

# Nurse Workforce Factors and Quality of Care



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KENTUCKY 45<sup>TH</sup> IN THE NATION FOR HEALTHCARE**

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# Quality of Care



## Institute of Medicine

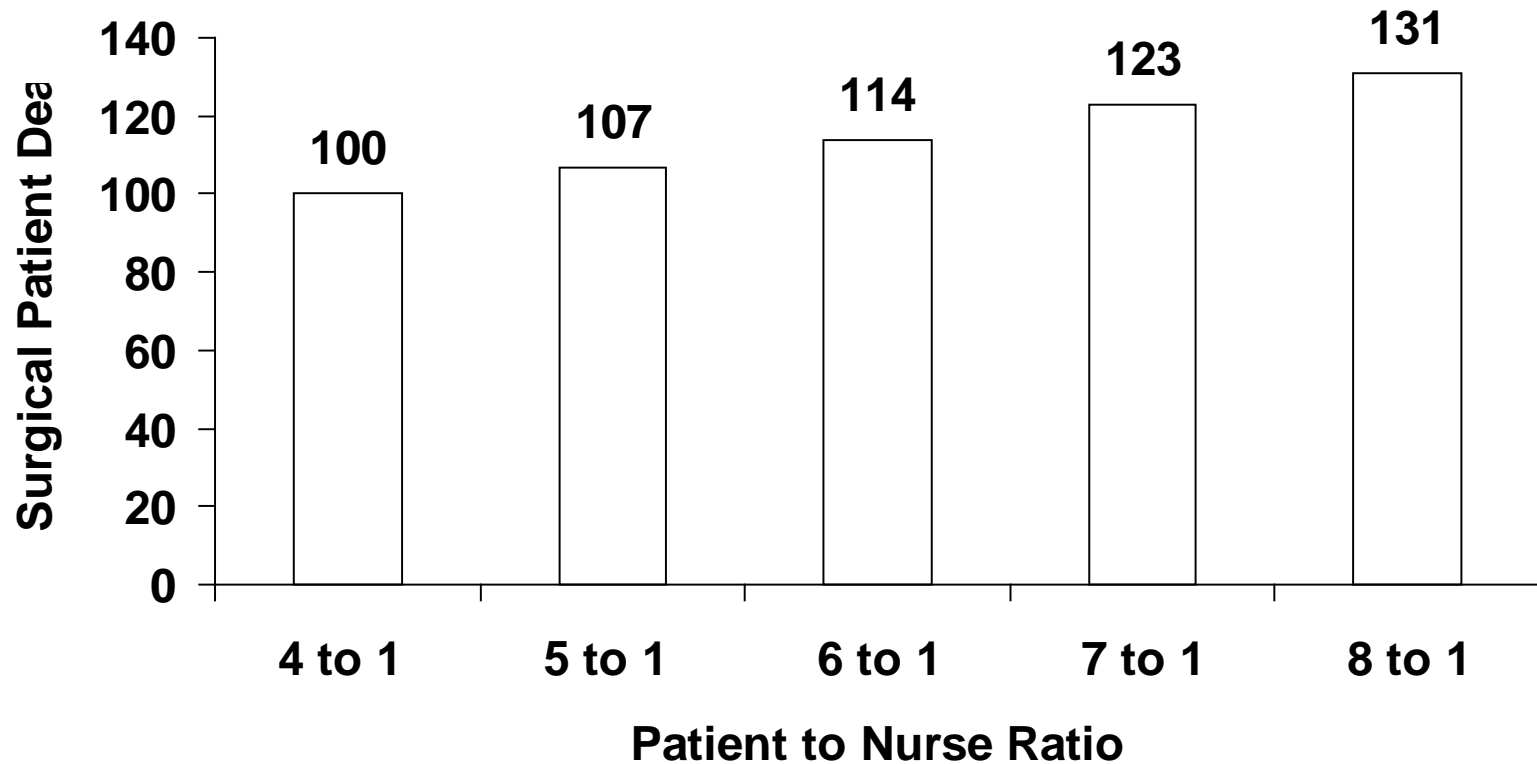
- **To Err is Human: Building a Safer Health System (1999)**
  - 98,000 people die every year from medical errors
- **Crossing the Quality Chasm: A New Health System for the 21<sup>st</sup> Century (2001)**
  - Deficiencies in the quality of our health care system
    - ✦ Fundamental change is necessary
  - 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



# IOM and more ...



## Institute of Medicine

- Keeping Patients Safe: Transforming the Work Environment of Nurses (2004)
  - Solutions to problems that threaten patient safety
    - ✦ Nurse staffing
    - ✦ Hours worked
    - ✦ Mandatory overtime

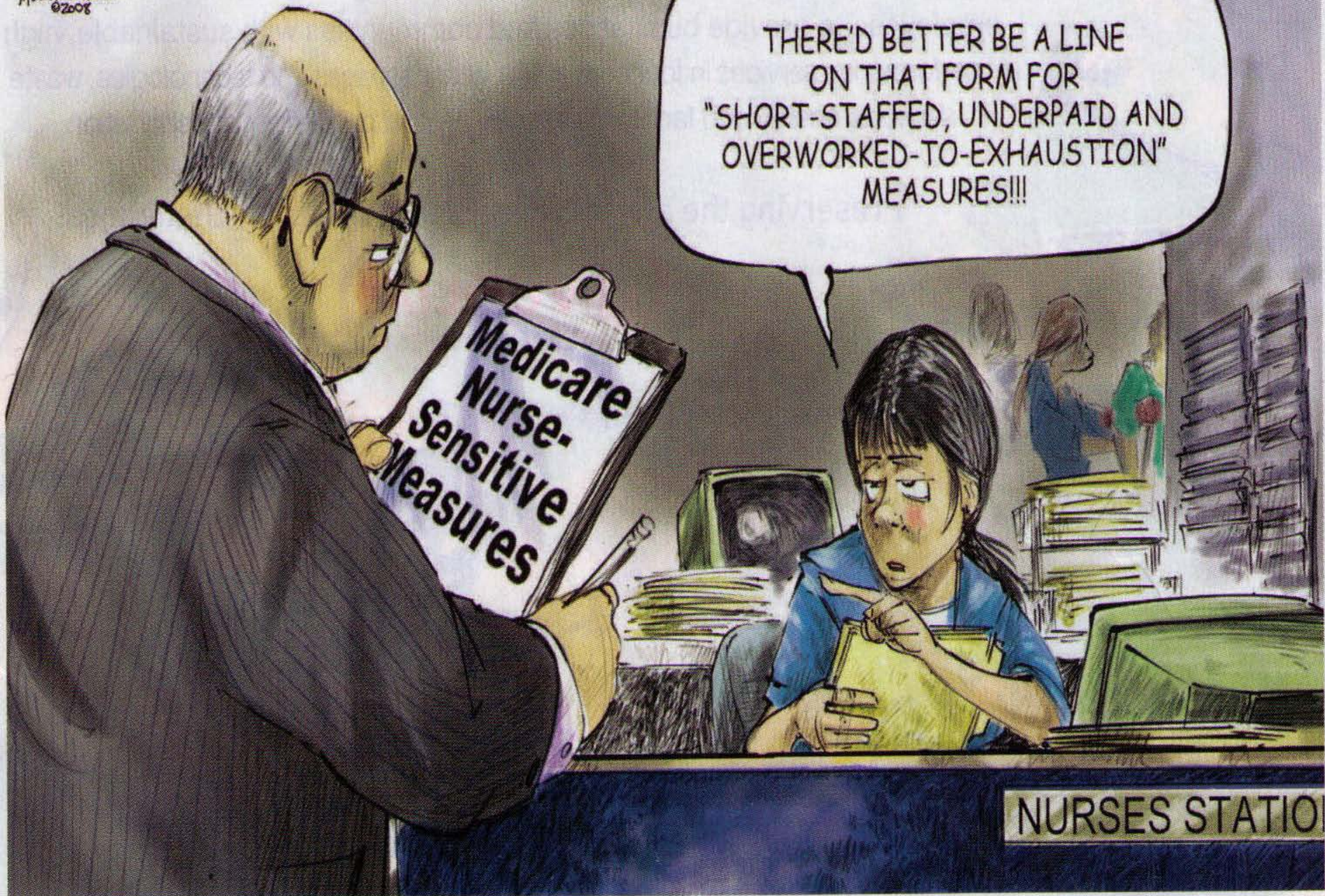
## Agency for Healthcare Research & Quality

- 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!!!

NURSES STATION



# 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

Aiken LH, Sloane DM, Cimiotti JP, Clarke SP, Flynn L., Seago JA., Spetz J., Smith HL. (2010). Implications of the California nurse staffing mandate for other states. Health Services Research. 45(2), 1-18.

# Data Sources



- Survey of registered nurses
- American Hospital Association Annual Survey
- Patient discharge summary data
  - California Office of Healthcare Planning & Development (OSHDP)
  - New Jersey Department of Health & 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 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



|                  | CA Mandate | CA  | NJ  | PA  |
|------------------|------------|-----|-----|-----|
| All staff nurses |            | 4.1 | 5.4 | 5.4 |
| Medical-surgical | 5:1        | 4.8 | 6.8 | 6.5 |
| Pediatric        | 4:1        | 3.6 | 4.6 | 4.4 |
| Intensive care   | 2:1        | 2.1 | 2.5 | 2.3 |
| Telemetry        | 5:1        | 4.5 | 5.9 | 5.7 |
| Oncology         | 5:1        | 4.6 | 6.3 | 5.7 |
| Psychiatric      | 6:1        | 5.7 | 7.0 | 7.9 |
| Labor/delivery   | 3:1        | 2.4 | 2.6 | 2.8 |

# 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

# Work Environment Characteristics



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)



# 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.

