

Center
for
Health Outcomes
and Policy Research

UNIVERSITY *of* PENNSYLVANIA
SCHOOL *of* NURSING

New Evidence on the Impact of Safe Nurse Staffing Interventions

Linda H. Aiken
Matthew D. McHugh

www.nursing.upenn.edu/chopr

Acknowledgments: QUT AU; University College Cork, IE; Universidad de los Andes, CL

Research: Lower hospital patient to nurse ratios are associated with

- **Lower mortality**
- **Fewer readmissions**
- **Shorter length of stay**
- **Fewer ICU Admissions**
- **Fewer healthcare associated infections**
- **Fewer falls with injuries and pressure ulcers**
- **Greater patient satisfaction**
- **Greater nurse job satisfaction, less burnout, greater intent to stay**



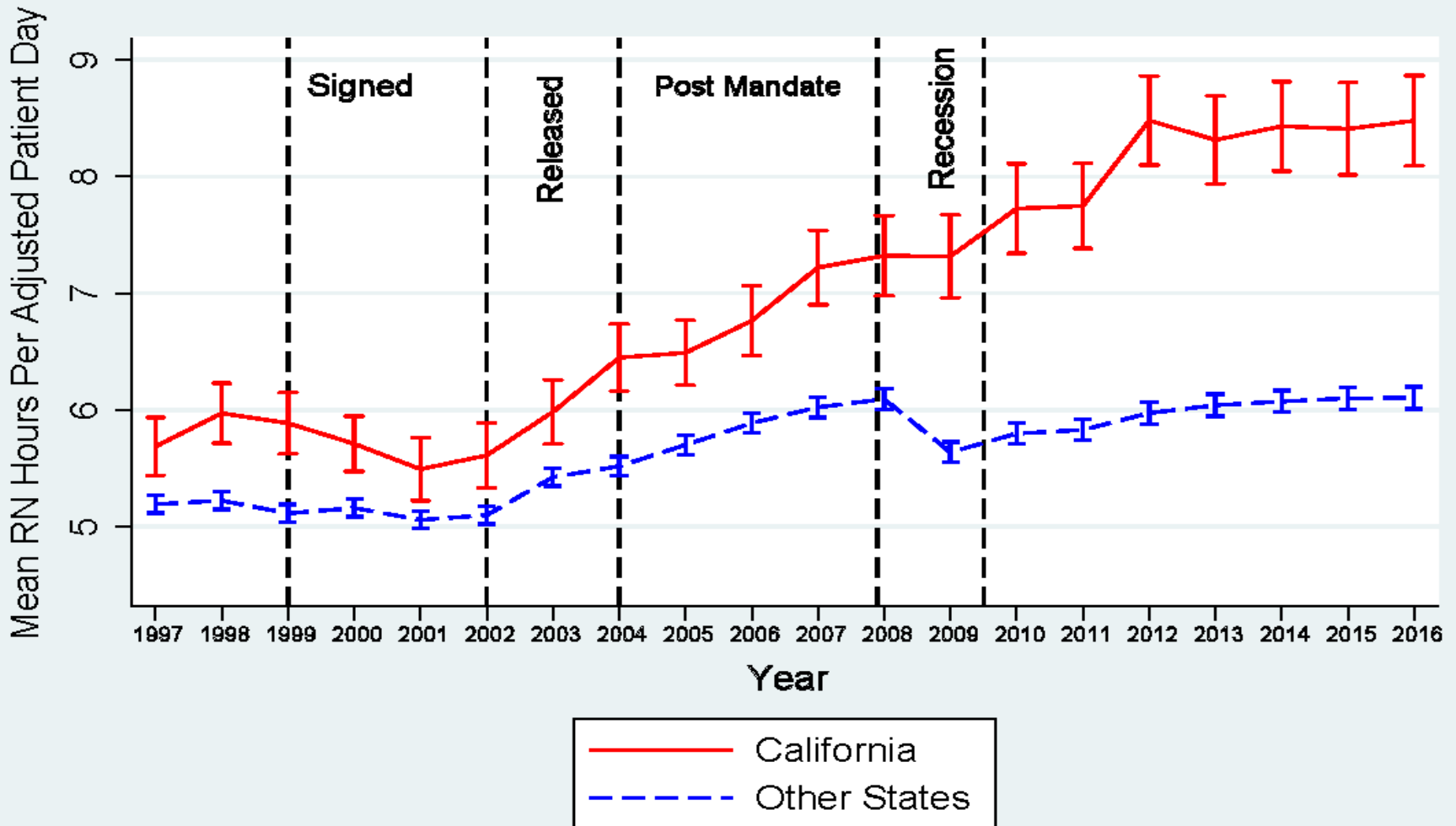
Evidence-Based Safe Nurse Staffing

- **Concludes there is strong and actionable evidence of association of nurse staffing and patient outcomes**
- **Encourages nurses and their national associations to support implementation of safe nurse staffing systems**
- **What do we know about outcomes of hospital patient to nurse ratio policy interventions?**

Nurse Staffing Policy Interventions Are Becoming More Common

- **Victoria, AU in 2000**
- **California, US in 2004**
- **Last 5 years:**
 - **Wales, UK**
 - **Scotland, UK**
 - **Ireland**
 - **Queensland, AU**
- **Other jurisdictions considering: More US states, Korea, Chile**

Nurse staffing changes in California compared to other states, 1997-2016



Nurse staffing mandates in California benefited patients

- **Penn research found no unintended adverse outcomes of staffing mandates and estimated...**

440

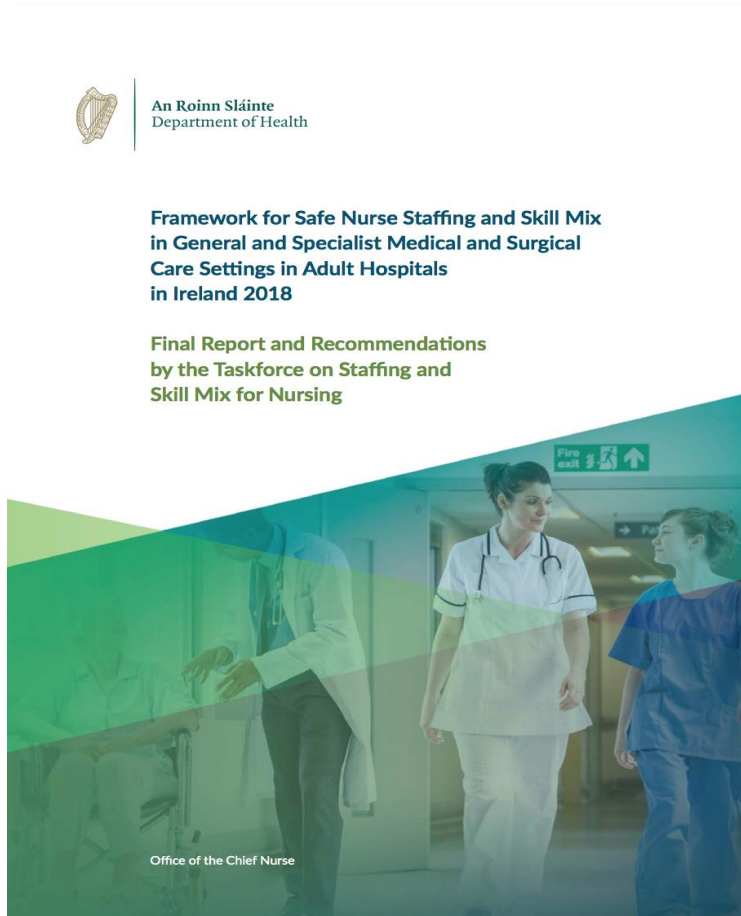
Surgical patient deaths avoided in California in first 3 years following ratio implementation

Implications of California ratios for other states in USA

Aiken, McHugh et al. Health Services Research, 2010

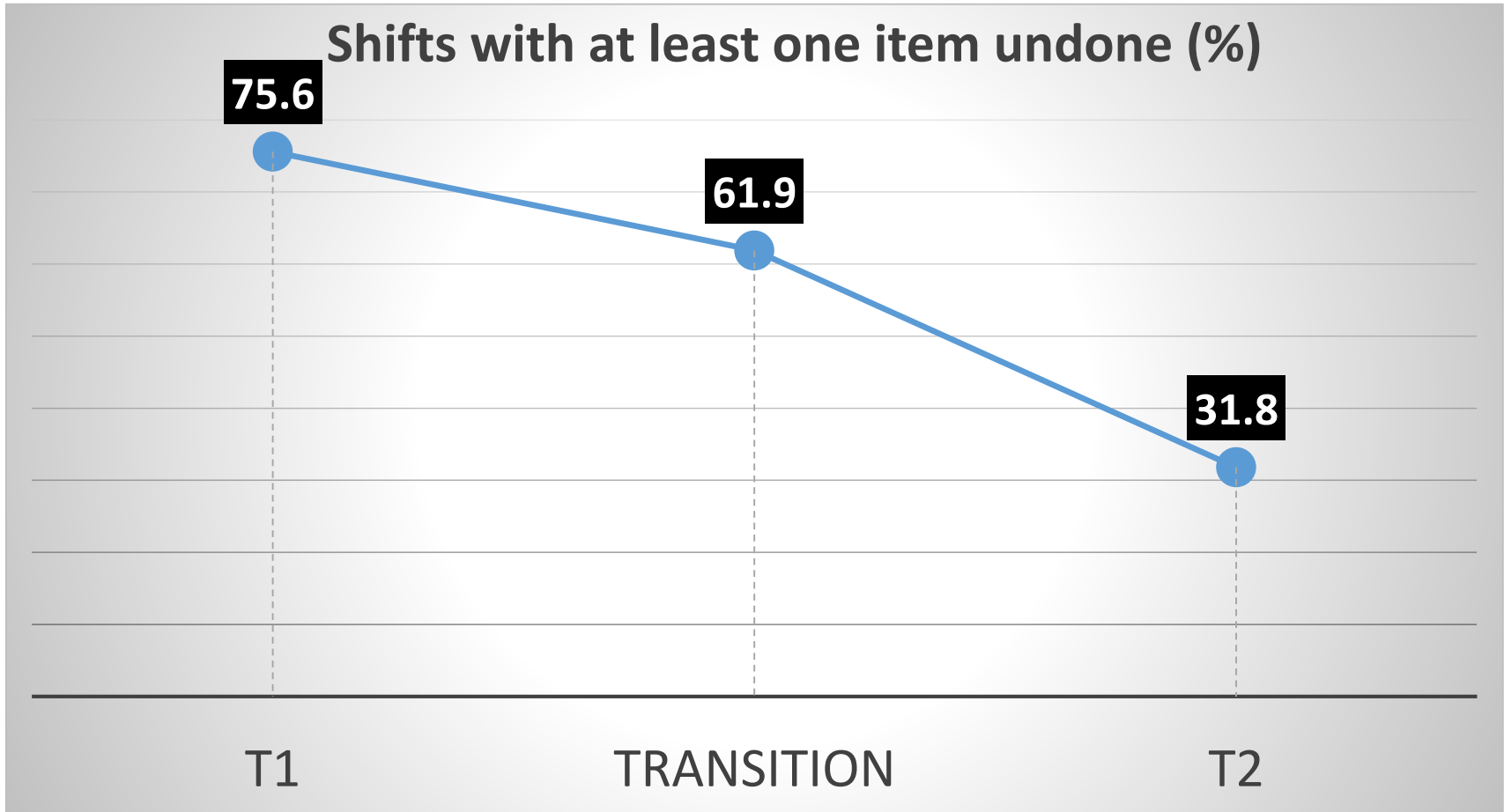
- **Nurses in Pennsylvania and New Jersey on average care for between 1-2 more patients each than nurses under staffing mandates in CA**
- **If Pennsylvania and New Jersey staffed at California mandated ratios, odds of death after general surgery estimated to be reduced by 10 to 13 % annually saving thousands of lives**
- **But lack of baseline measures in CA have resulted in contentious stakeholder debate on whether ratios work**

Ireland Framework for Safe Nurse Staffing and Skill-Mix



- Systematic, evidence-based approach to determine RN/Health Care Assistant (HCA) staffing based on patient acuity and dependency levels
- Skill mix requirement 80% RN 20% HCA
- Ward leader role is 100% supervisory
- Pilot tested by independent research before national rollout

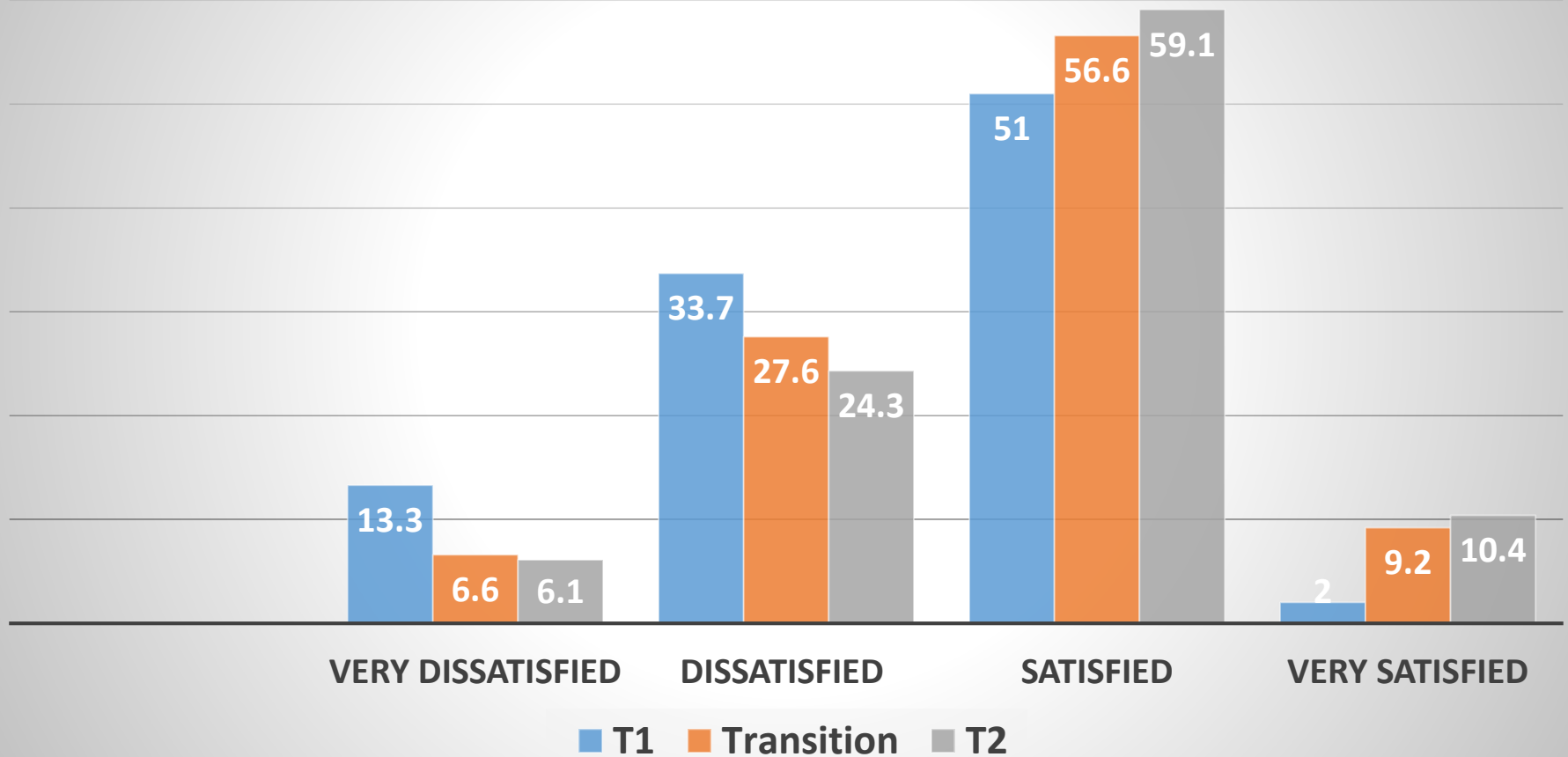
Ireland: Care Left Undone Events Before and After Pilot



Source: J Drennan, Cork

Ireland: Nurse Job Satisfaction

Increased from 53% Before to 70%



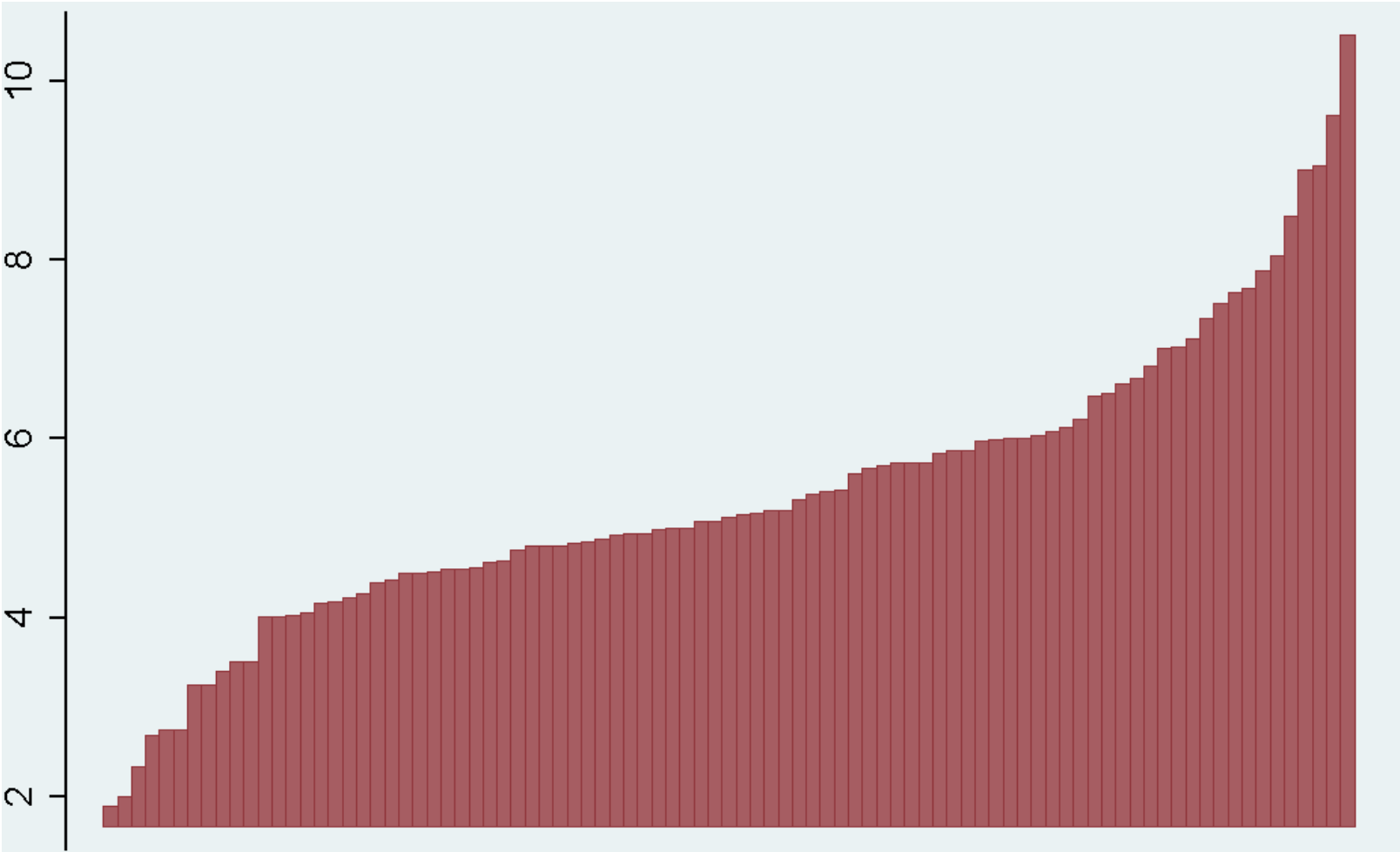
Source: Professor Jonathan Drennan, University College Cork, Ireland

Queensland AU: Exemplary Policy Process

- July 2016, Queensland Health implemented nurse-to-patient ratios in 27 public hospitals
- Ratios specify an average of 1:4 on morning/afternoon and 1:7 on night shifts in acute adult medical-surgical wards
- Prospective external evaluation with data collection and linked patient outcomes before and after implementation

Before ratios significant variation in public hospitals in patient to nurse ratios

Adult medical-surgical patients per nurse by facility



Data Source: RN4CAST-Australia survey data

Before: consequences of staffing variation for nurses and patients

- Each additional patient per nurse was associated with:

12%

Higher odds of death

2%

Longer length of stay

19%

Higher odds of nurse burnout

32%

Higher odds of poor care quality

Ratio legislation lead to improved nurse staffing

The average medical-surgical nurse saw a workload reduction of:

- 1-2 patients during the day; and**
- 1-3 patients on the night shift**

Better patient and nurse outcomes were associated with staffing improvements

Reductions of 1 patient per nurse were associated with:

9%

Lower odds of dying in the hospital

6%

Lower odds of readmission within 7-days

3%

Reduction in length of stay

7%

Reduction in nurse burnout

Public benefits of nurse staffing improvements in Queensland first 2 years

145

Deaths avoided

255

Readmissions avoided

Estimated cost savings would be ~ **\$2.2 million** (USD)

29,222

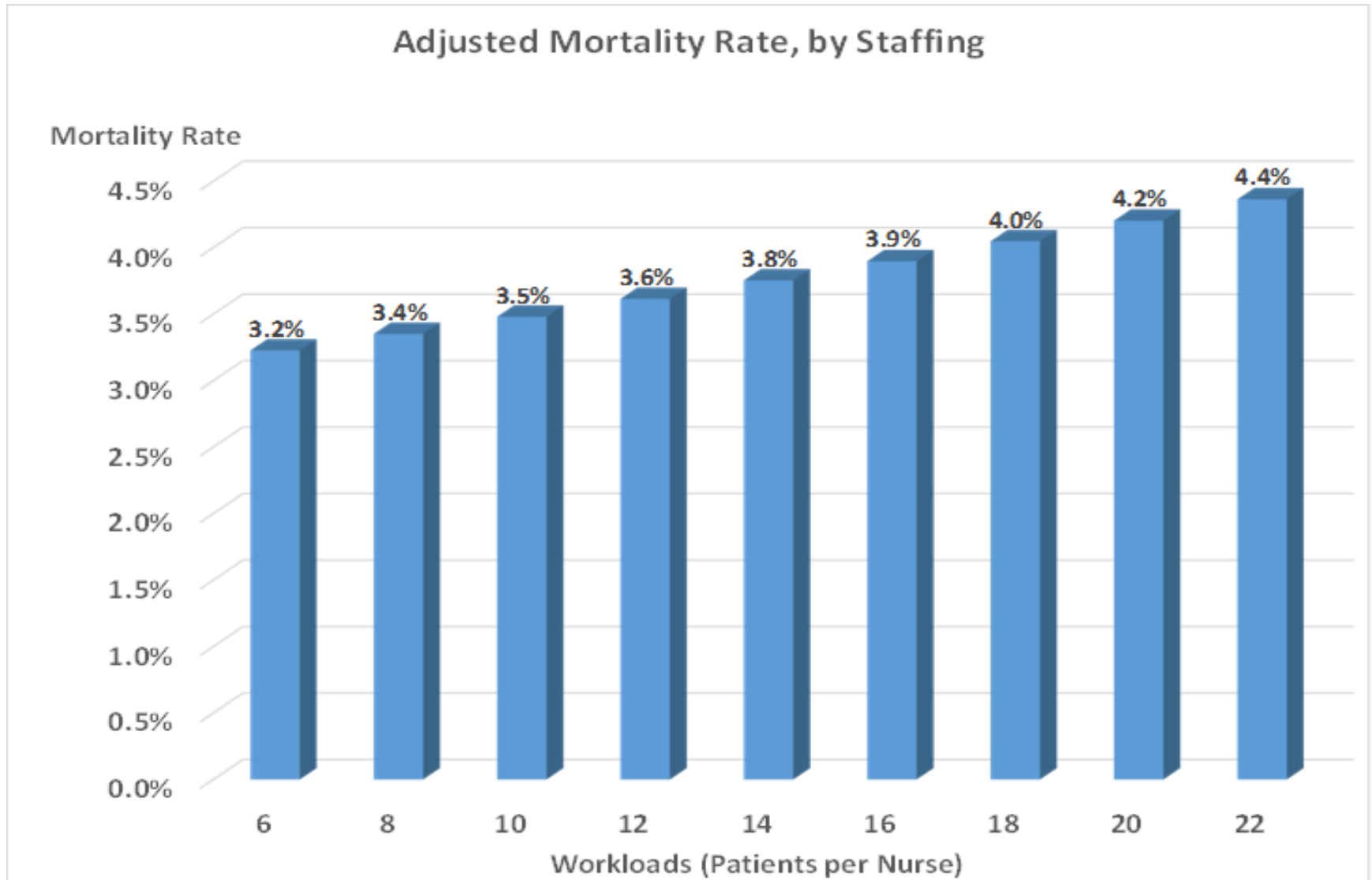
Hospital days avoided

Estimated cost savings would be ~ **\$20 million** (USD)

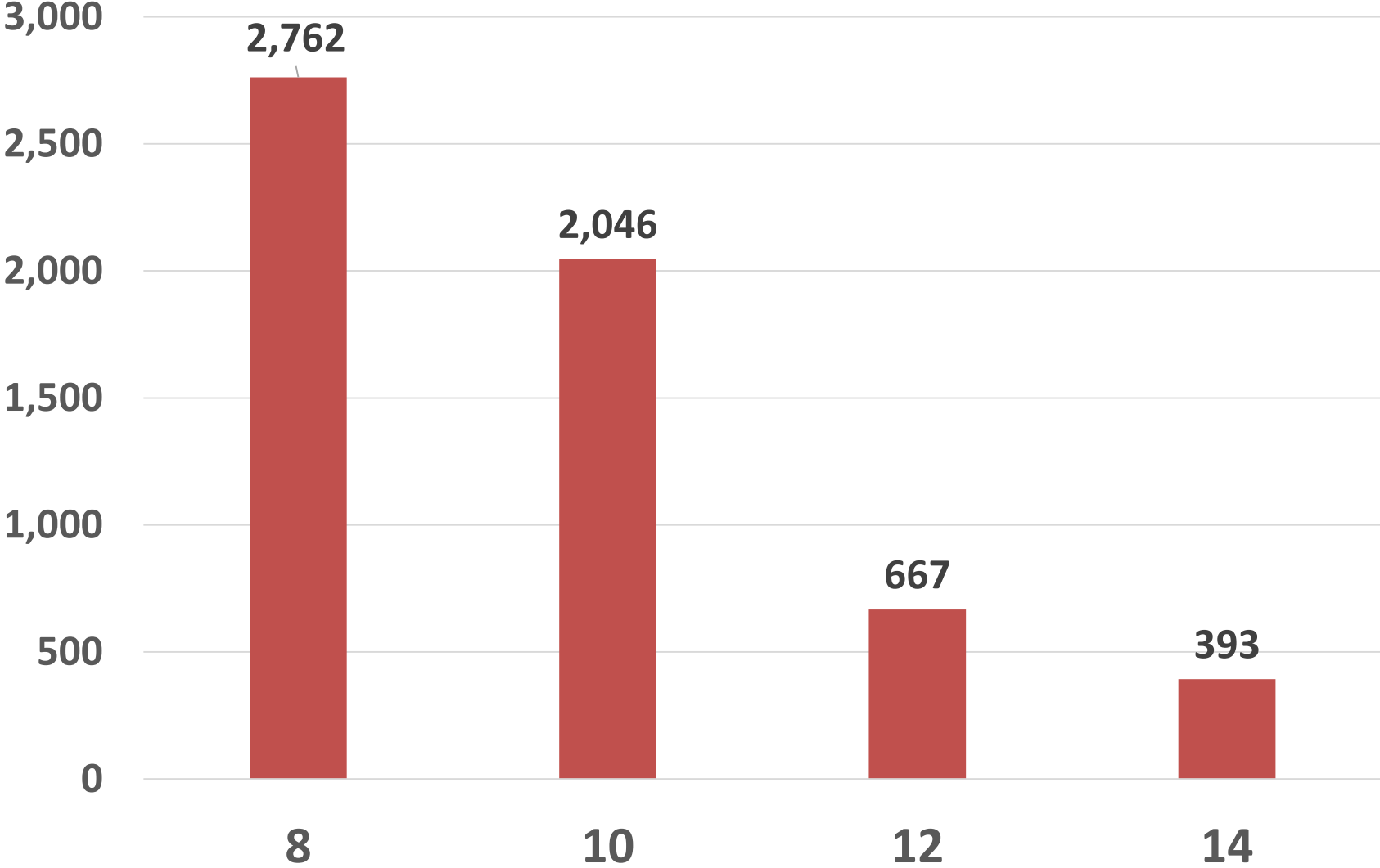
Chile: Example of Research Motivating Nurse Staffing Policy

**Investigator-Initiated Study Findings
Translated for Policy Makers**

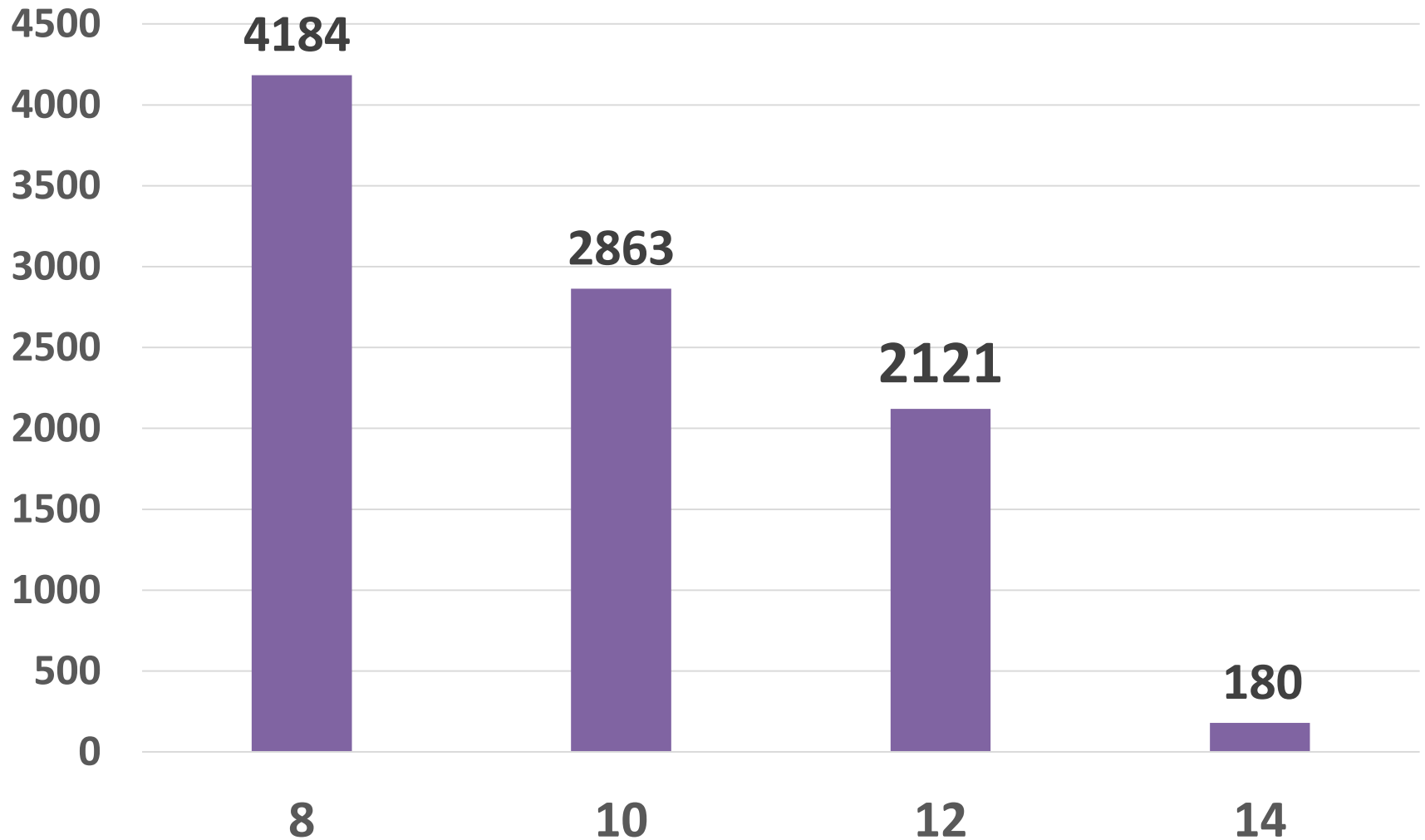
Chile: Large variation in hospital nurse staffing associated with mortality



Chile: Estimated Annual Avoided Hospital Deaths Under Different Patient to Nurse Ratios



Estimated Annual Avoided Readmissions by Different Nurse Staffing Ratios, Chile



Annual Costs of Patient-to-Nurse Ratio Improvements Less Projected Savings from Avoided Readmissions, Chile

| Ratio Patient-to-Nurse | Est. Additional Staff Costs (in millions USD) | Savings from Readmissions Avoided (in millions USD) | Net Cost* (in millions USD) |
|------------------------|---|---|-----------------------------|
| 14 | \$11.0 | \$6.0 | \$5.0 |
| 12 | \$19.7 | \$10.0 | \$9.7 |
| 10 | \$34.3 | \$15.5 | \$18.8 |
| 8 | \$58.9 | \$21.6 | \$37.3 |

Conclusions

- **Evidence suggests policies establishing safe nurse staffing standards improve patient and nurse workforce outcomes**
- **Savings from avoided readmissions, shorter length of stay, fewer complications help finance improved nurse staffing**
- **Gold standard of evidence-based policy: Inclusion of funded prospective pre and post intervention research**
- **Prospective research evaluating outcomes of staffing policies will also contribute further evidence about causal links between nursing and patient outcomes**

Come to Policy Café Today 1300-14:30

Level 5, Policy Café A, Next to Registration

- Experts from jurisdictions with nurse staffing standards to answer questions**
- Linda Aiken, Univ Penn, USA, Moderator**
- Shelley Nowlan, Chief Nurse, Queensland, AU**
- Diane Murray, Deputy Chief Nurse, Scotland**
- Gillian Knight, Deputy Chief Nurse, Wales**
- Matthew McHugh, Univ Penn, USA**
- Consuelo Cerón Mackay, Univ los Andes, Chile**