

**6TH INTERNATIONAL SYMPOSIUM
RAPID RESPONSE SYSTEMS**

PITTSBURGH

MAY 10-11, 2010

Patient safety: the big picture

**Professor Jeffrey Braithwaite, PhD
University of New South Wales,
Australia**

**Presentation to the Sixth International Symposium
on Rapid Response Systems**

Tuesday, May 11, 2010, Pittsburgh, USA



**THE UNIVERSITY OF
NEW SOUTH WALES**



**AUSTRALIAN INSTITUTE
OF HEALTH INNOVATION**



Australian Institute of Health Innovation's mission

Our mission is to enhance local, institutional and international health system decision-making through evidence; and use systems sciences and translational approaches to provide innovative, evidence-based solutions to specified health care delivery problems.

<http://www.med.unsw.edu.au/medweb.nsf/page/ihi>



THE UNIVERSITY OF
NEW SOUTH WALES



AUSTRALIAN INSTITUTE
OF HEALTH INNOVATION



Leadership team

- **Professor Jeffrey Braithwaite**

Foundation Professor and Director, Australian Institute of Health Innovation, University of New South Wales

- **Professor Enrico Coiera**

Professor and Director, Centre for Health Informatics, Australian Institute of Health Innovation, University of New South Wales

- **Professor Ken Hillman**

Professor, Simpson Centre for Health Services Research, Australian Institute of Health Innovation, University of New South Wales



THE UNIVERSITY OF
NEW SOUTH WALES



AUSTRALIAN INSTITUTE
OF HEALTH INNOVATION



Background - the Centre

*The Centre for Clinical Governance Research undertakes **strategic research, evaluations and research-based projects** of national and international standing with a core interest to **investigate health sector issues of policy, culture, systems, governance and leadership.***

<http://www.med.unsw.edu.au/medweb.nsf/page/ClinGov> About



THE UNIVERSITY OF
NEW SOUTH WALES



AUSTRALIAN INSTITUTE
OF HEALTH INNOVATION



Research personnel: NIH [NHMRC] Program Grant

Chief Investigators

Professor Jeffrey Braithwaite

Professor Johanna Westbrook

Professor Enrico Coiera

Professor Bill Runciman

Professor Ric Day



THE UNIVERSITY OF
NEW SOUTH WALES



AUSTRALIAN INSTITUTE
OF HEALTH INNOVATION



But first, an audience poll

- **Poll question #1:**

- Who is **pessimistic** about patient safety?
- [that we realistically **cannot** get levels of iatrogenic harm down, ie we cannot reduce rates of adverse events and near misses, and they might even be going up, based on existing strategies]

- **Poll question #2:**

- Who is **optimistic** about patient safety?
- [that we **can** get levels of iatrogenic harm down perhaps by a considerable amount, ie we will or can reduce rates of adverse events and near misses, based on existing strategies]



Part 1: We have thrown a lot at patient safety ...



THE UNIVERSITY OF
NEW SOUTH WALES



AUSTRALIAN INSTITUTE
OF HEALTH INNOVATION



What are we doing?

- Safety improvement programs [training]
- Root cause analyses
- Incident monitoring
- Met/RRTs
- Accreditation
- Credentialling
- Standards
- Policy
- Guidelines
- Procedures, checklists
- Restructuring
- Inquiries when things go wrong
- Try harder
- Hope
- [Insert your favoured strategy here]



Part 2: What we are throwing these strategies at ...



THE UNIVERSITY OF
NEW SOUTH WALES



AUSTRALIAN INSTITUTE
OF HEALTH INNOVATION



First, some context

Your chances of:	
Matching 3 numbers in international lotteries	1 : 359
3 numbers plus the POWERBALL	1 : 13,644
4 numbers	1 : 19,030
4 numbers plus the POWERBALL	1 : 723,144
5 numbers	1 : 5,138,133
5 numbers plus the POWERBALL	1 : 195,249,054

Source: http://www.allottery.com/powerball_lottery_results.php



THE UNIVERSITY OF
NEW SOUTH WALES



AUSTRALIAN INSTITUTE
OF HEALTH INNOVATION



The quality and safety problem

The incidence of:	
Experiencing an adverse event in an intensive care unit [1]	1 : 2
Being injured if you fall in hospital [2]	1 : 2
An adverse event in ICU being serious enough to cause death or disability [3]	1 : 10
Experiencing an adverse event or near miss in hospital [4]	1 : 10
Experiencing a complication from a medication or drug [5]	1 : 20
Developing a hospital acquired infection [6]	1 : 30

[1] Andrews et al, 1997; [2] Schwendimann et al, 2006; [3] Andrews et al, 1997; [4] CCGR data, average across studies in Australia, Canada, Denmark, New Zealand, UK and USA; [5] Andrews et al, 1997; [6] Pittet, 2005;



THE UNIVERSITY OF
NEW SOUTH WALES



AUSTRALIAN INSTITUTE
OF HEALTH INNOVATION



The quality and safety problem

The incidence of:	
Being harmed while in hospital [7]	1 : 300
Dying from a medication error in hospital (as an inpatient) [8]	1 : 854
Having a retained foreign body after surgery (intra-abdominal) [9]	1 : 1,000
Being subjected to wrong site surgery [10]	1 : 112,999
Dying as a result of anaesthesia [11]	1 : 250,000
Contracting HIV as a result of a screened blood transfusion [12]	1 : 2,600,000

[7] Multiple sources of data, averaged by CCGR across studies in Australia, Canada, Denmark, New Zealand, UK and USA; [8] Kohn et al, 1999; [9] Gawande et al, 2003; [10] Kwann et al, 2006; [11] JCAHO, 1998; [12] Lackritz et al, 1995.



The quality and safety problem

Assume a 700 bed tertiary referral hospital:

- 5,000 staff
- 75,000 inpatients annually
- 50,000 of these are same day cases
- complex casemix
- lots of teaching and research
- a busy, productive place



THE UNIVERSITY OF
NEW SOUTH WALES



AUSTRALIAN INSTITUTE
OF HEALTH INNOVATION



13

The quality and safety problem

The results applied here would mean:

- 7,500 patients would experience an adverse event - some detectable, some not noticeable or attributable
- many would be infections, falls and medication errors
- some 1,500 patients would suffer a major disability
- and 350 would die from iatrogenia



The quality and safety problem

- A patient would suffer from wrong site surgery perhaps every 2 years or so
- Someone would die as a result of anaesthesia on average every 5 years or so
- There would be other more exotic examples of adverse events, depending on specialty



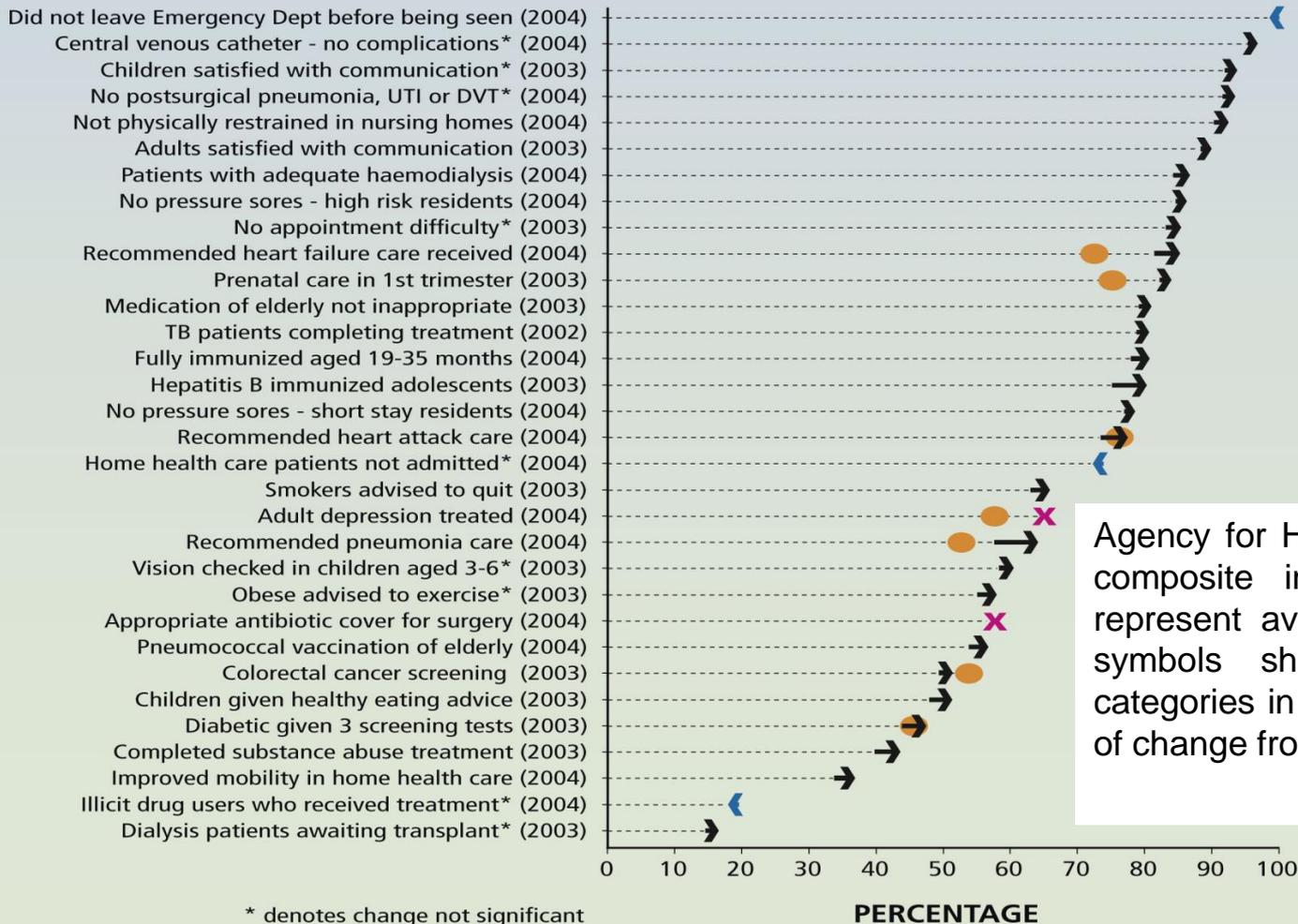
The quality and safety problem

- Proportion of recommended care delivered to adults in the United States of America: 54.9% [95% CI 54.3-55.5%] [McGlynn et al NEJM 2003]
- Proportion of indicated care delivered to children in ambulatory settings in the United States of America: 46.5% [95% CI 44.5-48.4%] [Mangione-Smith et al NEJM 2003]



The quality and safety problem

% OF ELIGIBLE PATIENTS WHO RECEIVED RECOMMENDED OR EXPECTED CARE



Agency for Healthcare Research & Quality composite indicators. Length of arrows represent average change per year. Oval symbols show triangulated data from categories in Fig. 1, extrapolated using rate of change from the equivalent category .

Part 3: Are we making headway?



THE UNIVERSITY OF
NEW SOUTH WALES



AUSTRALIAN INSTITUTE
OF HEALTH INNOVATION



Not at the systems level

- No known study to show a health system has improved across the board
- But isolated or notable changes
 - Pronovost's central line study [Pronovost et al 2006]
 - Surgical checklists study [Haynes et al 2009]
 - Hand hygiene [in some places]
 - Handover [in some places]
 - RCAs [in some places]



Not at the systems level

- METs/RRTs [some better than others]
- Improvements in clinicians' recognition of the importance of quality and safety
- The use of adverse event reporting systems and electronic charts
- The handling of dangerous materials and drugs eg anticoagulants, antibiotics and anticancer drugs [Degos et al BMJ 2009]



Not at the systems level

- But not systemic, widespread or ubiquitous change
- In short: progress has been painfully slow

Part 4: Where are we now?



THE UNIVERSITY OF
NEW SOUTH WALES



AUSTRALIAN INSTITUTE
OF HEALTH INNOVATION



Now

- We have done all these
- And we still have the ‘wicked problem’ of patient safety
- I.e., error rates and near misses are still running, as far as we know, at 10% of admissions



Now

- What's a wicked problem?
- *“a problem that is difficult or impossible to solve because of incomplete, contradictory, and changing requirements that are often difficult to recognize. Moreover, because of complex interdependencies, the effort to solve one aspect of a wicked problem may reveal or create other problems”.*



Now

- Wicked problems in the language of systems theory, are hard to ‘tame’
- Unlike problems in chess, mathematics or even gene research, many of which are tameable ie they are *solvable in principle*



Part 5: International colleagues and the WHO are not standing still though [Jha et al QSHC 2010]

[Let's use this as a checklist for
the contributions that MET/RRSs
make]



THE UNIVERSITY OF
NEW SOUTH WALES



AUSTRALIAN INSTITUTE
OF HEALTH INNOVATION



26

WHO topics of investigation [which ones do METs/RRSs contribute?]

Structural domain

1. Organisational determinants and latent failures
2. Structural accountability: the use of accreditation and regulation to advance patient safety
3. Safety culture
4. Inadequate training and education, staffing issues



WHO topics of investigation

Structural domain

5. Stress and fatigue
6. Production pressures
7. Lack of appropriate knowledge and availability of knowledge, transfer of knowledge
8. Devices, procedures without human factors engineering



WHO topics of investigation

Process domain

9. Errors in the process of care through misdiagnosis
10. Errors in the process of care through poor test follow-up
11. Errors in the structure and process of care: counterfeit and substandard drugs



WHO topics of investigation

Process domain

12. Measures of patient safety

13. Errors in process: unsafe injection practices



WHO topics of investigation

Outcomes domain

14. Adverse events and injuries due to medical devices
15. Adverse events due to medications
16. Adverse events due to surgical errors
17. Adverse events due to healthcare associated infections
18. Adverse events due to unsafe blood products



WHO topics of investigation

Outcomes domain

19. Patient safety among pregnant women and newborns
20. Patient safety concerns – older adults
21. Adverse events due to falls in hospitals
22. Injury due to pressure sores and ulcers
23. How to bring the patient voices into the patient safety agenda



Part 6: What more do we need? Delving deeper



THE UNIVERSITY OF
NEW SOUTH WALES



AUSTRALIAN INSTITUTE
OF HEALTH INNOVATION



What more do we need?

- Understanding three aspects to patient safety:
- The magnitude of the predicament ✓✓✓
- The categories of harm ✓✓
- How to tackle and resolve some of these deep problems ✗



What more do we need?

- Partnerships
- More involvement, ownership, improvement, trust
- Better leadership, management, cultures, teamwork
- Harness IT more effectively
- Social movements [eg, IHI initiatives]



What more do we need?

- METs and RRSs: where do they fit in?
- What contributions do they make to patient safety, the big picture?

METs and RRTs

- Systematic review and meta-analysis of RRTs [Chan et al Archives of Internal Medicine 2010]
- Examined: 18 studies involving 1.3 million admissions
- Found: implementation of an RRT associated with a 33.8% reduction [children: 37.7%] in cardiopulmonary arrest outside ICU



METs and RRTs

- Not associated with lower hospital mortality rates in adults; 21.4% reduction in children
- Conclusion: RRTs have broad appeal, but evidence to support their effectiveness in reducing hospital mortality is lacking



METs and RRTs

- MERIT study: relationship between early emergency team calls and serious adverse events [Chen et al Critical Care Medicine 2009]
- Examined: 11,242 serious adverse events and 3,700 emergency team calls



METs and RRTs

- Found: for every 10% increase in the proportion of calls there was a:
 - 2.0 reduction in unexpected cardiac arrests per 10,000 admissions
 - 2.2 reduction in overall cardiac arrests per 10,000 admissions
 - 0.9 reduction in unexpected deaths



METs and RRTs

- Conclusion: More MET calls, fewer cardiac arrests and unexpected deaths
- Early review of acutely ill ward patients by an emergency team is desirable



A final comment on METs/RRTs/RRSs



THE UNIVERSITY OF
NEW SOUTH WALES



AUSTRALIAN INSTITUTE
OF HEALTH INNOVATION



- “I suppose the process of acceptance will pass through the usual four stages:
- This is worthless nonsense,
 - This is an interesting, but perverse, point of view,
 - This is true, but quite unimportant,
 - I always said so.”

[JBS Haldane Journal of Genetics 1963; 58(3), 464]



THE UNIVERSITY OF
NEW SOUTH WALES



AUSTRALIAN INSTITUTE
OF HEALTH INNOVATION



Part 7: Audience questions



THE UNIVERSITY OF
NEW SOUTH WALES



AUSTRALIAN INSTITUTE
OF HEALTH INNOVATION



Audience questions

- In the case of your HCO, has your MET/RRT demonstrably delivered improved patient safety and care?
- How do you, or would you, know this is the case?
- What strategies will you develop to strengthen your MET/RRT's links to improved safety and care?



THE UNIVERSITY OF
NEW SOUTH WALES



AUSTRALIAN INSTITUTE
OF HEALTH INNOVATION





THE UNIVERSITY OF
NEW SOUTH WALES



AUSTRALIAN INSTITUTE
OF HEALTH INNOVATION

ClinGov
46

Useful references

- Chen J, Bellomo R, Flabouris A, Hillman K, Finfer S, MERIT investigators and the ANZICS Clinical Trials Group. The relationship between early emergency team calls and serious adverse events. *Crit Care Med.* 2009;37(1):148-53.
- Chan PS, Jain R, Nallmothu BK, Berg RA, Sasson C. Rapid Response Teams: A systematic review and meta-analysis. *Arch Intern Med.* 2010;170(1):18-26.



Useful references

- Jha AK, Prasopa-Plaizier, N, Larizgoitia I, Bates DW. Patient safety research: an overview of the global evidence. Qual Saf Health Care 2010;19:42-47.



THE UNIVERSITY OF
NEW SOUTH WALES



AUSTRALIAN INSTITUTE
OF HEALTH INNOVATION

ClinGov
48