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

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.

Conceptual Framework:
Knowledge-Based Nursing Initiative (KBNI)

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

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? Is it "powered" to see a difference?
- Review the strengths, threats, and limitations prior to inclusion

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

<table>
<thead>
<tr>
<th>Question / Topic / Sample</th>
<th>Type of Evidence</th>
<th>Patient Assessment</th>
<th>Nursing Diagnosis</th>
<th>Nursing Interventions</th>
<th>Nurse-Sensitive Outcome</th>
<th>Evidence Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mead, CM et al. 2006</td>
<td>Quasi-experimental, non-random, non-equivalent groups (baseline for 2 wks and then 1 or 2 hr rounding x 4 wks)</td>
<td>Study conducted at the unit level (medical, surgical &amp; combined care units). Not designed to study or describe patient level data (no fall risk assessments)</td>
<td>Unable to determine if units evaluated in the study had patient populations who had diagnosis of Risk for Falls/Fall-related Injury</td>
<td>Rounding protocol by RN/CNA included multiple 12 items (pain assessment, positioning, &amp; environmental management-6/12 fall prev. strategies)</td>
<td>Fall outcomes were evaluated (post hoc) based on fall counts over the 6-week study period. Falls decreased w/ 1 hr rounding. Study not designed to study patient falls. Can’t be used to support rounding to prevent falling in acute care.</td>
<td></td>
</tr>
</tbody>
</table>

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 controlled 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)

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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
- 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

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

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Unit A</th>
<th>Unit B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit Type &amp; Specialty</td>
<td>Medical/Telemetry Acute Care for Elderly</td>
<td>Medical/Telemetry Heart Failure</td>
</tr>
<tr>
<td>Volume (2007)</td>
<td>2,325 Admits/Year</td>
<td>2,648 Admits/Year</td>
</tr>
<tr>
<td></td>
<td>78% Admits</td>
<td>77% Admits</td>
</tr>
<tr>
<td></td>
<td>12% Transferred in</td>
<td>9% Transferred in</td>
</tr>
<tr>
<td></td>
<td>Observation</td>
<td>Observation</td>
</tr>
<tr>
<td>Patients</td>
<td>Avg Age=67 yrs (±19)</td>
<td>Avg Age=68 yrs (±17)</td>
</tr>
<tr>
<td></td>
<td>61% &gt; 65 yrs</td>
<td>61% &gt; 65 yrs</td>
</tr>
<tr>
<td>Length of Stay</td>
<td>Avg LOS=5.0 Days (±5.3)</td>
<td>Avg LOS=5.0 Days (±4.0)</td>
</tr>
<tr>
<td></td>
<td>62% w/ LOS ≥ 4 days</td>
<td>62% w/ LOS ≥ 4 days</td>
</tr>
<tr>
<td>Disposition</td>
<td>Home=57%; Home Care=12%</td>
<td>Home=59%; Home Care=14%</td>
</tr>
<tr>
<td></td>
<td>SNF=21%; Rehab 2%</td>
<td>SNF=19%; Rehab=2%</td>
</tr>
</tbody>
</table>

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 & pm 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)
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Results: Individualized Diagnoses Care Plans Driven by Patient Assessment

Selected Outcomes: Falls & Fall-related Injury

<table>
<thead>
<tr>
<th>Metric Name (9LM Data)</th>
<th>2nd Qtr (Pre) N=441</th>
<th>4th Qtr (Post) N=389</th>
<th>Direction of Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients who fell</td>
<td>8</td>
<td>5</td>
<td>Down</td>
</tr>
<tr>
<td>Total number of falls</td>
<td>9</td>
<td>5</td>
<td>Down</td>
</tr>
<tr>
<td>Number of patients with more than one fall</td>
<td>1</td>
<td>0</td>
<td>Down</td>
</tr>
<tr>
<td>Number of patients with a fall resulting in minor injury</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Number of patients with a fall resulting in a moderate injury</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Assessment & Diagnosis: Fall Prevention

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

Plan and Treat: Falls Prevention

<table>
<thead>
<tr>
<th>Metric Name (9LM Data)</th>
<th>2nd Qtr (Pre)</th>
<th>4th Qtr (Post)</th>
<th>Direction of Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>% At Risk of Fall patients with Fall Prevention Care Plan Initiated</td>
<td>49.8%</td>
<td>96.2%</td>
<td>Arrow Up</td>
</tr>
<tr>
<td>% At Risk of Fall patients with Fall Prevention or Management education documented*</td>
<td>0.0%</td>
<td>13.2%</td>
<td>Arrow Up</td>
</tr>
</tbody>
</table>

*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.

Results: Staff RN Survey

"The Electronic Health Record provides me with enough information to organize nursing care."

<table>
<thead>
<tr>
<th>Metric Name (9LM Data)</th>
<th>2nd Qtr (Pre)</th>
<th>4th Qtr (Post)</th>
<th>Direction of Change</th>
</tr>
</thead>
<tbody>
<tr>
<td># patients with a fall per 1000 patient days</td>
<td>3.93</td>
<td>2.72</td>
<td>Down</td>
</tr>
<tr>
<td>Number of patient admissions between falls</td>
<td>23.0</td>
<td>49.0</td>
<td>Arrow Up</td>
</tr>
<tr>
<td>% patients who fell who were At Risk of Fall prior to the fall event</td>
<td>50%</td>
<td>40%</td>
<td>Down</td>
</tr>
<tr>
<td># patients with minor injuries per 1000 patient days</td>
<td>0.98</td>
<td>1.09</td>
<td>Arrow Up</td>
</tr>
<tr>
<td># patients with moderate injuries per 1000 patient days</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

There was a 33% improvement in the percentage of RNs agreeing that the EHR improved their ability to "organize nursing care."
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**Results: Staff RN Survey**

"I use the Electronic Health Record to guide patient care delivery."

- There was a 24% improvement in percentage of RNs agreeing that the EHR is used to "guide patient care delivery."

**Results: Staff RN Survey**

"What % of time do you spend in direct patient care?"

- The KBNI deployment did not impact the time spent in direct patient care time despite:
  - New evidence-based content
  - 6 new or revised electronic care plans with associated assessments, diagnoses, interventions, & outcomes
  - Several practice changes.

- IT deployments have negatively impacted patient care in the past.

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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.

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**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.

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**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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**Thank You**

**Questions?**
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Acknowledgement/Thanks

We would like to acknowledge the contributions of the many ACW Team Members who have helped us to get where we are today and will help us to realize our lofty goals for the future!

- Norma Lang, PhD, RN, FAAN– Project Leader
- Elizabeth C. Devine, PhD, RN, FAAN
- Laura Burke, PhD, RN, FAAN
- Karlene Kerfoot, PhD, RN, FAAN
- Sally Lundeen, PhD, RN, FAAN
- Ellen Harper, MBA, RN
- Mary Hook, PhD, RN
- Mary Hagle, PhD, RN
- Judy Murphy, RN, FACN, FPHN
- Sharon Sweeney Fee, PhD, RN
- Jennifer Grenn, Cerner-based Project Manager
- Andrew Carlson, Aurora-based Project Manager
- Tae Yoon Kim, PhD, RN
- Amy Cleman, PhD, RN
- Lauren Nilles, MEL
- Andrew Parr, RN, BSN
- Jim Mills, BSN, RN
- Ali Ujiale, BS, RN
- Pam Mueller, BSN, RN
- Jenny Maltby, BSN, RN
- Ping Li, MS, RN
- Wendy Olson, BSN, MS
- Aurora & Cerner IT Design & Build Teams
- Plus many, many others.

Selected References


Murphy J. (2006). The best IT project is not an IT project. J Healthcare Inf Mgmt, 23(1), 5-6.