Nurse Workforce Factors and Quality of Care

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Quality of Care

Institute of Medicine

- To Err is Human: Building a Safer Health System (1999)
  - 98,000 people die every year from medical errors
- Crossing the Quality Chasm: A New Health System for the 21st Century (2001)
  - Deficiencies in the quality of our health care system
    - Fundamental change is necessary
  - Insufficient evidence to support nurse staffing ratios in hospitals
    - Call for additional research
Nurse Workload and Patient Outcomes

Over the past 2 decades nurses have reported:
- Not enough nurses in hospitals to provide quality care
- Not enough staff to get the job done
- Not enough support staff to allow time with patients

Increased nurse workload (Aiken et al, 2002):
- Each additional patient per nurse
  - 7% increase in odds of dying
  - 7% increase in failure-to-rescue
  - 23% increase in burnout
  - 15% increase in job dissatisfaction
Nurse Staffing and Patient Mortality

Surgical Patient Death Rates by Patient to Nurse Ratio:

- 4 to 1: 100
- 5 to 1: 107
- 6 to 1: 114
- 7 to 1: 123
- 8 to 1: 131

Patient to Nurse Ratio
Institute of Medicine
  - Solutions to problems that threaten patient safety
    - Nurse staffing
    - Hours worked
    - Mandatory overtime

Agency for Healthcare Research & Quality
- AHRQ meta analysis (Kane et al. 2007)
  - Evidence of association between nurse staffing and patient outcome

National Quality Forum
- Nurse-sensitive measures
There'd better be a line on that form for "short-staffed, underpaid and overworked-to-exhaustion" measures!!!
California 1990’s

- 1990’s hospital industry completely restructured care delivery
- Reduced number of hospital beds
- Replaced registered nurses with unlicensed personnel
  - Many untrained
- Managed care resulted in
  - Sicker patients
  - More complex care needs and intensive care
  - Fewer registered nurses providing care
California Nurses Association and AB 394

- **October 1999 California landmark legislation**
  - First state to mandated safe staffing in acute care units
  - California Department of Health Services established minimum staffing ratios
- **CNA was confident that AB 394**
  - Would bring nurses back into the workforce
  - Improve the quality of patient care
AB 394

AB 394, Kuehl. Health facilities: nursing staff

- “This bill would prohibit a general acute care hospital, an acute psychiatric hospital, and a special hospital, as defined, from assigning an unlicensed person to perform nursing functions in lieu of a registered nurse ....”

- “This bill would require the department, with regard to general acute care hospitals, acute psychiatric hospitals, and special hospitals, to adopt regulations that establish certain minimum nurse-to-patient ratios ...”
Nurse Staffing Laws & Legislative Activities

- 15 states & the District of Columbia have enacted nurse staffing legislation
  - CA, CT, IL, ME, MN, NV, NJ, NY, NC, OH, OR, RI, TX, VT, WA
- States have varying approaches to staffing legislation
  - Staffing plans
  - Disclosure or public reporting
  - Mandated ratios
- Nurse staffing legislation
  - Very contentious issue

Source: American Nurses Association
Research and Staffing Ratios

California mandated unit specific nurse staffing ratios

- Provided a natural experiment
- Did changing nurse staffing produce favorable results?
Implications of the California Nurse Staffing Mandate for Other States

- California mandates can be viewed as a benchmark
- Compare nurse-to-patient ratios in California hospitals to other states (NJ and PA)
- Potential consequence of California legislation
  - Nursing skill mix
- Compare outcomes for nurses and indicators of quality of care
- Compare patient outcomes
  - 30-day inpatient mortality and failure-to-rescue

Data Sources

- Survey of registered nurses
- American Hospital Association Annual Survey
- Patient discharge summary data
  - California Office of Healthcare Planning & Development (OSHPD)
  - New Jersey Department of Heath & Senior Services (NJDHSS)
  - Pennsylvania Health Care Cost Containment Council (PHC4)
Survey Methodology

- Survey of registered nurses in 3 states (CA, NJ, PA)
  - Lists from state licensing board
  - Random sample (>200,000)
  - CA and PA (40%), NJ (50%)
  - Mailed to home of nurses

- Assess nonresponse bias
  - Random sample on non-responders (n = 1,300)
  - Few demographic differences
  - No differences on perception of work environment and quality of care
Nurse Survey

- Demographics
  - Age, sex, educational attainment, years experience
- Burnout
  - Maslach Burnout Inventory-Human Services Survey
- Job satisfaction
- Intent to leave
- Work environment
  - Practice Environment Scale of the Nursing Work Index
- Quality of care
AHA Annual Survey

- **Hospital characteristics**
  - **Bed size**
    - Small (<100 beds), medium (101-250 beds), large (>251 beds)
  - **Teaching status – ratio of residents to beds**
    - No postgraduate trainees (nonteaching)
    - 1:4 or smaller trainee-to-bed ratio (minor teaching)
    - Higher than 1:4 (major teaching)
  - **Technology**
    - Open heart surgery, organ transplant or both
Patient Discharge Summary

- **Patient inclusion criteria**
  - General, orthopedic, and vascular surgery
  - Selected because they are common procedures in almost every hospital
  - Selected based on ICD-9 codes

- **Risk adjustment**
  - Elixhauser Comorbidity Index
  - Age, sex, transfer status, admission type
Outcomes of Interest

- **Nurses**
  - Job dissatisfaction
  - Burnout
  - Intent to leave

- **Patients**
  - 30-day mortality
  - Failure-to-rescue
    - Death from complications related to care provided
Statistical Analysis

- Final sample
  - Nurses 22,366
  - Patients 1,100,532
  - Hospitals 604
- Multivariate analysis
- Control for nurse, hospital and patient characteristics (130 patient-level)
- STATA 10 using robust estimation procedures to account for clustering of nurses and patients within hospitals
Nurse Findings

- **Mean hospital workloads by state**
  - **California**
    - Nurses staffed at or below the level mandated by legislation
    - Hospital mean 4.1 patients/RN
    - MS mandated by California 5:1 – study findings 4.8
  - **New Jersey & Pennsylvania**
    - All unit types workload higher than in California
    - Workload higher than the California mandated staffing levels
    - Hospital mean 5.4 patients/RN
    - MS 6.8 (NJ); 6.5 (PA)
## Average Workloads Reported by Hospital Nurses

<table>
<thead>
<tr>
<th></th>
<th>CA Mandate</th>
<th>CA</th>
<th>NJ</th>
<th>PA</th>
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<tbody>
<tr>
<td>All staff nurses</td>
<td></td>
<td>4.1</td>
<td>5.4</td>
<td>5.4</td>
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<tr>
<td>Medical-surgical</td>
<td>5:1</td>
<td>4.8</td>
<td>6.8</td>
<td>6.5</td>
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<tr>
<td>Pediatric</td>
<td>4:1</td>
<td>3.6</td>
<td>4.6</td>
<td>4.4</td>
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<tr>
<td>Intensive care</td>
<td>2:1</td>
<td>2.1</td>
<td>2.5</td>
<td>2.3</td>
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<tr>
<td>Telemetry</td>
<td>5:1</td>
<td>4.5</td>
<td>5.9</td>
<td>5.7</td>
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<tr>
<td>Oncology</td>
<td>5:1</td>
<td>4.6</td>
<td>6.3</td>
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<tr>
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<td>6:1</td>
<td>5.7</td>
<td>7.0</td>
<td>7.9</td>
</tr>
<tr>
<td>Labor/delivery</td>
<td>3:1</td>
<td>2.4</td>
<td>2.6</td>
<td>2.8</td>
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</table>
Medical-Surgical Nurses

- California mandated ratio 5:1
- Percent of nurses reporting staffing at or below the California benchmark of 5:1
  - California 88%
  - New Jersey 19%
  - Pennsylvania 33%
Pediatric Nurses

- California mandated ratio 4:1
- Percent of nurses reporting staffing at or below the California benchmark of 4:1
  - California 85%
  - New Jersey 52%
  - Pennsylvania 66%
Telemetry Nurses

- California mandated ratio 5:1
- Percent of nurses reporting staffing at or below the California benchmark of 5:1
  - California 93%
  - New Jersey 35%
  - Pennsylvania 52%
Oncology Nurses

- California mandated ratio 5:1
- Percent of nurses reporting staffing at or below the California benchmark of 5:1
  - California 90%
  - New Jersey 29%
  - Pennsylvania 55%
Psychiatric Nurses

- California Mandated ratio 6:1
- Percent of nurses reporting staffing at or below the California benchmark of 6:1
  - California 81%
  - New Jersey 56%
  - Pennsylvania 42%
Intensive Care Nurses

- California Mandated ratio 2:1
- Percent of nurses reporting staffing at or below the California benchmark of 2:1
  - California 85%
  - New Jersey 63%
  - Pennsylvania 71%
Labor & Delivery Nurses

- California mandated ratio 3:1
- Percent of nurses reporting staffing at or below the California benchmark of 3:1
  - California 94%
  - New Jersey 88%
  - Pennsylvania 89%
California Compliance Strategies

- **Patients assigned per nurse**
  - 42% of nurses reported a decrease in the number of patients assigned to them since legislation

- **Use of LVN**
  - 15% of nurses reported an increase in use of LVN
  - 25% of nurses reported a decrease in the use of LVN

- **Use of unlicensed personnel**
  - 34% of nurses reported a decrease in use of unlicensed personnel

- **Float and agency nurses**
  - 30% of nurses reported increase in floating
  - 34% of nurses reported increase use of agency nurses
Percent of nurses agreeing the following were present in their job

- **Reasonable workload**
  - California 73%
  - New Jersey 59%
  - Pennsylvania 61%

- **Adequate support services allow me to spend time with patients**
  - California 73%
  - New Jersey 59%
  - Pennsylvania 61%
Work Environment Characteristics

- Enough registered nurses in staff to provide quality patient care
  - California 58%
  - New Jersey 41%
  - Pennsylvania 44%

- Enough staff to get the work done
  - California 56%
  - New Jersey 40%
  - Pennsylvania 44%
Effects of Increased workloads

- Complaints from patients or families (OR = 1.2)
- Verbal abuse by patients (OR = 1.3)
- Verbal abuse by staff (OR = 1.3)
- Burnout (OR = 1.5)
- Job dissatisfaction (OR = 1.5)
- Work environment fair/poor (OR = 1.6)
- Quality of care fair/poor (OR = 1.8)
- Workload causes me to miss changes in patient condition (OR = 1.5)
- Workload causes me to look for a new position (OR = 1.6)
You don't look so good. Should I call the nurse?

I am the nurse!
Since Implementation of Mandated Ratios

California nurses report:

- 37% report fewer patients in their care assignments
- 71% say that quality of care has improved
- 65% report that workloads have been reduced
- 64% say nurse retention has improved
- 60% believed that nurses outside CA are more likely to come to work in the state
30-Day Inpatient Mortality
Estimated Effects of Nurse Staffing

Adding one additional patient to a nurse workload

- **California**
  - Unadjusted odds 1.10
  - Adjusted odds 1.13

- **New Jersey**
  - Unadjusted odds 1.12
  - Adjusted odds 1.10

- **Pennsylvania**
  - Unadjusted odds 1.06
  - Adjusted odds 1.06

All significant at <0.05
Failure-to-Rescue
Estimated Effects of Nurse Staffing

Adding one additional patient to a nurse workload

- California
  - Unadjusted 1.15
  - Adjusted 1.15

- New Jersey
  - Unadjusted 1.09
  - Adjusted 1.10

- Pennsylvania
  - Unadjusted 1.02 *
  - Adjusted 1.06

All significant at <0.05
Conclusion

- Nurses in CA cared for 1 fewer patient per shift than nurses in comparison states (PA and NJ) and 2 fewer on medical-surgical units.
- Most CA nurses had workloads in compliance with CA benchmark levels but only 19% of medical-surgical nurses in NJ and 33% in PA had workloads at or below the limit of 5 patients each.
- Nurse burnout, job dissatisfaction, intent to leave were significantly lower in CA hospitals than comparison states.
- If nurse workloads in PA and NJ were reduced to the levels in CA, surgical deaths would be reduced by 11% and 14%, respectively.