Nurse-Led Research to Improve Quality and Safety

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Cleveland Clinic Health System
Objectives

1. State why nursing research is important to improving quality and safety
2. Discuss 3 essential elements to value-based, evidence-based nursing practices
3. Describe outcomes of 3 nurse-led research study’s that focus on quality and safety
WHEN DO BEDSIDE NURSES CONDUCT & USE RESEARCH?

When:
A. A parent/loved one gets ill and they need to "look up" data on the topic
B. Time is given to do it
C. It's time to show clinical ladder experiences
D. The goal is optimal patient care
E. Need evidence for "Magnet" designation

NONE OF THE ABOVE
WHY DO RESEARCH?

• We need creative approaches to old and new health problems
  - To make a difference in the health status of the patients we serve
  - To match or integrate the rapidly expanding evidence-based knowledge about biological, behavioral and environmental influences on health
EVIDENCE-BASED PRACTICE

- Half of what you are taught in medical school will be proved to be wrong in 10 years, and the trouble is, none of your teachers know which half.  
  S. Burwell, Harvard Medical School

- We double our medical information every 3-5 years

  Do we change nursing practices every 3-5 years to match medical knowledge?
Value-Based Purchasing–Ever-Changing Requirements

2013

- Clinical Process of Care: 30%
- Pt. Experiences (HCAHPS): 70%

2014

- Clinical Process of Care: 45%
- Pt. Experiences (HCAHPS): 30%
- Clinical Outcomes: 25%

2015

- Clinical Process of Care: 20%
- Pt. Experiences (HCAHPS): 30%
- Clinical Outcomes: 30%
- Fiscal Efficiency: 20%

5 Outcomes: 30 day mortality in AMI, pneumonia and HF; CLABSI and patient safety

2015, Fiscal efficacy is defined:
Risk-adjusted and price standardized payments for all of part A & B services provided from 3 days before hospital admission (index admission) through 30 days after hospital discharge
Value-Based Purchasing – 2016

- Clinical Process of Care: 25%
- Pt. Experiences (HCAHPS): 10%
- Clinical Outcomes: 40%
- Fiscal Efficiency: 25%

5 Outcomes: 30 day mortality in AMI, pneumonia and HF; CLABSI and patient safety

Fiscal efficacy: Risk-adjusted and price standardized payments for all of part A & B services provided from 3 days before hospital admission (index admission) through 30 days after hospital discharge
Financial Improvement
Operational Efficiency
Strategic Partnering
Physician Alignment
Clinical Quality
Vision
LTACH
3 Essential Elements to Value-Based, Evidence-Based Nursing Practices

1. Understanding what EBP and research means to patient care
2. Encouraging EBPs
3. Mentoring & supporting nurses in EBP
Sacred Cows

“Someone or something that has been accepted or respected for a long time and that people are afraid or unwilling to criticize or question”

Merriman-Webster dictionary
Examples: Sacred Cows

• < 2000 mg sodium diet in patients with stable heart failure
• Milking chest tubes
• Trendelenburg position to stabilize cardiovascular hemodynamics in hypotension
• NaCl in endotubes to liquefy secretions
• Restricting visitation
• Restriction observation during CPR/code
• Use of cell phones in critical care
Evidence-based Practices

Definition:

• The integration of best research, clinical expertise, and patient values in making decisions about the care of individualized patients

• Nurses should make practice decisions based on evidence
3 Essential Elements to Value-Based, Evidence-Based Nursing Practices

1. Understanding what EBP and research means to patient care
2. Encouraging EBPs
3. Mentoring & supporting nurses in EBP
Cultivate a spirit of inquiry
TRANSFORMING HEALTH CARE
FROM THE INSIDE OUT
Nursing Leadership

- **Talk the talk**
  - Ask for evidence when a manager or nurse states why something ought to be done the way it’s being suggested
  - Use evidence to guide practice
  - **Rationale:**
    - Helps leaders recognize the importance of literature review and ‘best evidence’
Encouraging EBPs

• Keep the words EBP in the forefront of activities
  – Nursing education / systems that assist nurses to understand the value of EBP
  – Best practice posters/presentations
  – Develop funding to compensate for “time”
  – Develop awards/recognition for EBP project completion
CC Evidence Based Nursing Practice Model

Adapted from Albert NM, Siedlecki SL. JONA 2008; 38:90-96.
CCF Created Images

Cleveland Clinic Nursing Institute: Strength (Levels) of Clinical Evidence Guide

- Strength of clinical evidence is based on findings from a review of literature.
- "Literature" is generally defined as all pertinent publications on the topic; however, if the topic has a lot of information about it, select:
  (a) More recent publications (e.g., within the last 5 years), and
  (b) Publications with the highest level of evidence (see below)

Level I
- Randomized controlled trial (RCT)
- Meta-analysis of all outcome related to area or research question of interest

Level II
- Systematic review of an outcome related to an area or research question of interest
- All of the quantitative or qualitative research, or the single center or multicenter studies, can be: medical record review, retrospective or prospective studies, can be descriptive, comparative, correlational studies
- Order of strength:
  - Systematic review
  - Comparative studies
  - Descriptive, observational studies
  - Case report studies
  - Expert opinion
  - Qualitative research

Level III
- Consensus guidelines created by national organizations or national experts without conflicts of interest (funding)
- Consensus guidelines generally include multiple recommendations that may be derived from evidence that includes R1, R2 and NR
- Use research expert opinion knowledge:
- Strength of evidence is higher when most recommendations are from randomized controlled trials and lower when based on R2 and NR evidence

Non-Research (NR) Publications - Lowest Strength
- Non-research references include:
  - Review manuscript
  - Case study
  - Expert opinion
  - Quality report
  - Hospital criteria
  - Hospital "data"
  - Editorial

Cleveland Clinic Nursing Institute: Quality of Evidence Guide

Level I
- Well defined search methods (review manuscripts)
- Predominantly recent and primary references
- Appropriate sample size and justification for inclusion and exclusion
- Precision in findings (narrow confidence intervals around the mean)
- Systematic review or meta-analysis contains predominantly controlled trials / comparative research designs, when available
- Data collection and analysis are appropriate for research design (research manuscript)
  - Power analysis completed
  - Random assignment
  - Blinding of caregivers to interventions
  - Appropriate length of collection of data on outcomes
  - Multicenter study
  - Diagram of those enrolled and excluded
  - Valid, reliable scales
  - Effect size stated
  - Expertise of corresponding or senior author evident
  - Consistent results
  - Discussion, implications and/or conclusions clearly follow from data analysis (research manuscript) or review of literature (review manuscript)

Good Quality Evidence
- General description of search methods (review manuscripts)
- Some recent and primary references
- Sample size appears adequate but not justified
- Systematic review or meta-analysis contains mostly "comparative" research designs, when available
- Questionable fit between research design (and research questions) and data collection, data analysis, and/or implications / conclusion (research manuscript)
- Expertise of corresponding or senior author not evident
- Results primarily consistent
- Some discussion, implications and/or conclusions addressed appropriately

Low Quality Evidence
- Insufficient description of search methods
- Insufficient use of recent and primary references
- Insufficient data sample size
- Systematic review or meta-analysis contains many non-"comparative" research designs (unless none available)
- Lack of fit between research design (and research questions) and data collection, data analysis, and/or implications / conclusion (research manuscript)
- Predominantly recent and primary references
- Sample size appears adequate but not justified
- Systematic review or meta-analysis contains mostly "comparative" research designs, when available
- Data collection and analysis are appropriate for research design (research manuscript)
  - Power analysis completed
  - Random assignment
  - Blinding of caregivers to interventions
  - Appropriate length of collection of data on outcomes
  - Multicenter study
  - Diagram of those enrolled and excluded
  - Valid, reliable scales
  - Effect size stated
  - Expertise of corresponding or senior author evident
  - Consistent results
  - Discussion, implications and/or conclusions clearly follow from data analysis (research manuscript) or review of literature (review manuscript)
Select Manuscript to Critique

1. Identify Strength and Quality of Evidence
2. Consider applicability to your practice – What problem will it address?
3. Do the manuscript findings have *clinical significance*? What difference will findings make for patient outcomes?
4. Is it feasible to implement the evidence into my practice?
5. How will I know when I have made a difference?
3 Essential Elements to Value-Based, Evidence-Based Nursing Practices

1. Understanding what EBP and research means to patient care
2. Encouraging EBPs
3. Mentoring & supporting nurses in EBP
Literature Review Takes Too Long

• Nursing Research requires a review of the literature as part of the process
  – Learn short cuts
Literature Reviews

• Learn tricks of finding papers
• Learn tricks of reviewing papers
• Learn how to:
  – read tables
  – read graphs
  – read figures
  – read statistics (basics)
Collaboration

- At least 2 nurse authors on one project
- Include a CNS/nurse scientist (local or external consultant) to assist
- Include experts on the topic
  - Interdisciplinary support
- National Organizations
- Company support (be aware of bias)
- Systematic reviews or meta-analyses on topic
Evidence Matters
Examples: Nursing Research in Quality and Safety

• Early Mobility
• Hospital-acquired infection
• Monitoring Alarms
ABCDE Bundle Implementation

**Spontaneous Awakening Trials**
- Daily SAT Safety Screen
- Use of sedation scales in goal-directed delivery of psychoactive medications
- Daily Sedation Cessation*

**Spontaneous Breathing Trials**
- Daily SBT Safety Screen
- Daily Weaning Trial* (Protocol-driven)

**Coordination of Awakening and Breathing Trials**

**Choice of Sedatives**
- Inter-professional effort to coordinate SAT & SBT
- Choice of agent, continuous versus intermittent, and use of narcotics

**Delirium Assessment and Monitoring**
- Regular delirium assessment and mitigation in 100% ICU patients

**Exercise/Early Mobility**
- Daily exercise regimens, including ambulation (vented & non-vented patients)

ABCDE Bundle Implementation

Awakening & Breathing Trial Coordination

Choice of sedatives & analgesics

Increase:
- Liberation form the ventilator
- Earlier ICU and hospital discharge
- Return to normal brain function
- Independent functional status
- Survival

Delirium Monitoring

Early mobility; Exercise

Does early progressive mobility benefit patients with primary neurological injury treated in a Neuro ICU?

For NIC: Do the early mobility effects have an effect on financial factors?
### OUTCOMES / MEASURES:

#### 16 Level of mobility

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Bed rest without passive ROM</td>
</tr>
<tr>
<td>2.</td>
<td>Bed rest with passive ROM</td>
</tr>
<tr>
<td>3.</td>
<td>Bed rest with active ROM</td>
</tr>
<tr>
<td>4.</td>
<td>Turn and position every 2 hrs</td>
</tr>
<tr>
<td>5.</td>
<td>Head of bed routinely &lt; 30°</td>
</tr>
<tr>
<td>6.</td>
<td>Head of bed elevated ≥ 30°</td>
</tr>
<tr>
<td>7.</td>
<td>HOB ≥ 45° - &lt; 65° + legs in a dependent position x 60 min</td>
</tr>
<tr>
<td>8.</td>
<td>HOB ≥ 65° + legs in dependent position x 60 min (beach chair)</td>
</tr>
<tr>
<td>9.</td>
<td>Meets #8, 9 or 10 but for &gt; 60 minutes</td>
</tr>
<tr>
<td>10.</td>
<td>Dangle with assistance</td>
</tr>
<tr>
<td>11.</td>
<td>Stand at side of bed</td>
</tr>
<tr>
<td>12.</td>
<td>Stand and pivot to chair</td>
</tr>
<tr>
<td>13.</td>
<td>Walk with assistance</td>
</tr>
<tr>
<td>14.</td>
<td>Walk independently</td>
</tr>
</tbody>
</table>

Assessed x 13 days by CRF at bedside or medical record review
Outcomes and Measures

• Outcomes measured by medical and administrative record review
  – ICU and hospital length of stay (LOS)
  – Discharge disposition
  – ICU acquired DVTs
  – Blood stream infections
  – Ventilator associated pneumonia
  – HAPU
  – 30 day mortality

• Patient factors assessed
  – Apache III score
  – Demographics (age, race, gender…)

Cleveland Clinic
## Results: Pt Characteristics

<table>
<thead>
<tr>
<th>Factor</th>
<th>Pre-Intervention N = 260</th>
<th>Post-Intervention N = 377</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age- years; Mean (SD)</td>
<td>62.7 (16.1)</td>
<td>61.3 (16.7)</td>
<td>0.45</td>
</tr>
<tr>
<td>Caucasian, n (%)</td>
<td>168 (64.6)</td>
<td>274 (72.7)</td>
<td>0.08</td>
</tr>
<tr>
<td>APACHE III, total</td>
<td>59.2</td>
<td>55.0</td>
<td>0.16</td>
</tr>
<tr>
<td>CCI; mean (SD)</td>
<td>2.6 (2.2)</td>
<td>2.6 (2.3)</td>
<td>0.78</td>
</tr>
<tr>
<td>Gender, female; n (%)</td>
<td>129 (49.6)</td>
<td>189 (50.1)</td>
<td>0.44</td>
</tr>
<tr>
<td>Walking aid; n (%)</td>
<td>34 (13.1)</td>
<td>21 (5.6)</td>
<td>0.006</td>
</tr>
<tr>
<td>Walking barrier; n (%)</td>
<td>10 (3.9)</td>
<td>41 (11.1)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>O2 use at home; n (%)</td>
<td>10 (3.8)</td>
<td>20 (5.3)</td>
<td>0.38</td>
</tr>
<tr>
<td>Resp. ventilator, Y; %</td>
<td>139 (53.7)</td>
<td>139 (36.9)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
Results: Change in Mobility Level

Highest Mobility Over 13 Days: Percentage (%) of Pts

Mobility level 1-7  | Mobility level 8-12  | Mobility level 13-14  | Mobility level 15-16

Pre-Intervention   | Post-Intervention

P < 0.001
# Results: Clinical Outcomes

<table>
<thead>
<tr>
<th>Outcome Factors</th>
<th>Pre-Interv. N = 260</th>
<th>Post-Interv. N = 377</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOS (days); ICU; mean (SD)</td>
<td>7.8 (9.6)</td>
<td>4.3 (5.1)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Hospital; mean (SD)</td>
<td>15.2 (16.0)</td>
<td>10.2 (8.2)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>BSI; n (%)</td>
<td>10 (3.8)</td>
<td>3 (0.8)</td>
<td>0.015</td>
</tr>
<tr>
<td>VAP; n (%)</td>
<td>4 (1.5)</td>
<td>1 (0.27)</td>
<td>0.11</td>
</tr>
<tr>
<td>DVT ≥ 1; n (%)</td>
<td>17 (6.5)</td>
<td>42 (11.1)</td>
<td>0.12</td>
</tr>
<tr>
<td>HAPU; n (%)</td>
<td>10 (3.8)</td>
<td>4 (1.1)</td>
<td>0.026</td>
</tr>
<tr>
<td>Mortality, 30-days; n (%)</td>
<td>43 (16.5)</td>
<td>45 (12.0)</td>
<td>0.12</td>
</tr>
<tr>
<td>Disposition (home); n (%)</td>
<td>67 (25.8)</td>
<td>139 (37.1)</td>
<td>0.002</td>
</tr>
<tr>
<td>Psych Profile, Mean Sc. (SD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>2.4±2.4</td>
<td>1.7±2.0</td>
<td>0.13</td>
</tr>
<tr>
<td>Depression</td>
<td>0.90±1.09</td>
<td>0.59±0.86</td>
<td>0.055</td>
</tr>
<tr>
<td>Anxiety</td>
<td>1.03±1.05</td>
<td>0.74±0.82</td>
<td>0.029</td>
</tr>
<tr>
<td>Hostility</td>
<td>0.48±0.71</td>
<td>0.35±0.51</td>
<td>0.18</td>
</tr>
</tbody>
</table>
Results – After adjusting for walking aid, walking barrier and ventilator

<table>
<thead>
<tr>
<th>Factor</th>
<th>Mean (SEM)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICU LOS, Days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-Intervention</td>
<td>7.37 (0.68)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Post-Intervention</td>
<td>4.75 (0.64)</td>
<td></td>
</tr>
<tr>
<td>Hosp LOS, Days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-Intervention</td>
<td>15.16 (0.96)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Post-Intervention</td>
<td>10.21 (1.04)</td>
<td></td>
</tr>
<tr>
<td>APACHE III Score</td>
<td></td>
<td>0.90</td>
</tr>
<tr>
<td>Pre-Intervention</td>
<td>59.0 (2.64)</td>
<td></td>
</tr>
<tr>
<td>Post-Intervention</td>
<td>58.7 (2.54)</td>
<td></td>
</tr>
</tbody>
</table>
Phase III: Post Intervention

• 480 patients enrolled during a new 4 month period
  – 260 Phase 1
  – 377 Phase 2
    – A 45% growth in volume compared to Phase 1
  – 480 Phase 3
    – A 27% growth in volume compared to Phase 2
    – An 85% growth in volume compared to Phase 1
Conclusions

• An early progressive mobility protocol in the NICU increased mobility level and improved some clinical outcomes, including length of stay

• Early mobility may improve psychological profiles of ICU patients
  —More research is needed

• A nurse driven early progressive mobility protocol should be implemented to improve patient outcomes AND improve efficiency
  —Higher census capability → higher revenue
RESEARCH QUESTION

• Is there a difference in overall infection (BSI + VAP + SSI) and specific infection rates across 4 matched strata (CTICU, MICU, SICU, and NICU) by disposable vs. reusable ECG-LW groups
  – For all patients
  – For infections that occurred > 48 hours after admission to the ICU
  – By time to infection
  – After controlling for patient characteristics and comorbidity levels that varied by groups
Randomized:

7939 Cases

3463 Reusable

Excluded:
- In hospital > 2 days before study start date: 104
- Patient on study unit < 24 hours: 120
- Extended stay on study unit after stop date: 52
- Other: 3

3184 cases

4476 Disposable

Excluded:
- In hospital > 2 days before study start date: 131
- Patient on study unit < 24 hours: 189
- Extended stay on study unit after stop date: 74
- Patient off wires: 21
- Other: 5

4056 cases
Sample – 7240 Cases

• CTICU: 3260 cases (2 matched units)
• MICU: 1484 cases (2 matched units)
  • Disposable group had larger sample size d/t randomization allocation
• SICU: 1540 cases (3 matched units)
  • Disposable group had larger sample size d/t 2 units randomized to disposable and 1 to reusable
• NICU: 956 cases (2 matched units)
  • Disposable group had larger sample size d/t randomization allocation
Data Collection

• BSI and VAP data were provided from Infection Prevention Department
  —Hospital-acquired infection data
• SSI data were provided from Society Thoracic Surgeons database:
  —Surgical Site Infection: Yes  No
  —Sternal Superficial Wound Inf.: Yes  No
  —Deep Sternal Infection: Yes  No
  —Mediastinitis: Yes  No
RESULTS

• Infections; all cases:
  – 86 (BSI, VAP or SSI) infections in 74 patients
  – Infections in 80 records
    – BSI: 61 cases (16 CLABSI)
    – VAP: 19 cases
    – SSI: 6 cases
Infection Rates

Paired RR, 1.35 (0.99, 1.83); \( P = 0.058 \)

No Differences in Infection Rate

BSI+VAP+SSI

- Disposable
- Reusable
Infection Rates: BSI + VAP + SSI*

No Differences in Infection Rate

P = 0.48
P = 0.47
P = 0.47
P = 0.72

CTICU*
MICU
SICU
NICU

Raw RR: 1.47
1.31
1.40
1.19

(0.51, 4.23)
(0.62, 2.74)
(0.52, 3.54)
(0.45, 3.14)

N = 7240

Disposable
Reusable
Infection Rates > 48 Hrs: BSI + VAP + SSI*

No Differences in Infection Rate

Paired RR (All): 1.43 (0.97, 2.12)

Raw RR:
- ALL: 1.65 (0.52, 5.20)
- CTICU*: 1.32 (0.63, 2.76)
- MICU: 1.36 (0.54, 3.43)
- SICU: 1.42 (0.51, 4.00)
- NICU: 1.36 (0.54, 3.43)
<table>
<thead>
<tr>
<th>Measure</th>
<th>Reusable Mean (95% CI)</th>
<th>Disposable Mean (95% CI)</th>
<th>Difference Mean (95% CI)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICU LOS</td>
<td>3.61 (3.44, 3.77)</td>
<td>3.62 (3.47, 3.76)</td>
<td>0.01 (-0.21,0.23)</td>
<td>0.94</td>
</tr>
<tr>
<td>Age (years)</td>
<td>62.83 (62.30,63.36)</td>
<td>62.29 (61.82,62.76)</td>
<td>-0.54 (-1.25,0.17)</td>
<td>0.13</td>
</tr>
<tr>
<td>CCI</td>
<td>2.48 (2.40, 2.55)</td>
<td>2.63 (2.56, 2.70)</td>
<td>0.15 (0.05,0.25)</td>
<td>0.002</td>
</tr>
<tr>
<td>Hosp LOS</td>
<td>21.79 (21.02,22.57)</td>
<td>22.06 (21.41,22.72)</td>
<td>0.27 (-0.75,1.28)</td>
<td>0.60</td>
</tr>
</tbody>
</table>

N = 7240; Full Sample

<table>
<thead>
<tr>
<th>Measure</th>
<th>Reusable Mean (95% CI)</th>
<th>Disposable Mean (95% CI)</th>
<th>Difference Mean (95% CI)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICU LOS</td>
<td>6.67 (6.36,6.99)</td>
<td>7.06 (6.78,7.35)</td>
<td>0.39 (-0.04,0.82)</td>
<td>0.075</td>
</tr>
<tr>
<td>Age (years)</td>
<td>63.08 (62.24,63.91)</td>
<td>62.26 (61.52,63.00)</td>
<td>-0.81 (-1.93,0.30)</td>
<td>0.15</td>
</tr>
<tr>
<td>CCI</td>
<td>2.56 (2.45,2.68)</td>
<td>2.75 (2.65,2.86)</td>
<td>0.19 (0.04,0.34)</td>
<td>0.016</td>
</tr>
<tr>
<td>Hosp LOS</td>
<td>24.86 (23.58,26.14)</td>
<td>25.51 (24.43,26.58)</td>
<td>0.65 (-1.02,2.32)</td>
<td>0.45</td>
</tr>
</tbody>
</table>

N = 2578; Sample w LOS > 48 Hrs in ICU

CCI, Charlson Comorbidity Index; LOS, Length of Stay
## Patient Characteristics

**N = 7240; Full Sample**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Level</th>
<th>Reusable Prob (95% CI)</th>
<th>Disposable Prob (95% CI)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCI 5+</td>
<td>No</td>
<td>0.85 (0.83, 0.87)</td>
<td>0.83 (0.81, 0.85)</td>
<td>0.24</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>0.15 (0.13, 0.17)</td>
<td>0.17 (0.15, 0.19)</td>
<td></td>
</tr>
<tr>
<td>Discharge Disp</td>
<td>Home</td>
<td>0.38 (0.36, 0.41)</td>
<td>0.35 (0.32, 0.37)</td>
<td><strong>0.028</strong></td>
</tr>
<tr>
<td></td>
<td>Not Home</td>
<td>0.62 (0.59, 0.64)</td>
<td>0.65 (0.63, 0.68)</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>0.55 (0.52, 0.58)</td>
<td>0.56 (0.53, 0.59)</td>
<td>0.69</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>0.45 (0.42, 0.48)</td>
<td>0.44 (0.41, 0.47)</td>
<td></td>
</tr>
<tr>
<td>Insurance Type</td>
<td>Gov’t/SP</td>
<td>0.47 (0.44, 0.50)</td>
<td>0.46 (0.43, 0.49)</td>
<td>0.62</td>
</tr>
<tr>
<td></td>
<td>Comm</td>
<td>0.53 (0.50, 0.56)</td>
<td>0.54 (0.51, 0.57)</td>
<td></td>
</tr>
<tr>
<td>Marital Status</td>
<td>Other</td>
<td>0.48 (0.45, 0.51)</td>
<td>0.46 (0.43, 0.49)</td>
<td>0.21</td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>0.52 (0.49, 0.55)</td>
<td>0.54 (0.51, 0.57)</td>
<td></td>
</tr>
<tr>
<td>Race</td>
<td>White</td>
<td>0.79 (0.76, 0.81)</td>
<td>0.77 (0.74, 0.79)</td>
<td>0.33</td>
</tr>
<tr>
<td></td>
<td>Non-White</td>
<td>0.21 (0.19, 0.24)</td>
<td>0.23 (0.21, 0.26)</td>
<td></td>
</tr>
</tbody>
</table>

CCI, Charlson Comorbidity Index; Disp, Disposition; Gov’t, Government; SP, Self Pay
## Patient Characteristics

N = 2578; Sample w LOS > 48 Hrs in ICU

<table>
<thead>
<tr>
<th>Measure</th>
<th>Level</th>
<th>Reusable Prob (95% CI)</th>
<th>Disposable Prob (95% CI)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCI 5+</td>
<td>No</td>
<td>0.85 (0.82,0.87)</td>
<td>0.83 (0.80,0.85)</td>
<td>0.25</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>0.15 (0.13,0.18)</td>
<td>0.17 (0.15,0.20)</td>
<td></td>
</tr>
<tr>
<td>Discharge Disp</td>
<td>Home</td>
<td>0.30 (0.27,0.32)</td>
<td>0.25 (0.23,0.28)</td>
<td>0.026</td>
</tr>
<tr>
<td></td>
<td>Not Home</td>
<td>0.70 (0.68,0.73)</td>
<td>0.75 (0.72,0.77)</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>0.54 (0.50,0.58)</td>
<td>0.56 (0.52,0.59)</td>
<td>0.55</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>0.46 (0.42,0.50)</td>
<td>0.44 (0.41,0.48)</td>
<td></td>
</tr>
<tr>
<td>Insurance Type</td>
<td>Gov’t/SP</td>
<td>0.46 (0.42,0.49)</td>
<td>0.45 (0.41,0.48)</td>
<td>0.72</td>
</tr>
<tr>
<td></td>
<td>Commercial</td>
<td>0.54 (0.51,0.58)</td>
<td>0.55 (0.52,0.59)</td>
<td></td>
</tr>
<tr>
<td>Marital Status</td>
<td>Other</td>
<td>0.51 (0.47,0.55)</td>
<td>0.47 (0.44,0.50)</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>0.49 (0.45,0.53)</td>
<td>0.53 (0.50,0.56)</td>
<td></td>
</tr>
<tr>
<td>Race</td>
<td>White</td>
<td>0.77 (0.74,0.80)</td>
<td>0.76 (0.72,0.79)</td>
<td>0.42</td>
</tr>
<tr>
<td></td>
<td>Non-White</td>
<td>0.23 (0.20,0.26)</td>
<td>0.24 (0.21,0.28)</td>
<td></td>
</tr>
</tbody>
</table>

CCI, Charlson Comorbidity Index; Disp, Disposition; Gov’t, Government; SP, Self Pay
# Multivariate Analyses*

## N = 7240; Full Sample

<table>
<thead>
<tr>
<th>Infection Type</th>
<th>Disposable: N [Rate/100]</th>
<th>Reusable: N [Rate/100]</th>
<th>Paired RR</th>
<th>Paired P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>All (includes SSI)</td>
<td>56 [0.379]</td>
<td>30 [0.260]</td>
<td>1.35 (0.94,1.95)</td>
<td>0.10</td>
</tr>
<tr>
<td>BSI</td>
<td>41 [0.277]</td>
<td>20 [0.173]</td>
<td>1.40 (0.91,2.16)</td>
<td>0.12</td>
</tr>
<tr>
<td>BSI + SSI</td>
<td>45 [0.304]</td>
<td>22 [0.191]</td>
<td>1.49 (0.97,2.29)</td>
<td>0.072</td>
</tr>
</tbody>
</table>

## N = 2578; Sample w LOS > 48 Hrs in ICU

<table>
<thead>
<tr>
<th>Infection Type</th>
<th>Disposable: N [Rate/100]</th>
<th>Reusable: N [Rate/100]</th>
<th>Paired RR</th>
<th>Paired P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>All (includes SSI)</td>
<td>55 [0.479]</td>
<td>28 [0.313]</td>
<td>1.43 (0.93,2.19)</td>
<td>0.10</td>
</tr>
<tr>
<td>BSI</td>
<td>40 [0.349]</td>
<td>19 [0.213]</td>
<td>1.43 (0.89,2.30)</td>
<td>0.14</td>
</tr>
<tr>
<td>BSI + SSI</td>
<td>44 [0.383]</td>
<td>20 [0.224]</td>
<td>1.59 (0.97,2.61)</td>
<td>0.067</td>
</tr>
</tbody>
</table>

* Adjusted for Comorbidity and Disposition

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No Differences in Infection Rate
Proposed 2014 National Patient Safety Goal on Alarm Management

- Critical Access Hospital (CAH) and Hospital (HAP) Accreditation Programs

NPSG.06.01.01

- Leaders establish alarm safety as a hospital priority
- Provide an annual inventory of alarms & identify the default alarm settings
- Based on the inventory, identify the most important alarms to manage
- Establish policies and procedures to manage alarms
- Educate staff about new alarm policies and procedures
Research Questions:

1. Is there a difference in the number of false/nuisance sightings/crisis calls (i.e., lead off, no telemetry, lead failure or other false alarms) identified by the Central Monitoring Unit (CMU)?

2. Is there a difference in true sightings/crisis calls identified by the Central Monitoring Unit (CMU)?
SAMPLE – 4 CT SD/Tele Units

During the 4 month study period (September - December 2011), the following schedule was followed:

– Month 1: *Both groups* received usual care ECG monitoring
– Month 2: Groups received either *reusable or disposable* ECG LWs
– Month 3: *Both groups* received usual care ECG monitoring
– Month 4: Groups received either *reusable or disposable* ECG LWs
Randomized: 2230 Patient Cases

Allocation

1696 Reusable

Excluded: In unit <4 hours: 7

112 Both ECG LWs

1745 cases

522 Disposable

Excluded: In unit <4 hours: 2

Analysis

576 cases
ANALYSIS METHODS

• *Non-inferiority* of the disposable LWs to reusable LWs used a one-sided test and a non-inferiority region of 25%
  
  —Non-inferiority tests provided evidence that disposable ECG LWs were clinically and statistically *as effective* as reusable ECG LWs.

• *Superiority* of the disposable LWs to reusable LWs used a two-sided test
RESULTS

• 1611 patients had 2330 admissions to the 4 study floors
  — 534 patients had 596 medical admissions;
  — 1175 patients had 1734 surgical admissions

• In total, 9385.5 days of ECG monitoring
  — Disposable ECG LWs, 2566 days
  — Reusable ECG LWs, 6819.5 days
Patient Characteristics; N = 1611

There was no difference between ECG LW groups in mean (95% CI) age ($P=0.29$): reusable, 65.03 (64.4, 65.6) years; disposable, 64.64 (63.9, 65.4) years

<table>
<thead>
<tr>
<th>Measure</th>
<th>Level</th>
<th>Reusable Prob (95% CI)</th>
<th>Disposable Prob (95% CI)</th>
<th>$P$ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>0.62 (0.58,0.65)</td>
<td>0.65 (0.58,0.70)</td>
<td>0.35</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>0.38 (0.35,0.42)</td>
<td>0.35 (0.30,0.42)</td>
<td></td>
</tr>
<tr>
<td>Discharge</td>
<td>Home</td>
<td>0.65 (0.61,0.68)</td>
<td>0.66 (0.60,0.72)</td>
<td>0.67</td>
</tr>
<tr>
<td></td>
<td>Not Home</td>
<td>0.35 (0.32,0.39)</td>
<td>0.34 (0.28,0.40)</td>
<td></td>
</tr>
<tr>
<td>Insurance</td>
<td>Gov’t/Self-pay</td>
<td>0.63 (0.60,0.67)</td>
<td>0.67 (0.62,0.72)</td>
<td>0.20</td>
</tr>
<tr>
<td></td>
<td>Commercial</td>
<td>0.37 (0.33,0.40)</td>
<td>0.33 (0.28,0.38)</td>
<td></td>
</tr>
<tr>
<td>Race</td>
<td>Caucasian</td>
<td>0.86 (0.83,0.88)</td>
<td>0.85 (0.80,0.89)</td>
<td>0.75</td>
</tr>
<tr>
<td></td>
<td>Non-Caucasian</td>
<td>0.14 (0.12,0.17)</td>
<td>0.15 (0.11,0.20)</td>
<td></td>
</tr>
</tbody>
</table>
## ALARMS- Overall Comparisons

<table>
<thead>
<tr>
<th>Alarm Type</th>
<th>N [Rate / 100 Pt. Days]</th>
<th>Adjusted Relative Risk</th>
<th>P-values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dispos.</td>
<td>Reus.</td>
<td></td>
</tr>
<tr>
<td>NoTele, lead fail, leads off</td>
<td>764 [29.8]</td>
<td>2791 [40.9]</td>
<td>0.71 (0.53,0.96)</td>
</tr>
<tr>
<td>Monitor*</td>
<td>751 [29.3]</td>
<td>2242 [32.9]</td>
<td>0.88 (0.62,1.24)</td>
</tr>
<tr>
<td>False crisis</td>
<td>514 [20.0]</td>
<td>1640 [24.0]</td>
<td>0.90 (0.50,1.63)</td>
</tr>
<tr>
<td>All Negative**</td>
<td>2029 [79.1]</td>
<td>6673 [97.9]</td>
<td>0.81 (0.63,1.06)</td>
</tr>
<tr>
<td>True crisis</td>
<td>501 [19.5]</td>
<td>1334 [19.6]</td>
<td>1.00 (0.63,1.58)</td>
</tr>
</tbody>
</table>

* Monitoring alarms, artifact
** All negative alarms include No tele (telemetry), leads fail, leads off, monitoring alarms (artifact) and false crisis alarms
CONCLUSIONS

• Fewer false ECG monitoring alarms
  – Decreases alarm burden for nurses, patients and monitoring personnel for monitoring and/or responding to crisis alarms
    – May reduce nurse alarm fatigue
    – May increase awareness of important alarms that require nurse action
    – Saves nursing time in assessment & adjustments
    – Saves costs of paper recordings

• Fewer unnecessary ECG alarms may improve patient satisfaction by decreasing noxious noise and stress associated with perceived ECG abnormalities
Predictors of a Fall Event in Hospitalized Patients With Cancer

Luann J. Capone, MSN, APRN, BC, James F. Bena, MS, and Anne S. Taylor

Fall prevention for hospitalized patients is an important nursing quality indicator. Fall prevention for inpatients ranges from 23% to 42% of inpatient falls resulting in injuries, with 2% to 9% resulting in serious injuries, including fractures, subdural hematomas, and other organ injuries. The primary objective of this study was to examine the predictors of a fall event in hospitalized patients with cancer. The study included 500 patients with cancer who were admitted to the hospital. The results indicated that older age, lower body mass index, and history of falls were significantly associated with a fall event. The study also highlighted the need for improved fall prevention strategies for hospitalized patients with cancer.
NEGATIVE RESULTS ARE STILL POSITIVE!

“I’m feeling great . . . I think they’re giving me the placebo.”
EXCELLENCE is…

Starting with competence and leaning into the abyss

• Learning the unknown
• Being part of new growth and development
• Working through others to move forward
Value-Based and Evidence-Based Nursing Practices
Do You Know Where You Are Going?

Are you moving at all???
**Nursing Research → Advances Practice**

**MISSION:** Improve quality and patient safety
- Improve comfort and outcomes;
- Ensure a healing environment;
- Promote nursing research and EBP;
- Promote and optimize professionals' knowledge and education

**Promoting Nursing Excellence**
Nursing Research → Advances Practice

Leader in Innovation

Leader in Advancing EBP

Branding

Organizational Credibility

Safety, Quality

Organizational Credibility

Make $$$

Save $$$

Lived Experiences
Promotes Nursing Excellence
SUMMARY:

- May drive patient-centered innovations
- Improve patient outcomes
- Create efficiencies
- Develop structures, systems and processes that facilitate optimal care delivery

Not all nursing ideas work; must assess effectiveness via research
Value Based Nursing Practices
Your footsteps can set a new course for nursing practice