Using Evidence To Improve Nursing Care Outcomes

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Impacting Delivery of Health Care Through Research

- Identify a question that if answered could substantially affect patient outcomes
- Rigorous research methods that withstand scrutiny
- Publication in interdisciplinary journals
- Benchmarking nationally and internationally is powerful
- Dissemination to influential stakeholders
- Frame findings to maximize stakeholder support
- Persistence to stay the course until change is achieved
The Problem: Variation in Healthcare Quality

• Uneven quality and safety of healthcare across institutions within every country
• Can more effective strategies be identified to guarantee the public routine access to safe care of acceptable quality and affordable costs?
• Nurses are the most numerous health professionals, and are present in every healthcare setting?
• Could nursing be an underappreciated intervention to improve health care quality and patient outcomes?
Variation in Hospital 30-day General Surgical Mortality Rate
300 Hospitals, 9 Countries, Europe

Aiken et al., Lancet 2014

MEAN: 1.23%, RANGE: 0.00%-7.23%
Patient Satisfaction: Room for Improvement Every Country

<table>
<thead>
<tr>
<th>Country</th>
<th>Rate hospital 9 or 10</th>
<th>Recommend Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium</td>
<td>47</td>
<td>60</td>
</tr>
<tr>
<td>Switzerland</td>
<td>60</td>
<td>78</td>
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<tr>
<td>Germany</td>
<td>48</td>
<td>66</td>
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<tr>
<td>Spain</td>
<td>35</td>
<td>56</td>
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<td>Finland</td>
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<td>67</td>
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<tr>
<td>Greece</td>
<td>42</td>
<td>53</td>
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<tr>
<td>Ireland</td>
<td>61</td>
<td>74</td>
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<tr>
<td>Poland</td>
<td>55</td>
<td>57</td>
</tr>
<tr>
<td>England</td>
<td>43</td>
<td>NA</td>
</tr>
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</table>
Percent Nurses Reporting Too Few Staff to Provide Quality Care

![Bar chart showing percentage of nurses agreeing that there are too few staff to get the work done in various countries. The chart includes data for Belgium, Switzerland, Germany, Spain, Finland, Greece, Ireland, Netherlands, Norway, Poland, Sweden, England, and the U.S. The highest percentage is in Belgium at 84%, and the lowest percentage is in Switzerland at 49%.]
Why Aren’t There Enough Nurses?

• Doesn’t relate to national nurse shortages
• Does relate to too few budgeted positions for nurses in hospitals
• Has hospital nurse staffing improved over time?
• Yes, but not enough to keep up with complexity of care in hospitals as length of stay is shortened and more medical interventions are introduced
Are there consequences for adverse patient outcomes of having too few nurses in health care settings?
The Quality Health Outcomes Model

Preventable Deaths in British Military Hospitals during Crimean War, 1855 by Florence Nightingale

Key
Blue – Preventable Deaths
Pink – Deaths from Wounds
Gray – Deaths, all other causes

Source: Notes on Matters Affecting the Health, Efficiency and Hospital Administration of the British Army, 1858.
Mortality at Scatari Declined Sharply After Improvements in Care Environment Under Nightingale’s Influence, 1855

Death rate peaked in February 1855 at mortality rate of 43% of cases treated. Reforms began in March and within 6 months the mortality rate was 2%

Nursing: Need for more information

• Not much comparable information on nursing across institutions within the same countries or across countries

• No information
  – Difficult to point out differences
  – Difficult to understand consequences of variation
  – Evidence-based decision-making not possible

• Lack of transparency about nursing resources is convenient as nursing is a soft target for cost reductions

• Information is the best asset for influencing change
Quality and Safety Now on Public Agenda

- More transparency in public reporting of health care outcomes
- Public reporting produces good information on patient outcomes that can be used for research
- A promising area for nursing research is to link various sources of already available information on patient outcomes with nursing information such as staffing levels usually available in most health care settings
Conceptual Advances in Nursing Outcomes Research

- Characteristics of an organization’s workforce are not fixed but modifiable through policy intervention.
- In terms of actionable interventions to improve health services outcomes, workforce holds more promise than structural elements of organizations that are difficult to modify and may not be as closely related to care outcomes as assumed.
- Re-conceptualizing traditional “demographic” characteristics of health care workers as modifiable features of organizations places the onus on employers to take responsibility for old problems on which they have been passive: nurses’ qualifications, nurse vacancies, safety.
RN4CAST: One of the Largest Studies of Hospital Quality Outcomes

- RN4CAST studied determinants of patient outcomes in 12 countries in Europe including Norway with common protocol
- Other countries studied with same protocol: USA, Canada, New Zealand, South Korea, Japan, China, Thailand, South Africa, United Arab Emirates
RN4CAST Norway

Ingeborg Stromseng Sjetne
Norwegian Knowledge Center

Inger Marrethe Holter
Norwegian Nurses Organization
Methodological Advances

• Major bias in organizational performance research is at organization participation level
• Nurses are well positioned in healthcare delivery organizations to provide reliable and valid reports on context and quality of care
• Avoid non-response at organizational level by surveying nurses at home about their practice setting, obtaining employer name, and aggregating nurse responses to individual organizations thus avoiding getting organizations’ permission to study them.
• Link nurses’ reports to independent sources of information on patient outcomes
• Possible to create panel studies of organizational behaviors over time and their impact on patient outcomes
30-Day In-Hospital Surgical Mortality Rate, General Surgery, Norway by Hospital

Norway Mean: 1.40%, Range: 0.00% - 3.54%; Europe Mean 1.39
Patient to Nurse Ratio, Norway by Hospital

Mean: 3.7, Range: 2.8 - 5.6
The Quality Health Outcomes Model

% Rating Work Environment Poor or Fair, Norway by Hospital

Mean: 29%, Range: 10% - 63%
Are there any adverse consequences for patients if organizational features of nursing vary substantially?
Each 1 patient increase in nurses’ workloads is associated with 7% increase in mortality

Aiken et al., Medical Care 2011; Lancet 2014
Disseminate Findings Widely

• Interdisciplinary journals
• News release and media dissemination plan
• Develop talking points and stay on message
• Use social media
How do we know that poorer nurse staffing accounts for higher mortality?

• Include in predictive models all the other factors that might possibly affect mortality and see what effect nursing has after taking into account non-nursing factors.

• Use natural experiments or targets of opportunity that change staffing and measure mortality before and after.

• Study panels of hospitals over time.
Patient to Nurse Ratios in California Hospitals Compared to Nurse Staffing in Other States

<table>
<thead>
<tr>
<th></th>
<th>CA</th>
<th>FL</th>
<th>NJ</th>
<th>PA</th>
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</thead>
<tbody>
<tr>
<td>MedSurg</td>
<td>4.8</td>
<td>6.0</td>
<td>6.8</td>
<td>6.5</td>
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<tr>
<td>Pediatric</td>
<td>3.6</td>
<td>4.2</td>
<td>4.6</td>
<td>4.4</td>
</tr>
<tr>
<td>All ICUs</td>
<td>2.1</td>
<td>2.3</td>
<td>2.5</td>
<td>2.3</td>
</tr>
<tr>
<td>Telemetry</td>
<td>4.5</td>
<td>5.6</td>
<td>5.9</td>
<td>5.7</td>
</tr>
<tr>
<td>Oncology</td>
<td>4.6</td>
<td>5.5</td>
<td>6.3</td>
<td>5.7</td>
</tr>
<tr>
<td>Psych</td>
<td>5.7</td>
<td>8.9</td>
<td>7.0</td>
<td>7.9</td>
</tr>
<tr>
<td>Labor/Delivery</td>
<td>2.4</td>
<td>2.8</td>
<td>2.6</td>
<td>2.8</td>
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Aiken et al., Health Services Research 2010
Results from California Ratios

- January 1, 2004 50% of hospitals in California improved nurse staffing
- Now California RN staffing is the best in the country (Aiken et al., HSR, 2010)
- No evidence mandate caused hospitals to close
- Nursing skill mix did not decline (McHugh et al., Health Affairs, 2011)
- RN staffing in safety net hospitals improved significantly (McHugh et al., Milbank Q, 2012)
- If other states had California staffing, care outcomes would be better
  - If PA & NJ hospitals staffed at California levels, the odds of death after general surgery would be reduced by 13 % resulting in thousands fewer deaths annually (Aiken et al, HSR, 2010)
- Look for new national experiments: opportunity in Queensland, Australia
Impact on Legislation and Practice

• ICU staffing of 2 patients or less per nurse has become common practice
• Half American states have some form of staffing legislation
• National governments are considering staffing legislation or regulation: Australia (Queensland and Victoria); Ireland, Wales, England
• Even if legislation is not passed, having public debate and media coverage motivates change
Building the Business Case for Adequate Nurse Staffing

- PA hospitals with better nurse staffing and low nurse burnout had 30% fewer hospital acquired infections accounting for annual savings of $68 million Cimiotti, Aiken et al, Am J Infection Control 2012

- Each additional hour of RN hospital care/day reduced inpatient poor glycemic control by 16%.
  - Deaths for patients with poor glycemic control were 16% vs 9% for matched patients McHugh, Aiken Int J Qual in Healthcare, 2011
  - Costs for inpatients with poor glycemic control average $26,000 vs $18,000 for matched patients without so a savings of $8,000 per patient by preventing poor glycemic control
Business Case: Savings Due to Better Care and Reduced Nurse Turnover More than Offset Costs of Increased Staffing
Dall et al., 2009, Medical Care

• Adverse occurrences among hospital patients in US were associated with
  – 251,000 deaths
  – 22.6 million additional hospital days
  – $41.8 billion nationally in medical care costs
• Improved nurse staffing reduces adverse occurrences and nurse turnover
• Annual savings per additional nurse added to improve staffing offset the cost of hiring additional nurses
Consequences of Not Having Enough Nurses at Hospital Bedside

• Poor clinical outcomes for patients: higher mortality, more complications, lower satisfaction, elderly are less likely to return to community living

• Higher cost of care to hospitals and nationally: preventable readmissions, costly to treat complications like infections, more long-term institutional care for frail elderly, expensive nurse turnover
Nurse Leadership and Engagement: Associated with Patient and Cost Outcomes?
Effect of Improved Nurse Staffing on Mortality Depends Upon Quality of Work Environment

Aiken et al. Medical Care, 2011.

Patient to Nurse Ratio

The difference in the odds on dying in hospitals with 8:1 and 4:1 patient/nurse ratios is -
0 percent in hospitals with poor environments;
16 percent in hospitals with mixed environments;
46 percent in hospitals with good environments.
% Somewhat/Not Confident Management Will Resolve Reported Problems,

**Norway by Hospital**

Mean: 74%, Range: 54% - 95%
Operationalizing Nurse Engagement

• Detailed information from 28,144 staff nurses 617 hospitals to create indicator of level of nurse engagement
  – **Least**: Little opportunity to participate
  – **Some**: Can serve on hospital committees
  – **More**: Involved in hospital governance
  – **Best**: Participate in hospital policy decisions and the hospital has a nurse in executive leadership
Nurses’ Lack of Confidence in Management’s Resolution of Problems in Care is Highly Associated With Nurse Engagement

- Least: 32%
- Some: 26%
- Moderate: 20%
- Highest: 14%

% Nurses not at all confident in management's resolution of care problems
High nurse engagement hospitals are more than twice as likely to be in highest quartile of high patient ratings compared to low nurse engagement hospitals.

<table>
<thead>
<tr>
<th>Nurse Engagement Levels</th>
<th>% Highest in Top Quartile of Highest Patient Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest</td>
<td>34 %</td>
</tr>
<tr>
<td>Lowest</td>
<td>15 %</td>
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</table>

High patient rating = 9 or 10 HCAHPS global rating scale
Quartile: All 464 hospitals with HCAHPS in 4 states (CA, FL, PA NJ)
Nurses have a record of success in primary care

- Many countries have shortage of primary care
- Nurses in expanded roles have demonstrated success in expanding access to primary care with high patient satisfaction and outcomes as good as or better than doctors
- Nurses have better outcomes in fostering more effective self care among chronically ill
- Nurses have less expensive practice patterns because they order fewer expensive diagnostic tests and prescription drugs
- Currently in USA,
  - APNs are estimated to provide over 800 million visits annually, important in view of primary care doctor shortage
  - APNs have facilitated the largest expansion of community health centers since LBJ; CHCs see more than 16 million people in over 7300 sites
  - More than 1500 newly established retail clinics provide 3 million visits a year
International Study of Use of Nurses in Expanded Roles

• Interviewed 3 key informants in 40 countries in North America, Europe, Australia, NZ
• All were using nurses with advanced scope of practice with varying regulatory and educational requirements
• Nurses in expanded roles were satisfactory to patients and without adverse outcomes for patients
Research Measures Used in RN4CAST Applicable to Other Settings

• Nurses’ workloads and home care agency work environments are associated with patient outcomes in home care (Jarrin, Aiken, Medical Care, 2014)

• Nurses’ workloads and work environment are associated with nursing home patient outcomes (Cho, Flynn, Aiken, JAGS, 2013)

• Having a professional nurse in general doctor practice is associated with better patient outcomes (Griffiths, Int J Nurs Studies, 2013)

• Work environment in primary care is associated with nurses’ scope of practice (Poghosyan, Aiken, J Ambulatory Management, 2014)
Summary

• Nurses positively impact access, quality, safety, patient satisfaction in every healthcare setting
• Nurses are cost-effective providers and the savings they achieve by preventing expensive complications offset their salary costs
• Adequate nurse staffing and good work environments are required to improve quality and safety of health care
• Nurse participation and leadership in healthcare returns value to the healthcare system
• We know this because of actionable research
• Investment in research on nurse workforce is essential in informing health policies