



A
C
E
R
H

AUSTRALIAN CENTRE
FOR
ECONOMIC RESEARCH
ON HEALTH

Economics and patient safety in Australian hospitals

Terri Jackson
Associate Professor, ACERH/UQ

Monash CHE Seminar Series
24 May 2007



THE UNIVERSITY OF
WESTERN AUSTRALIA





There are both human and *economic* costs

- Things 'going wrong' in hospital are a major burden on the health care budget:
 - Extended length of stay
 - Return to theatre
 - Additional days in intensive care
 - Additional days in rehabilitation
 - Readmission for treatment of hospital-acquired problems
 - Treatment of longer-term sequelae



Overview

- What do we know about patient safety and patient harms in Australia?
- What do we count as patient harm?
- How can we measure and monitor it?
- How much does it cost?
- How can use of routine data help us understand the economics of improving patient safety?
- A research plan



What do we know about Australia?

- Landmark 1995 QAHC study:
 - Careful (expensive) methods
 - Incidence: 16.6 % of multi-day inpatient stays
 - Costs: \$900 mil pa
- The newspapers:
 - Bundaberg
 - The NSW 'Cam affair'
 - WA's Royal Commission
- AS&Q Commission
 - Building on ACSQHC (1999-2005)



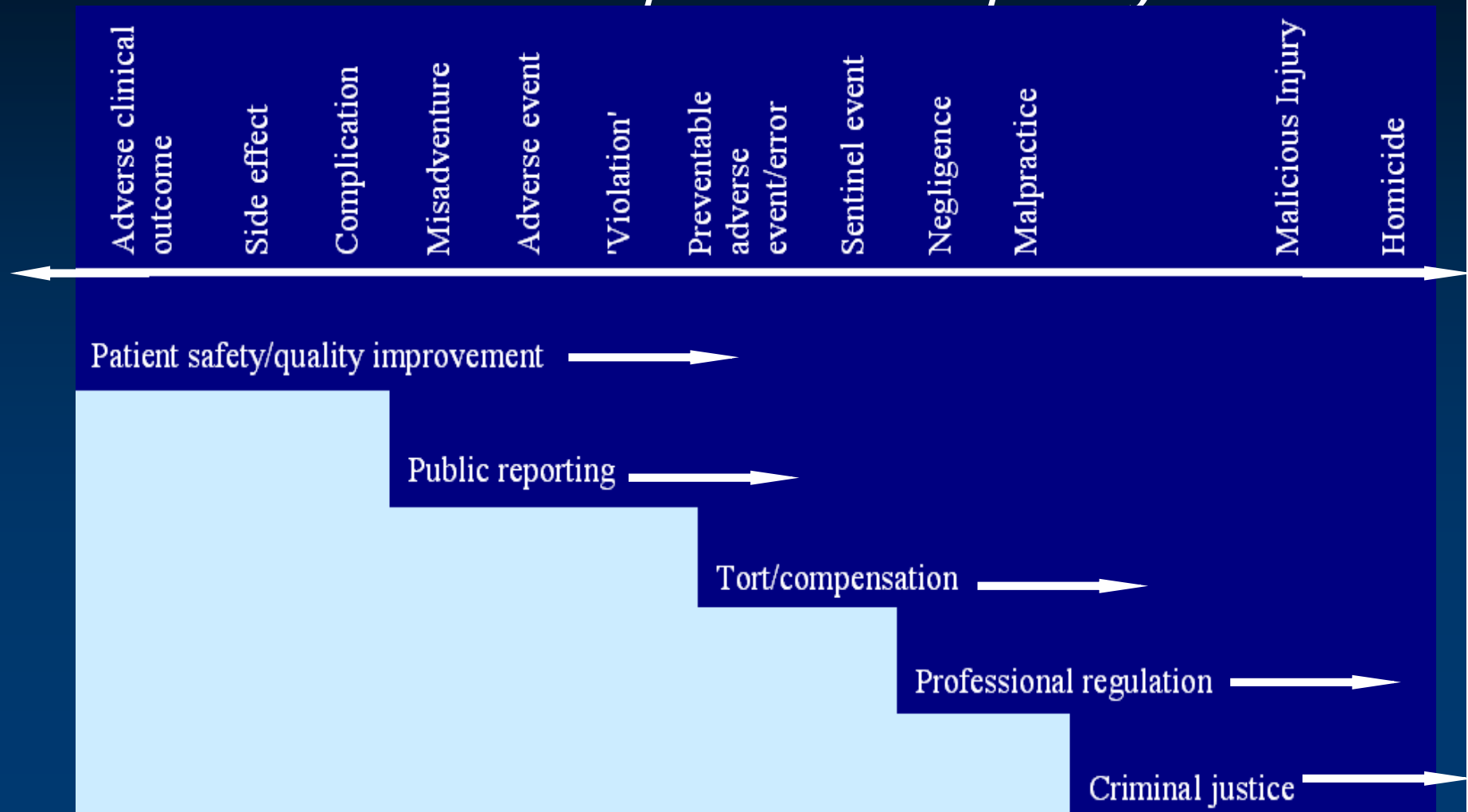
What do we 'count' as patient harm

- Multiple conflicting definitions
- Degree of blame the key factor
- Focussed on perceived 'preventability'
- Attention to the dramatic rather than the mundane



What and how you 'count' depends on why you want to count it

The Spectrum of Culpability





Using routine hospital discharge data

- ICD-10-AM has specific codes:
 - T 80.0-88.9 'Complications of surgical & medical care'
 - 'End of chapter' codes
 - Y 40-84.9 'External cause--complication of surgical or medical care'
- Australia has world-class quality hospital data
- Victorian (and now Qld) 'C-prefix' denoting:
 - Condition required treatment or extended LOS
 - Condition was not present on admission



Improving patient safety requires hospital-acquired incident cases for analysis

- Problem of distinguishing 'comorbidities' from 'adverse events'
- Incident *vs* prevalent cases
 - Not GP, nursing home, admission from another hospital
 - Overall rate in Victoria (2000/01): 8.25% (15.9 for multi-day stays)
 - Two-thirds (5.61%) were 'Incident' cases
- The 'C-prefix' adds valuable information
 - 41% of all hospital-acquired diagnoses were missed by ICD alone, eg, UTI, atrial fibrillation, pneumonia

Jackson TJ, Duckett SJ, Shephard J, & Baxter KG. 'Measurement of adverse events using 'incidence flagged' diagnosis codes' *Journal of Health Services Research and Policy*, 11 (1):21-25; 2006.



Estimation problems

- Sameday admissions
 - Less intensive coding of records
 - Symptoms of hospital-acquired diagnoses only develop at home
- Variations in 'depth' of coding
- Obstetrics largely excluded

- Direction of all problems: *underestimation*

*Jackson TJ, Duckett SJ, Shephard J, & Baxter KG. 'Measurement of adverse events using 'incidence flagged' diagnosis codes' *Journal of Health Services Research and Policy*, 11 (1):21-25; 2006.



Strengths of these data

- Strengths
 - Timely & cheap data collection
 - Standardised definitions and coding rules
 - Includes both dramatic and mundane
 - Independent reporting (not bedside)
 - Current payment incentives for thorough coding



Weaknesses of these data

- May miss same-day patient harms
 - Less coding investment
 - Symptoms appearing post-discharge
- Prefix not currently audited
- Coders may miss clues clinicians could spot
- No judgement about 'preventability'
 - Notorious in-rater reliability problems in this judgement
 - May be a 'strength' as today's routine complication becomes tomorrow's 'preventable' adverse event...



Risk factors and outcomes for hospital-acquired diagnoses (HADs)

- **Age is an important predictor of HADs**
 - 23% of patients over 85 compared to 3% in the 0-4 age group
- **Risk of HADs varies considerably by medical specialty**
 - Cardio-thoracic surgery 61% vs ENT surgery 3.6%
- **ALOS strongly associated with HADs**
 - 15.4 days with HAD vs 5.3 days without
- **ALOS both a risk factor and an outcome**
- **In-hospital mortality associated (not caused)**
 - 8% with HAD vs 1.6% without

Duckett SJ, Jackson TJ (2006). Risk factors and outcomes for incident adverse events in multi-day admissions to Victorian hospitals (under review).



Patterns of adverse events in elective surgery

- Adult, multi-day elective surgical admissions
- Incidence: 15.5% of cases
- Of all first-recorded complications:
 - Cardiac and circulatory (eg, arrhythmias and cardiac arrest) : 23.2%
 - Symptoms (eg, nausea /vomiting, fever): 17.9%
 - Surgery & anaesthesia-related (eg, haemorrhage & haematoma): 16.4%
- Highest rates by procedural chapters:
 - Respiratory procedures: 34%
 - Cardiovascular: 27.5%
- Highest rates by specific procedures:
 - CABG: 67.2%
 - Colectomy 51.6%
 - Hip arthroplasty: 41%
- Data useful in identifying broad patterns rather than investigating specific events

Moje C, Jackson TJ, McNair P. 'Adverse events in Victorian admissions for elective surgery' *Australian Health Review*, 30:3; August 2006



Key strength: links to patient costs

- **Victorian CWS data**
 - $n \approx 1$ mil records pa
 - $n \approx 35$ large public hospitals
 - Validated for use in hospital funding
- **What can cost data tell us?**
 - Economic burden of adverse events
 - Economic priorities for prevention efforts
 - Business case for:
 - prevention efforts
 - medical research
 - Cost-effectiveness analyses for:
 - Prevention programs
 - New patient safety devices and procedures



Incident cases represent a large economic burden to the health care system

- Patients with at least one C-prefixed adverse event:
 - Stay nearly 10 days longer than other patients
 - Cost \$ 6826 more per episode (controlling for DRG, age and co-morbidity)
- Extrapolated to entire hospital system:
 - At least \$511.5 mil additional cost in Victoria (2003/04)
 - Adds 18.6% to hospital expenditures
 - Around \$2 bil pa nationally
 - Even if only 40% preventable: \$200 mil pa saved in Vic; \$800 mil nationally

Ehsani JE, Jackson TJ and Duckett SJ. 'The incidence and cost of adverse events in Victorian hospitals, 2003-04' *Medical Journal of Australia*, 184;11; 5 June 2006



Re-admissions* add to this cost burden

- Current work on Victorian separations with a PDx in the T80-88.9 range of ICD-10-AM:
 - 16,045 admissions with a PDx of a 'complication of surgical or medical care'
 - \$70.6 mil pa public expenditure on these cases**

*Includes admissions for AEs from primary care and nursing homes

**McNair P, Jackson TJ. 'Costs of Victorian admissions for treatment of adverse-event principal diagnoses, 2005/06' analysis in progress, February 2007



ACERH's role: a training and research agenda

- Training for health economists in:
 - Validation and use of routine data
 - Understanding hospital-based care and costs
- Exploration of the 'quality' dimension:
 - Costs of patients with malnutrition
- Research agenda
 - Tracking sequelae of hospital AEs and their downstream costs (WA linked data)
 - Setting economic priorities (using new classification of AE's from coded data)
 - Comparison of routine *vs* voluntary sentinel event reporting (extraction algorithm for national SEs)
 - Testing of C-prefix screening algorithm
 - How do hospital-acquired diagnoses affect DRG assignment and hospital funding?
 - Costs of complications of nursing and other ward-based care



Questions? Discussion?

- t.jackson@uq.edu.au