
- "Universal" Care Plans and daily & prn Morse Fall Scale screening was in place prior to pilot
- Pilot brought some new content (no pre-data)
- Creating denominator for "patient day" statistics

Pilot Unit Demographics (Unit A)

of Discharges/Quarter

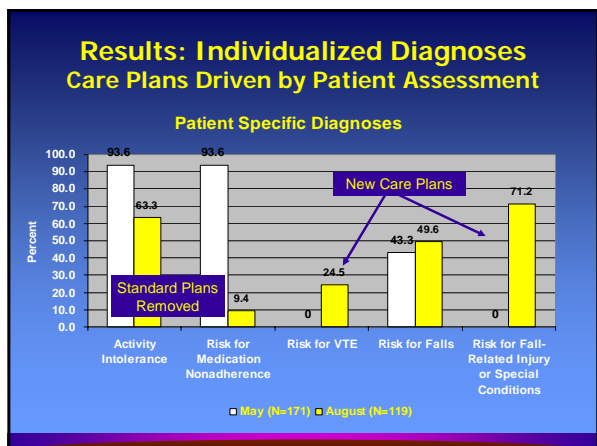


of Patient Days/Quarter



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Selected Outcomes: Falls & Fall-related Injury

Metric Name (9LM Data)	2 nd Qtr (Pre) N=441	4 th Qtr (Post) N=389	Direction of Change
Number of patients who fell	8	5	↓
Total number of falls	9	5	↓
Number of patients with more than one fall	1	0	↓
Number of patients with a fall resulting in minor injury	2	2	→
Number of patients with a fall resulting in a moderate injury	0	0	→

Assessment & Diagnosis: Fall Prevention

Metric Name (9LM Data)	2 nd Qtr (Pre)	4 th Qtr (Post)	Direction of Change
% patients assessed for risk w/in 24 hours of admission	100%	100%	→
% patients assessed for risk daily	98.4%	98.3%	→
% patients identified at risk for fall	50.1%	73.8%	↑
# fall risk factors/patient	5.36	10.84	↑
% patients identified at risk for fall-related injury	5.2%	72.5%	↑

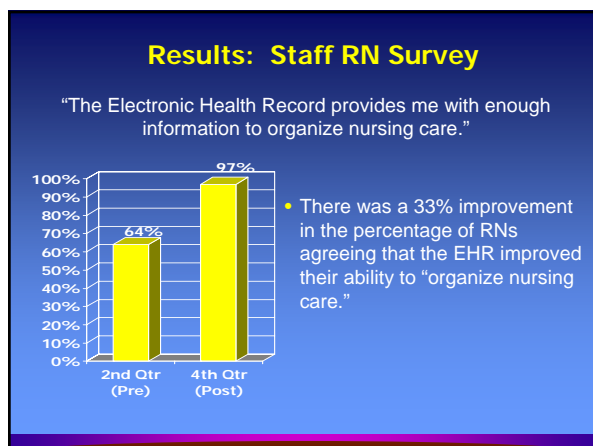
Plan and Treat: Falls Prevention

Metric Name (9LM Data)	2 nd Qtr (Pre)	4 th Qtr (Post)	Direction of Change
% At Risk of Fall patients with Fall Prevention Care Plan Initiated	49.8%	96.2%	↑
% At Risk of Fall patients with Fall Prevention or Management education documented*	0.0%	13.2%	↑

*Note: Based on these results, the education form was redesigned and presented to the nurse in a new way to see if adherence would increase. Subjective reports from the staff indicates improvement.

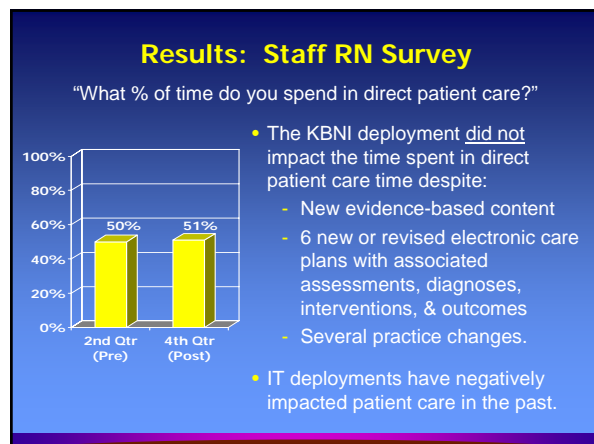
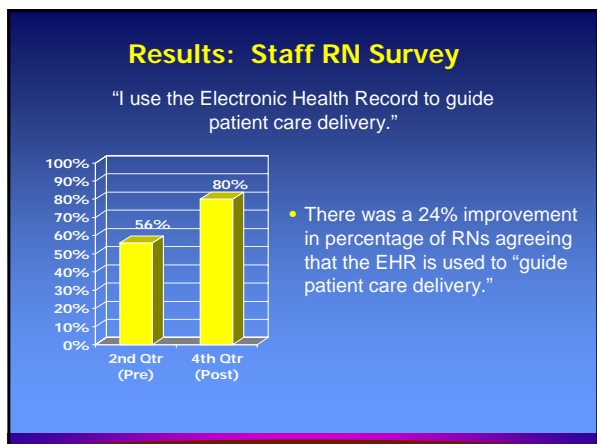
Patient Outcomes: Falls Prevention

Metric Name (9LM Data)	2 nd Qtr (Pre)	4 th Qtr (Post)	Direction of Change
# patients with a fall per 1000 patient days	3.93	2.72	↓
Number of patient admissions between falls	23.0	49.0	↑
% patients who fell who were At Risk of Fall prior to the fall event	50%	40%	↓
# patients with minor injuries per 1000 patient days	0.98	1.09	→
# patients with moderate injuries per 1000 patient days	0	0	→




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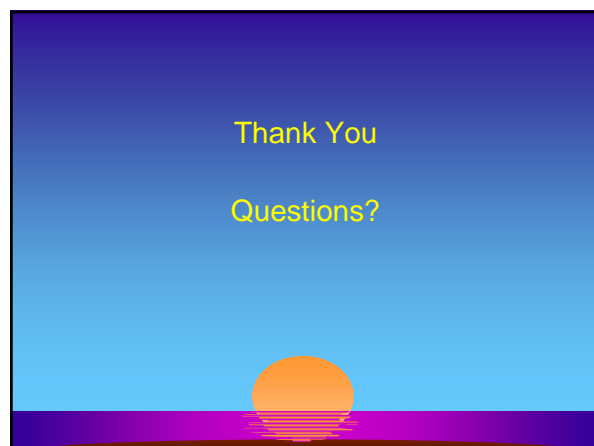
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- ### Lessons Learned
- **Leader support is critical**
 - Commitment, time, & resources are needed
 - Clinical (vs. IT) initiative
 - Build support for using prototype to enhance interdisciplinary collaboration & care planning
 - **KBNI Vision is Transformational . . . Takes Time**
 - The processes provide support for nurses to individualize care based on assessment (vs. applying a "standardized" care plan for all)
 - Processes require enhanced nursing judgment.

- ### Lessons Learned
- **A "Design Team" is Essential**
 - ACW Scientists, clinical transformers, & IT experts each play an essential role in making actionable evidence function within the workflow.
 - Team works hard to anticipate "challenges" with every new content topic and each design.
 - Receiving unit leaders & staff must be committed to support improvements.
- 

- ### Next Steps
- Team will continue to work on content & design for Go-Live in Fall, 2009 including Fluid Volume Excess, Pain Management, & Moderate Sedation.
 - Efforts are focused on using new data management tools to support access to the rich, nurse sensitive data.
 - Findings are used to guide project enhancements.
 - Simultaneously work on projects for using data for quality improvement and research on designing decision-support.



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