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MEDICINE,  
NURSING AND  
HEALTH SCIENCES

# Preventing falls in hospitals and aged care facilities: Innovation, policy, practice and negative trials

Prof Terry Haines

Head of School

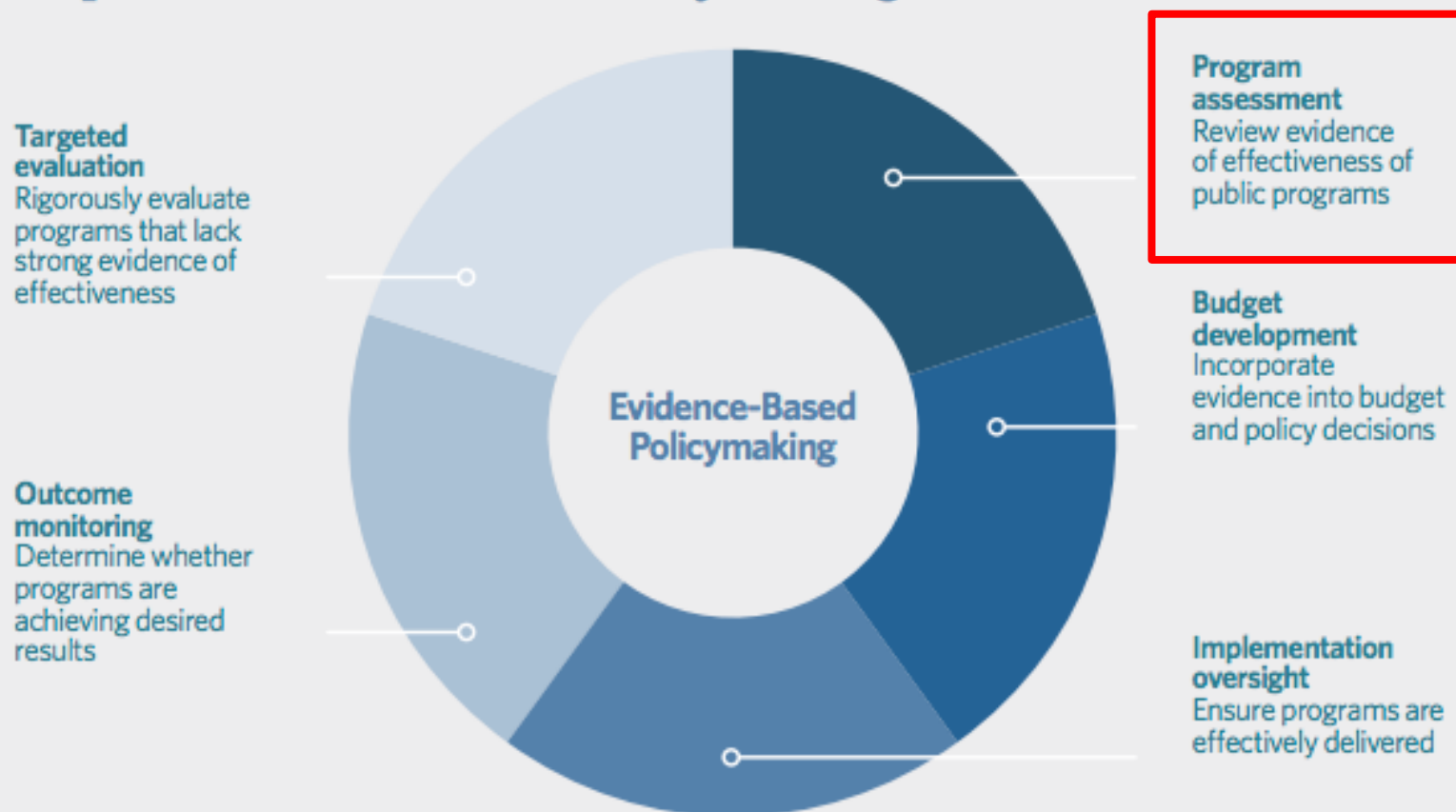
School of Primary and Allied Health Care

Monash University

Melbourne, VIC



Figure 1  
Steps in Evidence-Based Policymaking

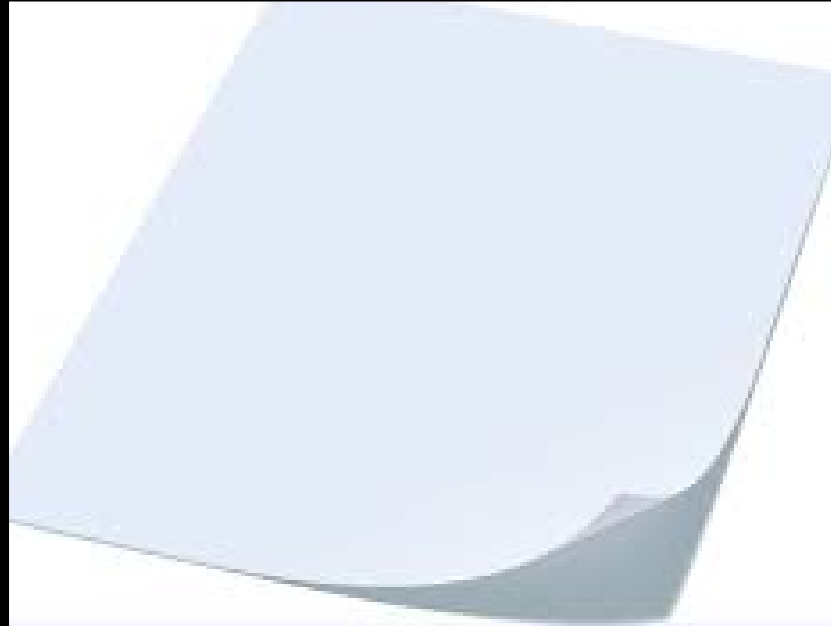


Evidence-Based Policymaking: A guide for effective government. A report from the Pew-MacArthur Results First Initiative, Nov 2014, <https://www.pewtrusts.org/~media/assets/2014/11/evidencebasedpolicymakingaguideforeffectivegovernment.pdf>

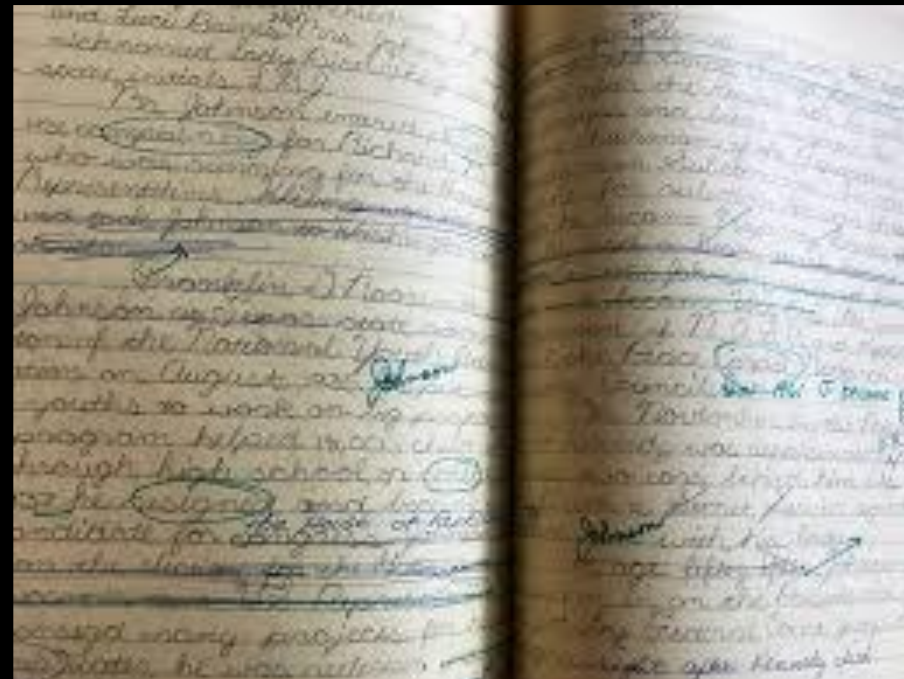
- Here is the evidence upon which I base my policy...



How I think I approach trying to rationally form an opinion...



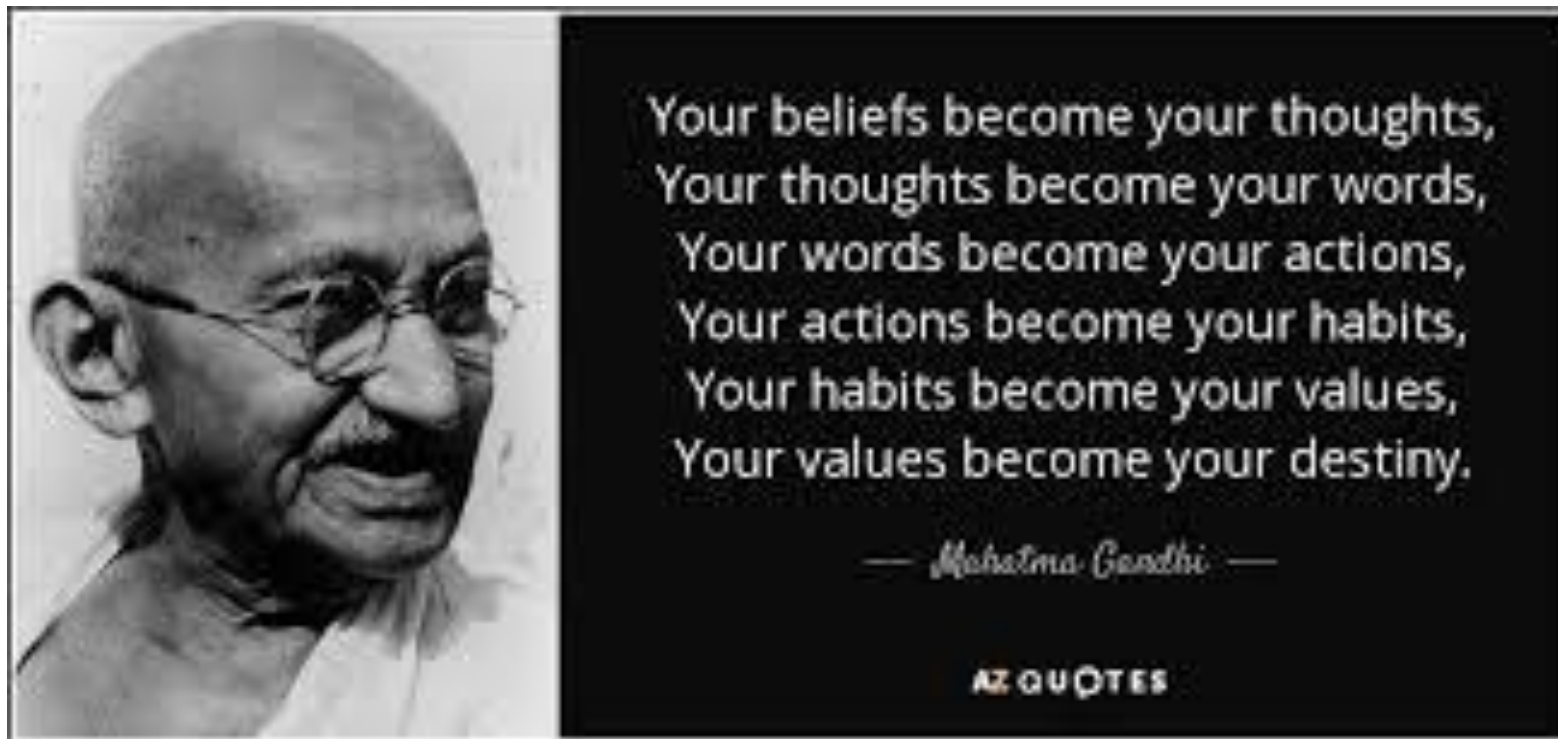
How it really looks.



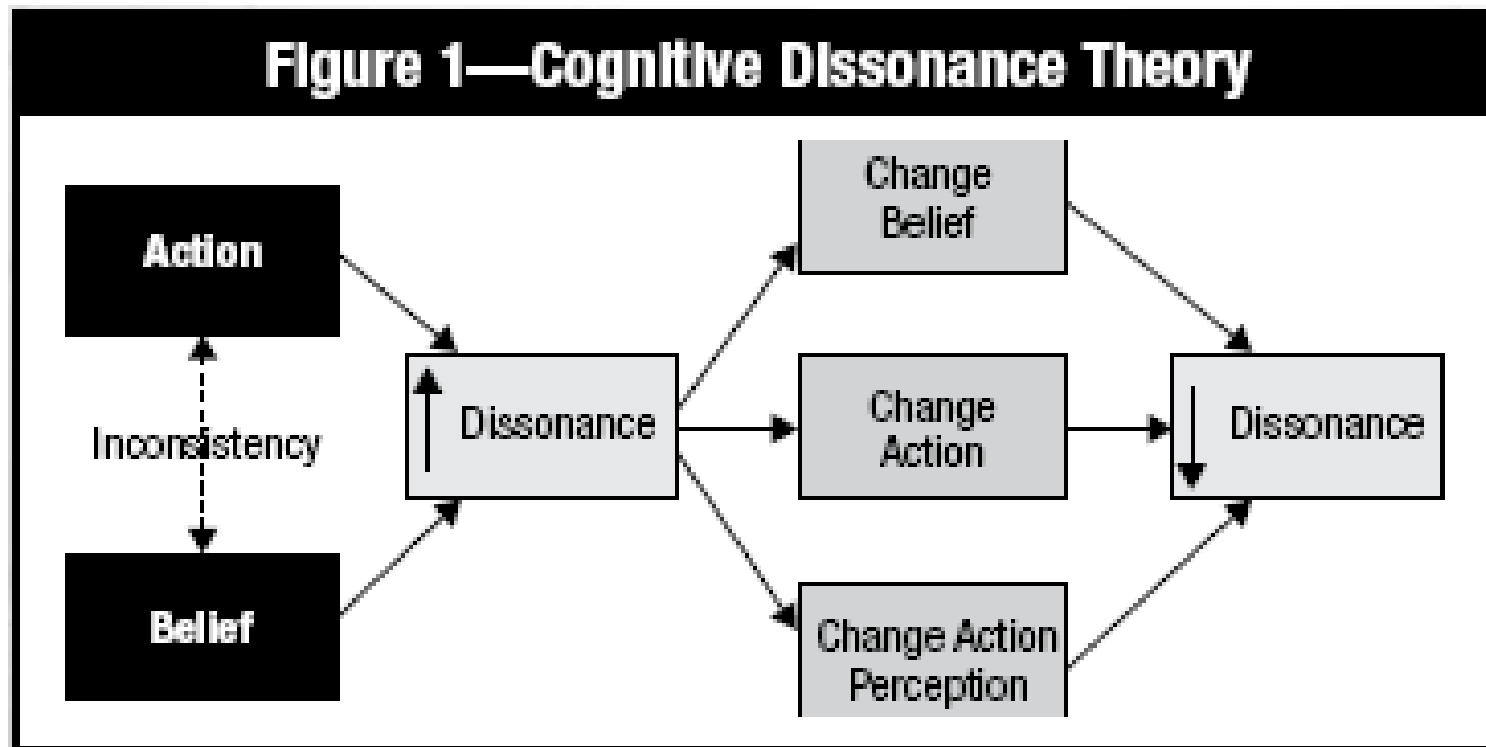


## Cognitive dissonance





- When a person holds two cognitions that are inconsistent with one another and experiences the pressure of an aversive motivational state
  - Festinger L, A theory of cognitive dissonance. Stanford: Stanford University Press, 1957



Bell T. The Social Psychology of IT Security Auditing From the Auditee's Vantage Point: Avoiding Cognitive Dissonance. Information Systems Audit and Control Association (ISACA) Journal 2010;3:1-4

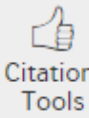




Article  
Text




Article  
info



Citation  
Tools

Health services research  
Protocol

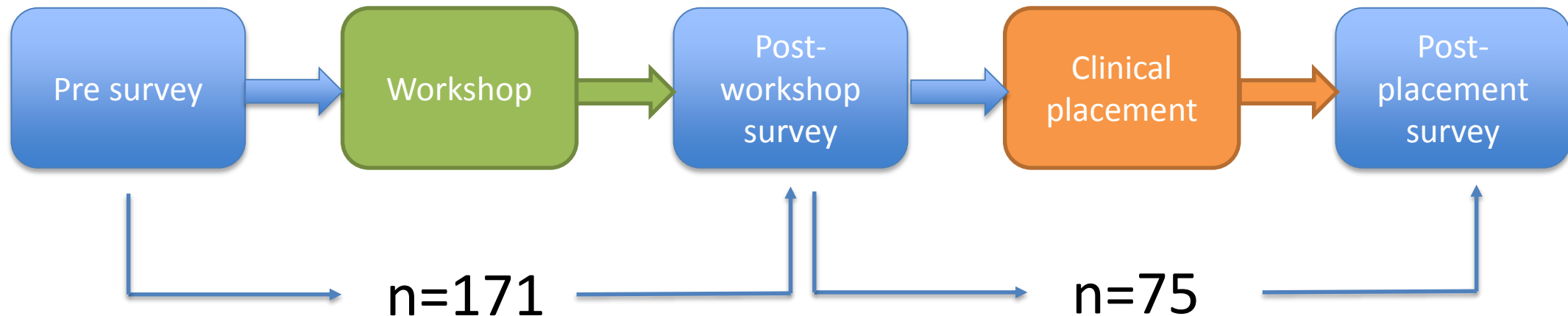
Establishing the effectiveness, cost-effectiveness and student experience of a Simulation-based education Training program On the Prevention of Falls (STOP-Falls) among hospitalised inpatients: a protocol for a randomised controlled trial 

Cylie Williams<sup>1, 2</sup>, Kelly-Ann Bowles<sup>2, 3</sup>, Debra Kiegaldie<sup>4</sup>, Stephen Maloney<sup>2</sup>, Debra Nestel<sup>5</sup>, Jessica Kaplonyi<sup>1</sup>, Terry Haines<sup>2, 3</sup>

- Pre-post-post, within group design
- Nursing, allied health and medical undergraduate students about to enter clinical placement at Peninsula Health



- Evidence: Does the best available evidence support the use of [strategy] as a means to prevent falls in hospital?
- Practice: Should [strategy] be used in hospitals to prevent falls?



## Cluster randomised trial of a targeted multifactorial intervention to prevent falls among older people in hospital

BMJ 2008 ; 336 doi: <https://doi.org/10.1136/bmj.39499.546030.BE> (Published 03 April 2008)

Cite this as: BMJ 2008;336:758

<a href="#">Article</a>	<a href="#">Related content</a>	<a href="#">Metrics</a>	<a href="#">Responses</a>	<a href="#">Peer review</a>
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Robert G Cumming, professor of epidemiology and geriatric medicine<sup>1,2</sup>, Catherine Sherrington, research fellow<sup>1,3,4</sup>, Stephen R Lord, senior principal research fellow<sup>4</sup>, Judy M Simpson, professor (biostatistics)<sup>1</sup>, Constance Vogler, staff specialist geriatrician<sup>5</sup>, Ian D Cameron, professor of rehabilitation medicine<sup>6</sup>, Vasi Naganathan, senior lecturer geriatric medicine<sup>2</sup>  
for the Prevention of Older People's Injury Falls Prevention in Hospitals Research Group

## Mobilisation alarms



Ann Intern Med. 2012 November 20; 157(10): 692–699. doi: 10.7326/0003-4819-157-10-201211200-00005.

## Effects of an Intervention to Increase Bed Alarm Use to Prevent Falls in Hospitalized Patients:

### A Cluster Randomized Trial

Ronald I. Shorr, MD, MS, A. Michelle Chandler, Lorraine C. Mion, RN, PhD, Teresa M. Waters, PhD, Minzhao Liu, MS, Michael J. Daniels, ScD, Lori A. Kessler, PharmD, and Stephen T. Miller, MD

EDITOR'S CHOICE

## REFINE (REducing Falls in In-patient Elderly) using bed and bedside chair pressure sensors linked to radio-pagers in acute hospital care: a randomised controlled trial

Opinder Sahota ✉, Avril Drummond, Denise Kendrick, Matthew J. Grainge, Catherine Vass, Tracey Sach, John Gladman, Mark Avis

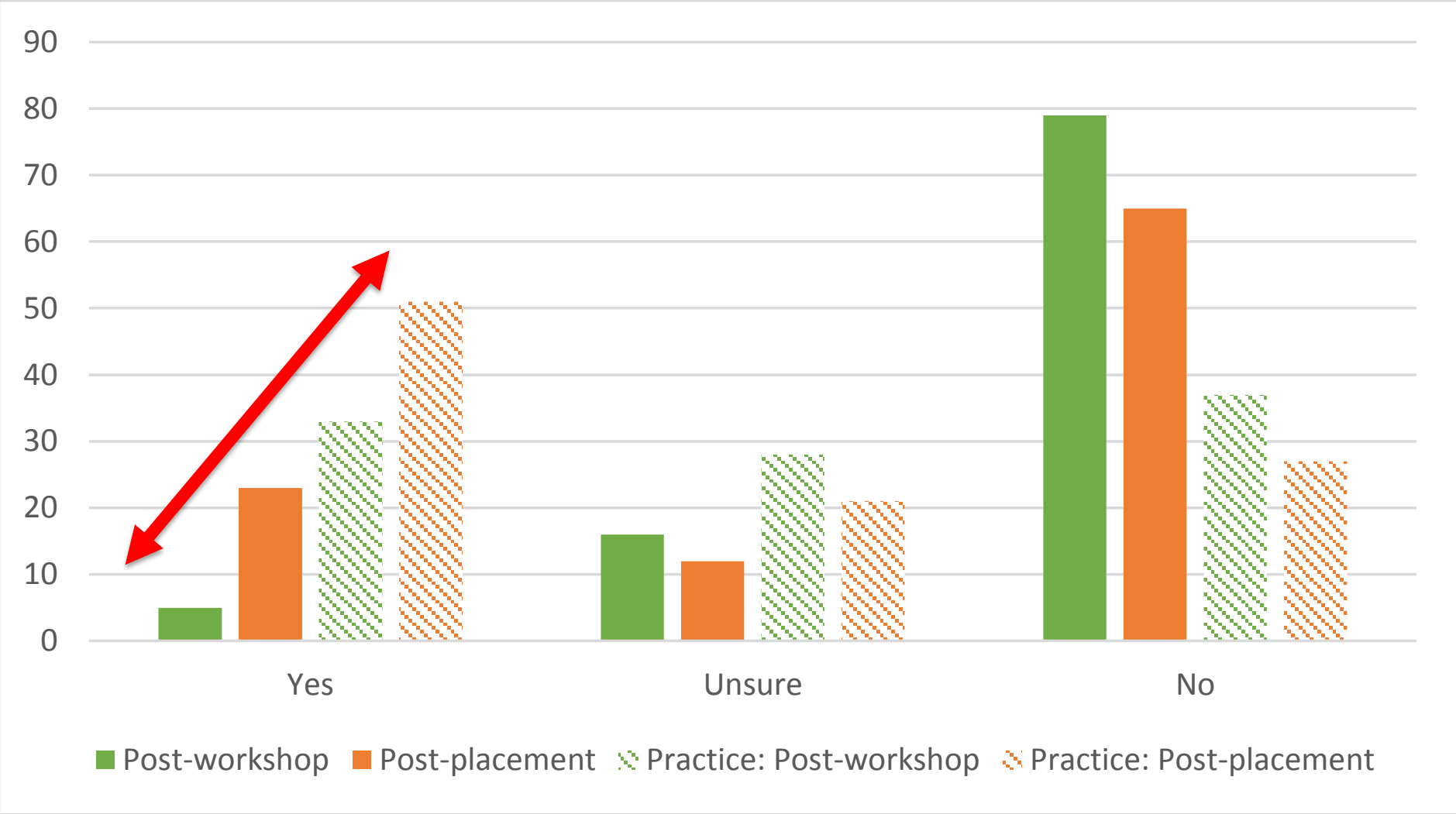
Age and Ageing, Volume 43, Issue 2, 1 March 2014, Pages 247–253, <https://doi.org/10.1093/ageing/aft155>

## 6-PACK programme to decrease fall injuries in acute hospitals: cluster randomised controlled trial

BMJ 2016 ; 352 doi: <https://doi.org/10.1136/bmj.h6781> (Published 26 January 2016)  
Cite this as: BMJ 2016;352:h6781

<a href="#">Article</a>	<a href="#">Related content</a>	<a href="#">Metrics</a>	<a href="#">Responses</a>	<a href="#">Peer review</a>
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Anna L Barker, associate professor<sup>1</sup>, Renata T Morello, research manager<sup>1</sup>, Rory Wolfe, professor of biostatistics<sup>1</sup>, Caroline A Brand, adjunct associate professor<sup>1</sup>, Terry P Haines, professor<sup>2</sup>, Keith D Hill, professor<sup>3</sup>, Sandra G Brauer, professor<sup>4</sup>, Mari Botti, professor<sup>5</sup>, Robert G Cumming, professor<sup>6</sup>, Patricia M Livingston, professor and associate dean (research),<sup>5</sup> Catherine Sherrington, professorial research fellow<sup>7</sup>, Silva Zavarsek, associate professor<sup>8</sup>, Richard I Lindley, professor<sup>7</sup>, Jeannette Kamar, policy and procedure coordinator<sup>9</sup>





## Pragmatic, Cluster Randomized Trial of a Policy to Introduce Low-Low Beds to Hospital Wards for the Prevention of Falls and Fall Injuries

Terry P. Haines PhD, Rebecca A.R. Bell PhD, Paul N. Varghese FRACP

Advertisement



### Low-low beds



### 6-PACK programme to decrease fall injuries in acute hospitals: cluster randomised controlled trial

BMJ 2016 ; 352 doi: <https://doi.org/10.1136/bmj.h6781> (Published 26 January 2016)

Cite this as: BMJ 2016;352:h6781

Article

Related content

Metrics

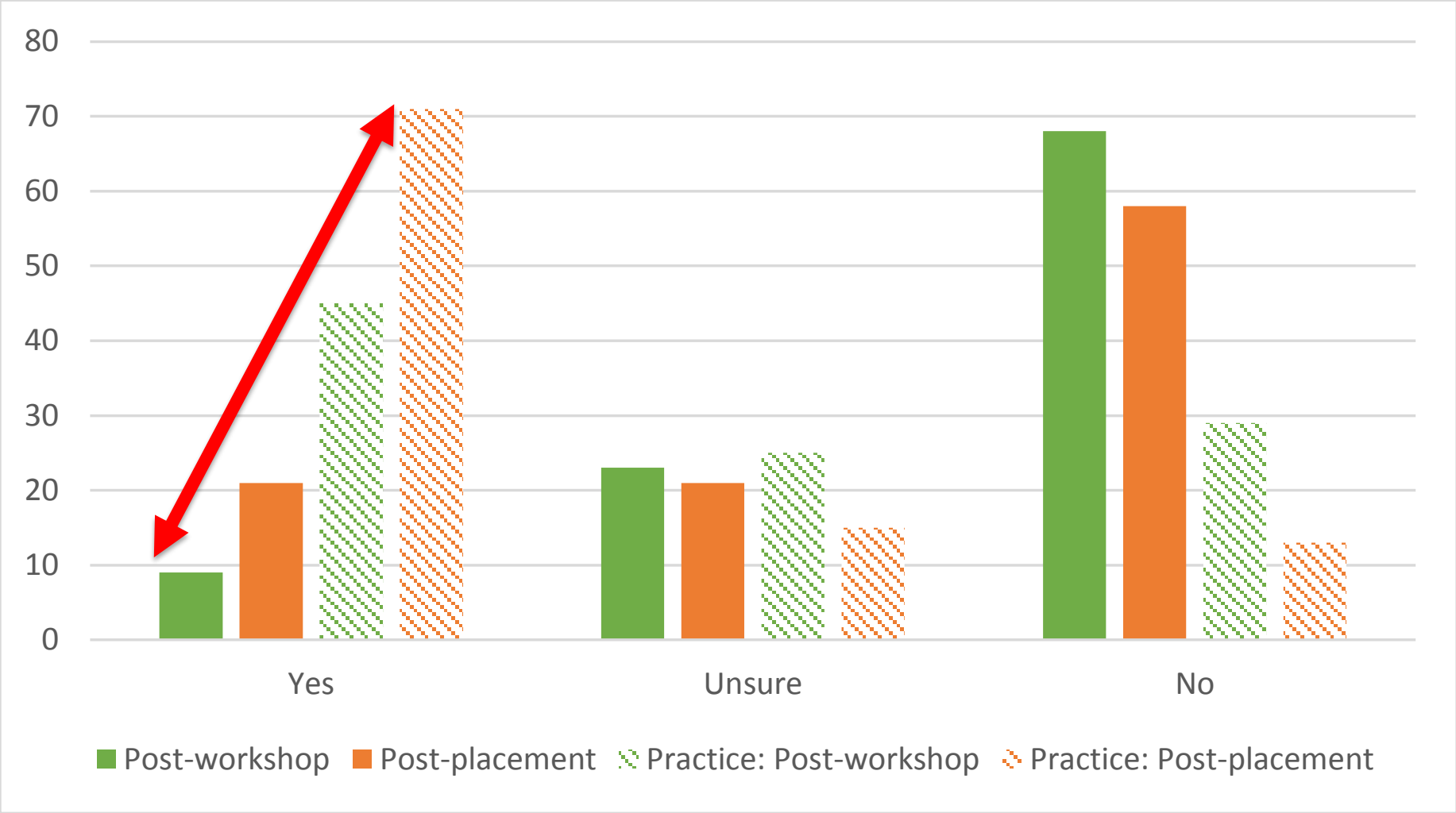
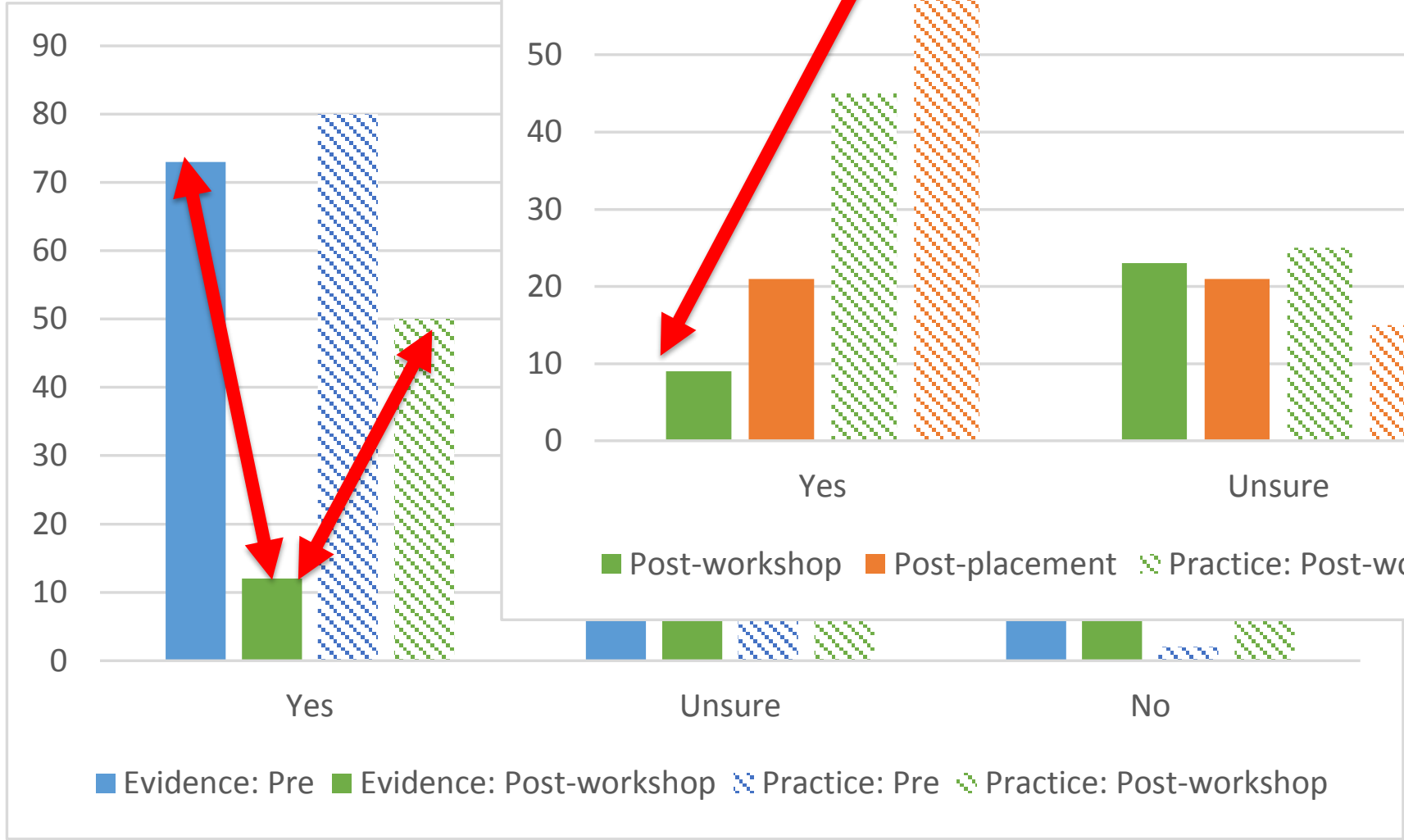
Responses

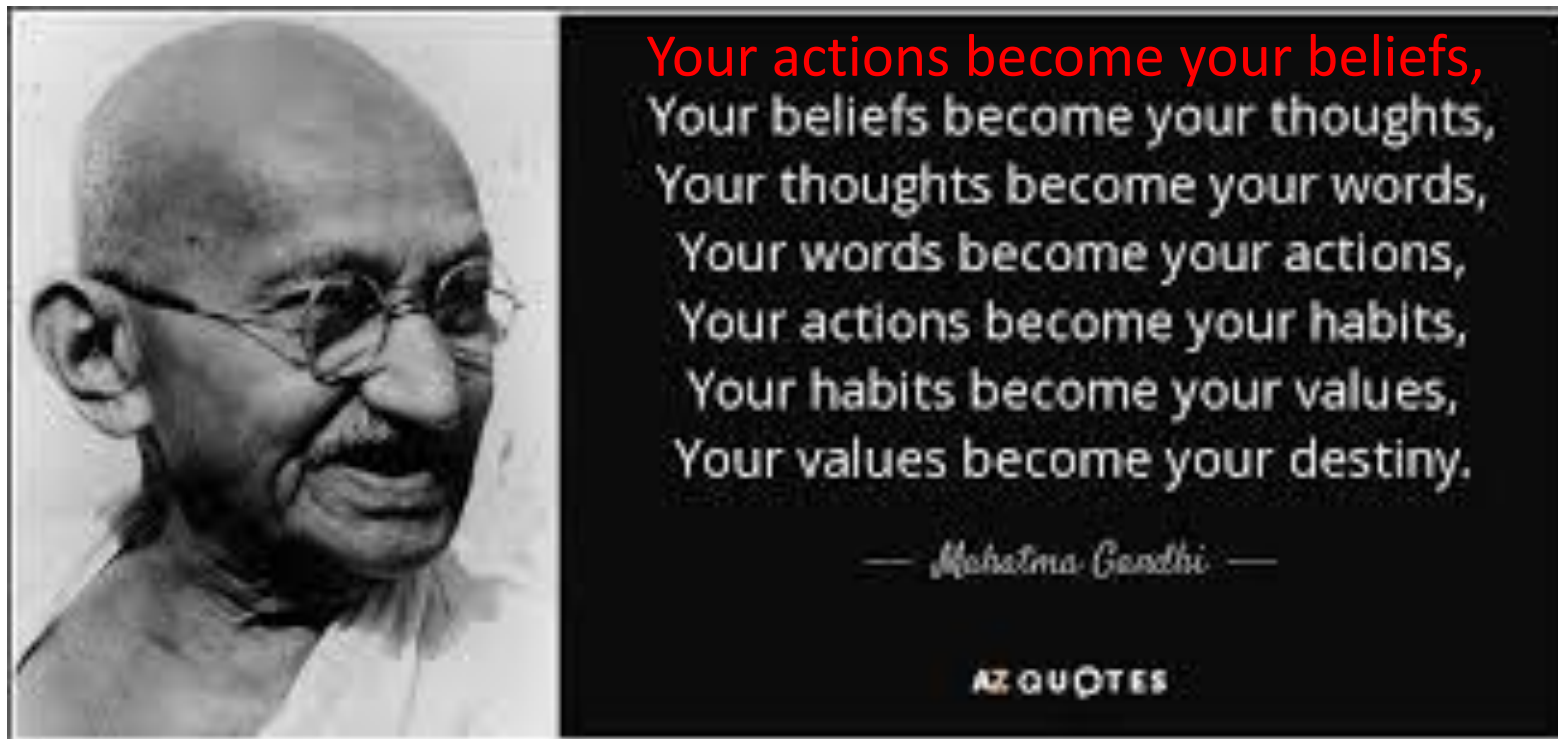
Peer review

Anna L Barker, associate professor<sup>1</sup>, Renata T Morello, research manager<sup>1</sup>, Rory Wolfe, professor of biostatistics<sup>1</sup>, Caroline A Brand, adjunct associate professor<sup>1</sup>, Terry P Haines, professor<sup>2</sup>, Keith D Hill, professor<sup>3</sup>, Sandra G Brauer, professor<sup>4</sup>, Mari Botti, professor<sup>5</sup>, Robert G Cumming, professor<sup>6</sup>, Patricia M Livingston, professor and associate dean (research),<sup>5</sup>, Catherine Sherrington, professorial research fellow<sup>7</sup>, Silva Zavarsek, associate professor<sup>8</sup>, Richard I Lindley, professor<sup>7</sup>, Jeannette Kamar, policy and procedure coordinator<sup>9</sup>



Response %





- Changing practice intentions is going to require more than just changing minds...



## Sunk cost bias



- Sunk cost
  - Previous costs that have already been incurred and cannot be recovered
  
- Sunk cost bias / error
  - Making decisions in the present to make past decisions look good / reasonable
  - Undue emphasis on previous expenditures of time, money, effort when making current choices

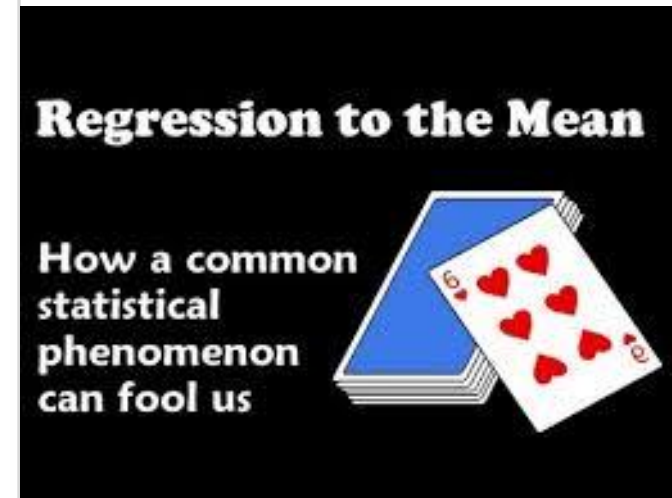
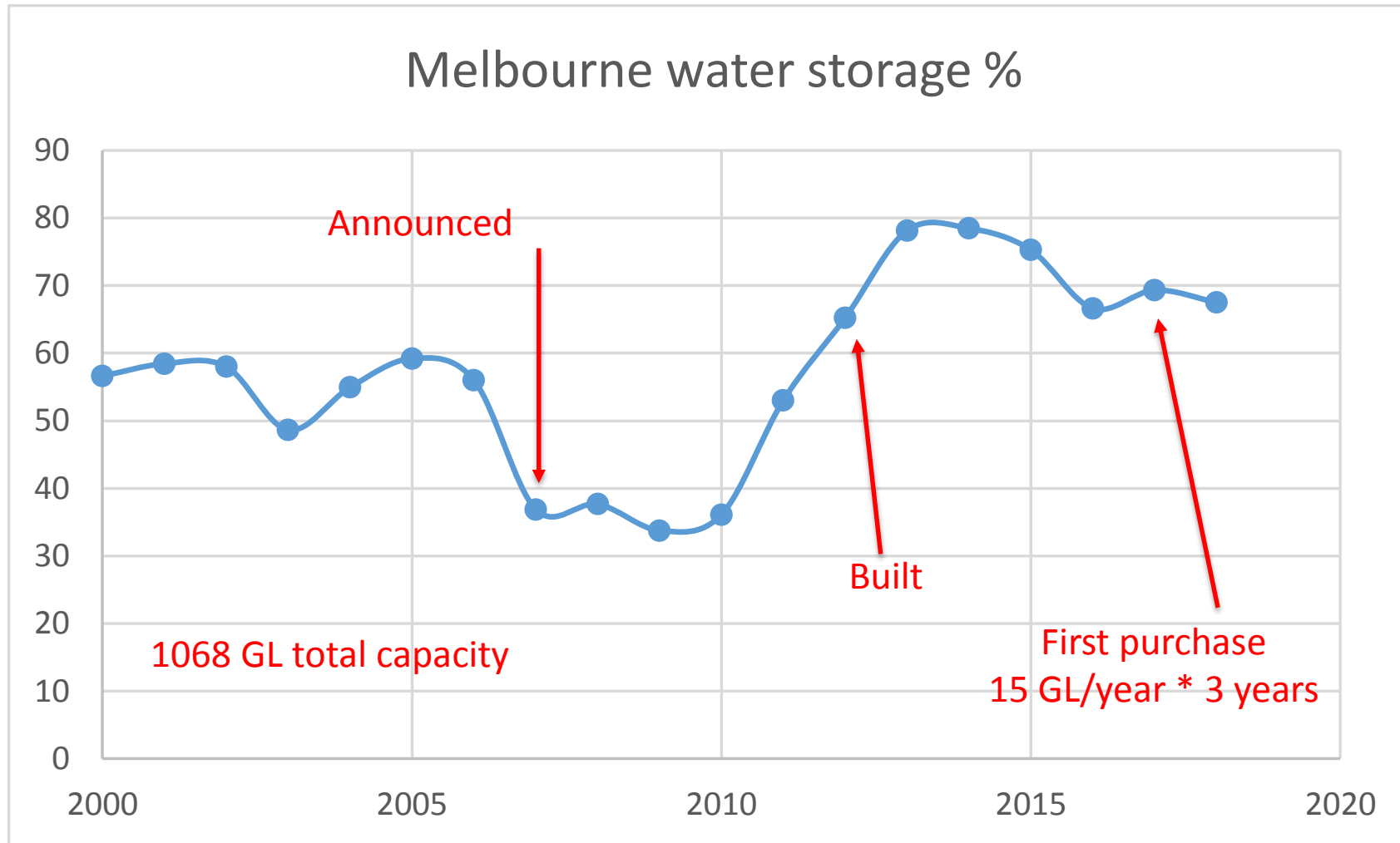


- Victorian Desalination Plant, Wonthaggi
  - Announced 2007
  - Completed 2012



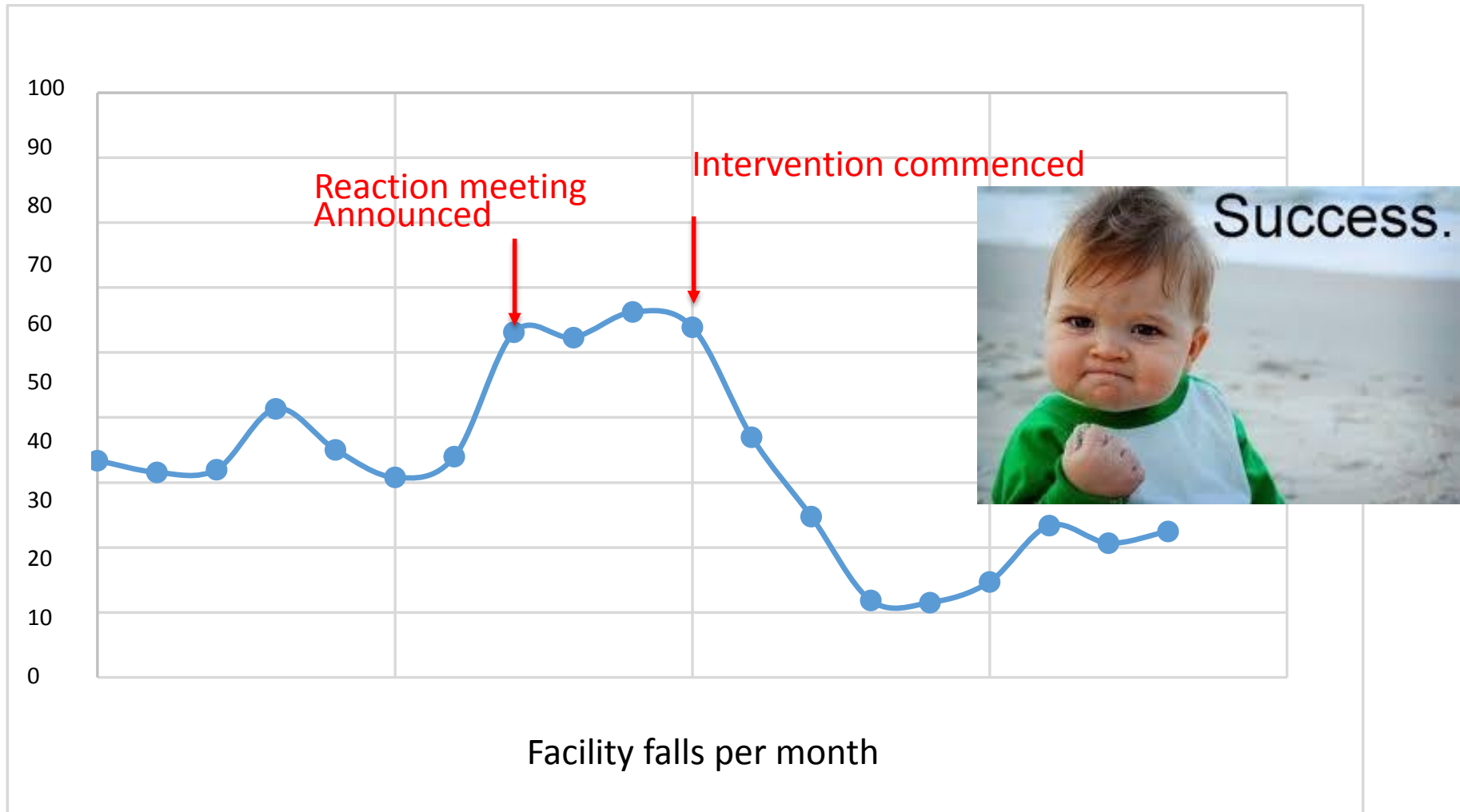
**\$4 Billion + \$600 Million per year for 30 years**

- <https://www.melbournewater.com.au/water/water-storage-and-use#/>



But are we any better?





## Where are falls prevention resources allocated by hospitals and what do they cost? A cross sectional survey using semi-structured interviews of key informants at six Australian health services

Deb Mitchell <sup>a, b</sup> ✉, Melissa Raymond <sup>c</sup>, Joanna Jellett <sup>d</sup>, Melinda Webb-St Mart <sup>e</sup>, Lee Boyd <sup>f, g</sup>, Mari Botti <sup>h, i</sup>,  
Kate Steen <sup>h</sup>, Alison Hutchinson <sup>a, i</sup>, Bernice Redley <sup>a, i</sup>, Terry Haines <sup>j</sup>

- Cross-sectional study
- 6 health services in Melbourne
  - 55,327 beds (nearly 8% of Australian hospital admissions)
- 196 interviews with key informants from randomly selected wards
  - Direct costs of falls prevention with patients (eg. purchases of bed alarms)
  - Indirect costs of delivering falls prevention with patients (eg. time spent completing FRATs)
  - Costs (direct / indirect) of non-patient directed falls prevention activities (eg. staff training, committees)



The estimated percentage of total resource allocation and average cost per bed per year of the top eight falls prevention activities.

Activity	% of total spent	Cost per bed AU\$
Physiotherapy treatment aimed at falls prevention	18%	1482
Continuous patient observers	14%	1160
Falls assessment/screen by professions other than nursing	12%	1033
Purchase, locate and respond to falls prevention alarms	11%	909
Nursing risk screening/assessment	8%	716
Informal falls prevention patient education	8%	695
Moving patients to a ward area with higher visibility	6%	541
Occupational Therapy treatment aimed at falls prevention	4%	362

- Total opportunity cost of falls prevention activities across these 6 services in one year

**AU \$46,478,014**

- Extrapolation nationally (admissions ratio 834,706 : 10,600,000)

**~AU \$590,000,000**

Since publication of the 2010 Cochrane review...





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# Flawed deductive reasoning and the death of a thousand cuts







## Preventing Falls and Harm From Falls in Older People

Best Practice Guidelines  
for Australian Residential Aged Care Facilities  
2009



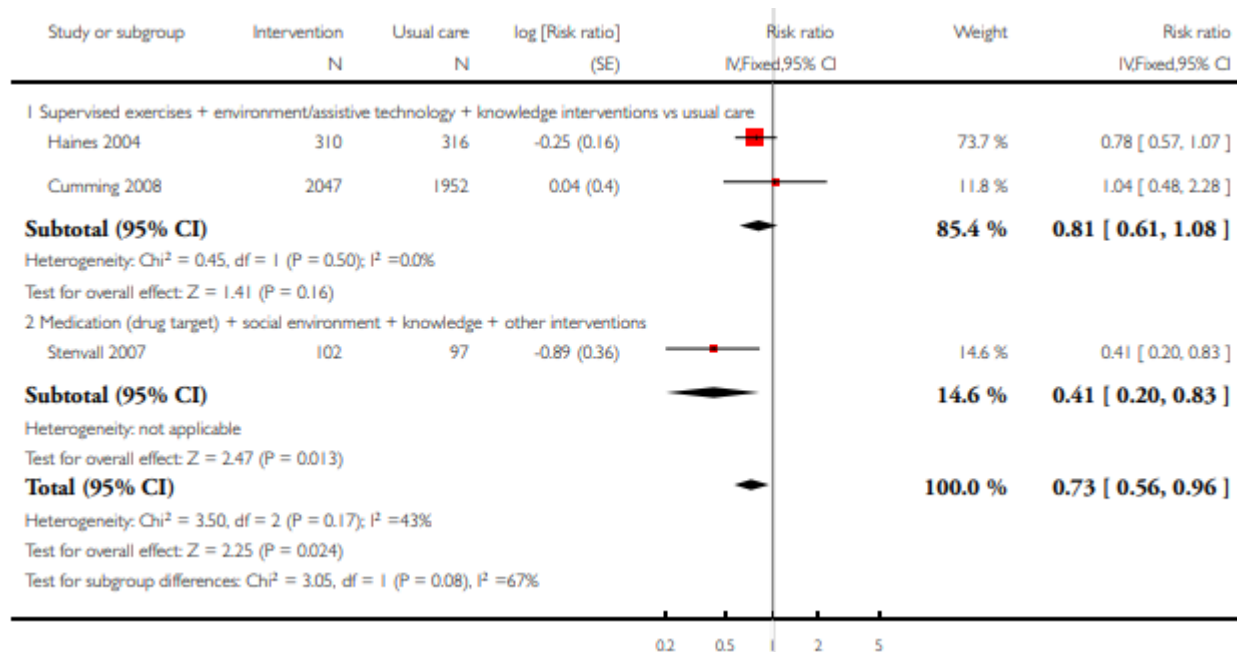
## Preventing Falls and Harm From Falls in Older People

Best Practice Guidelines  
for Australian Hospitals  
2009



## Interventions for preventing falls in older people in nursing care facilities and hospitals

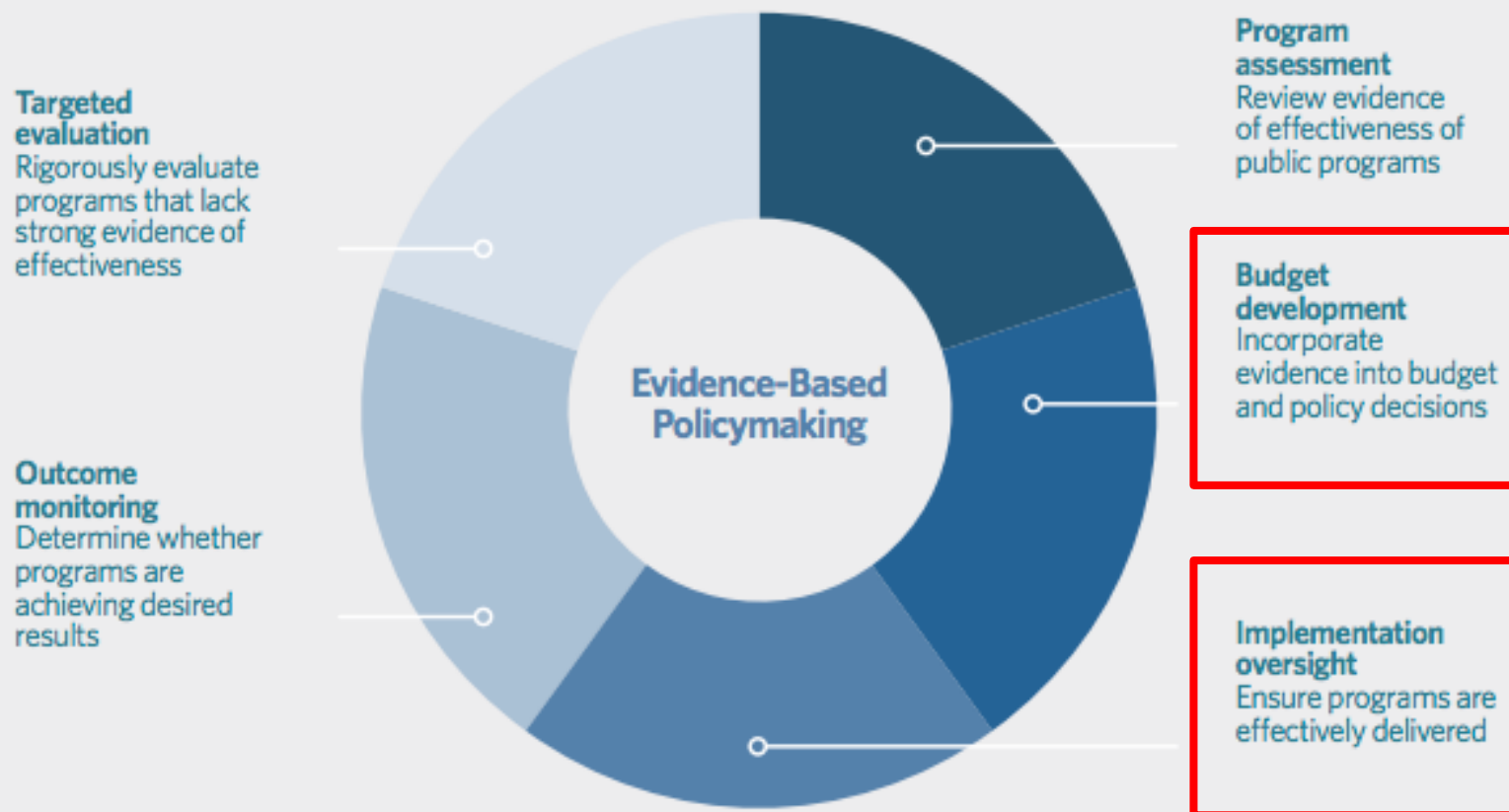
Ian D Cameron<sup>1</sup>, Geoff R Murray<sup>2</sup>, Lesley D Gillespie<sup>3</sup>, M Clare Robertson<sup>3</sup>, Keith D Hill<sup>4</sup>, Robert G Cumming<sup>5</sup>, Ngaire Kerse<sup>6</sup>



- “Pooled data from the three multifactorial studies in hospitals (Cumming 2008; Haines 2004; Stenvall 2007) that reported data on risk of falling showed a significant reduction.”

- Premise 1: Multifactorial interventions reduce risk of falling in hospitals
- Premise 2: My hospital uses a multifactorial intervention
- Inference: My hospital's approach is reducing the risk of falling

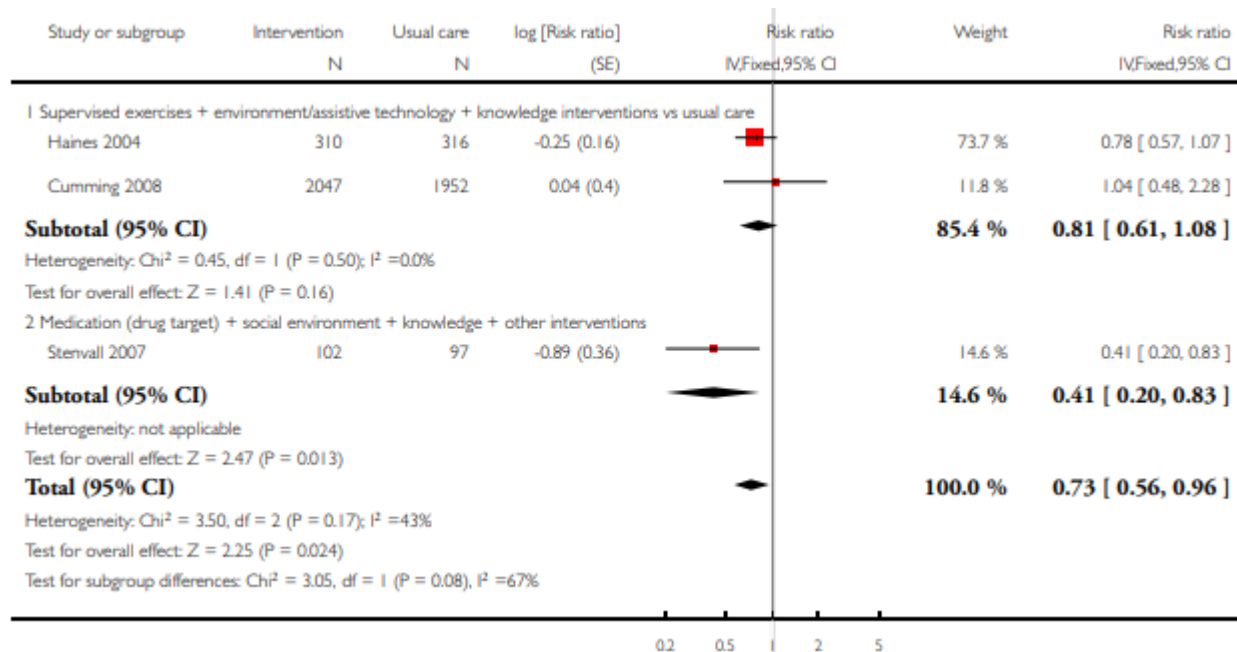
Figure 1  
Steps in Evidence-Based Policymaking



Evidence-Based Policymaking: A guide for effective government. A report from the Pew-MacArthur Results First Initiative, Nov 2014, <https://www.pewtrusts.org/~media/assets/2014/11/evidencebasedpolicymakingaguideforeffectivegovernment.pdf>

## Interventions for preventing falls in older people in nursing care facilities and hospitals

Ian D Cameron<sup>1</sup>, Geoff R Murray<sup>2</sup>, Lesley D Gillespie<sup>3</sup>, M Clare Robertson<sup>3</sup>, Keith D Hill<sup>4</sup>, Robert G Cumming<sup>5</sup>, Ngaire Kerse<sup>6</sup>



- “Pooled data from the three multifactorial studies in hospitals (Cumming 2008; Haines 2004; Stenvall 2007) that reported data on risk of falling showed a significant reduction.”

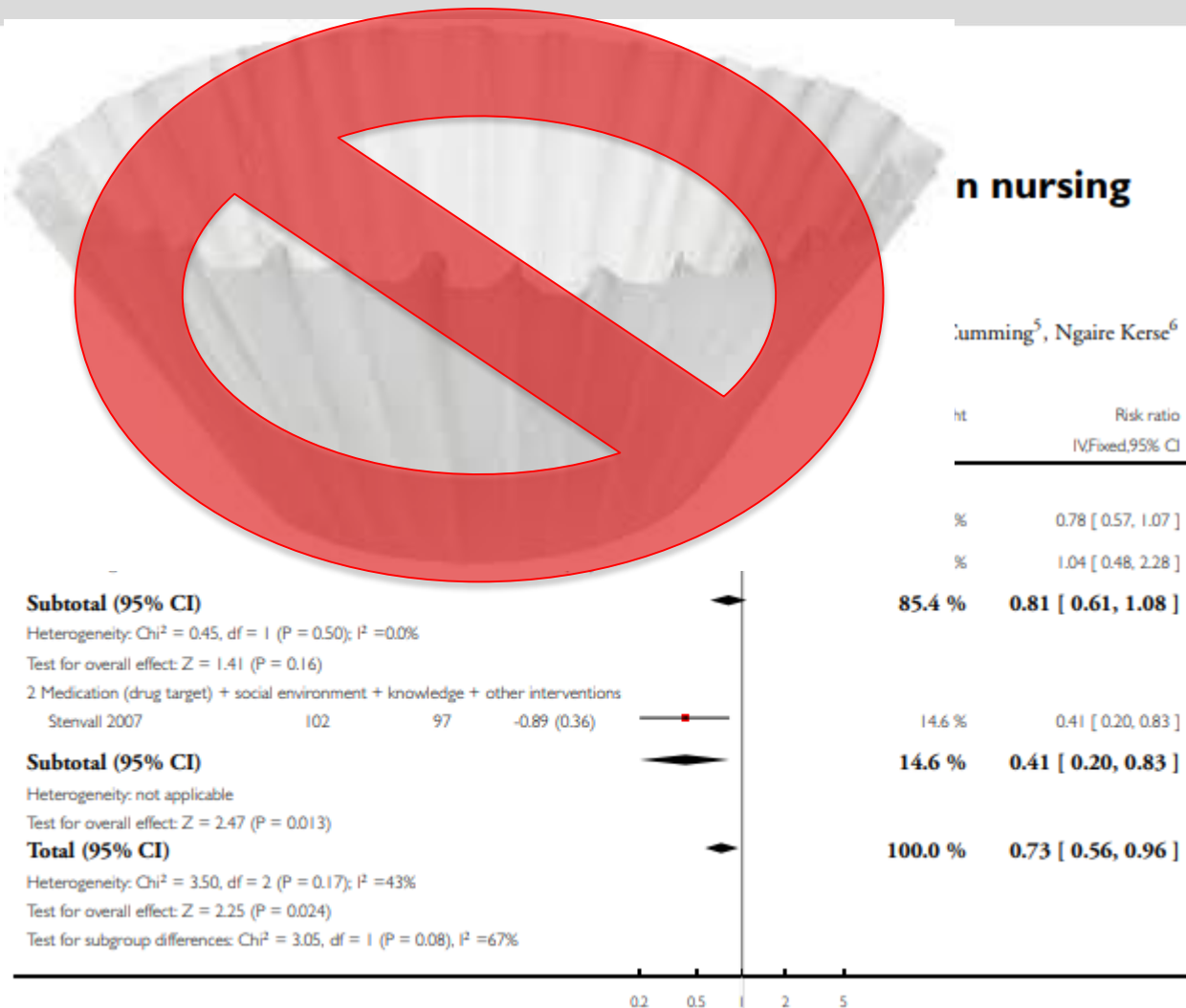


- Premise 1: Multifactorial interventions **that consume considerable additional resources beyond the comparator condition** reduce risk of falling in hospitals
- Premise 2: My hospital uses a multifactorial intervention **that does not involve use of anywhere near the same degree of resources, or even the same interventions involved in the studies that underpinned premise 1**
- Inference: My hospital's approach is reducing the risk of falling

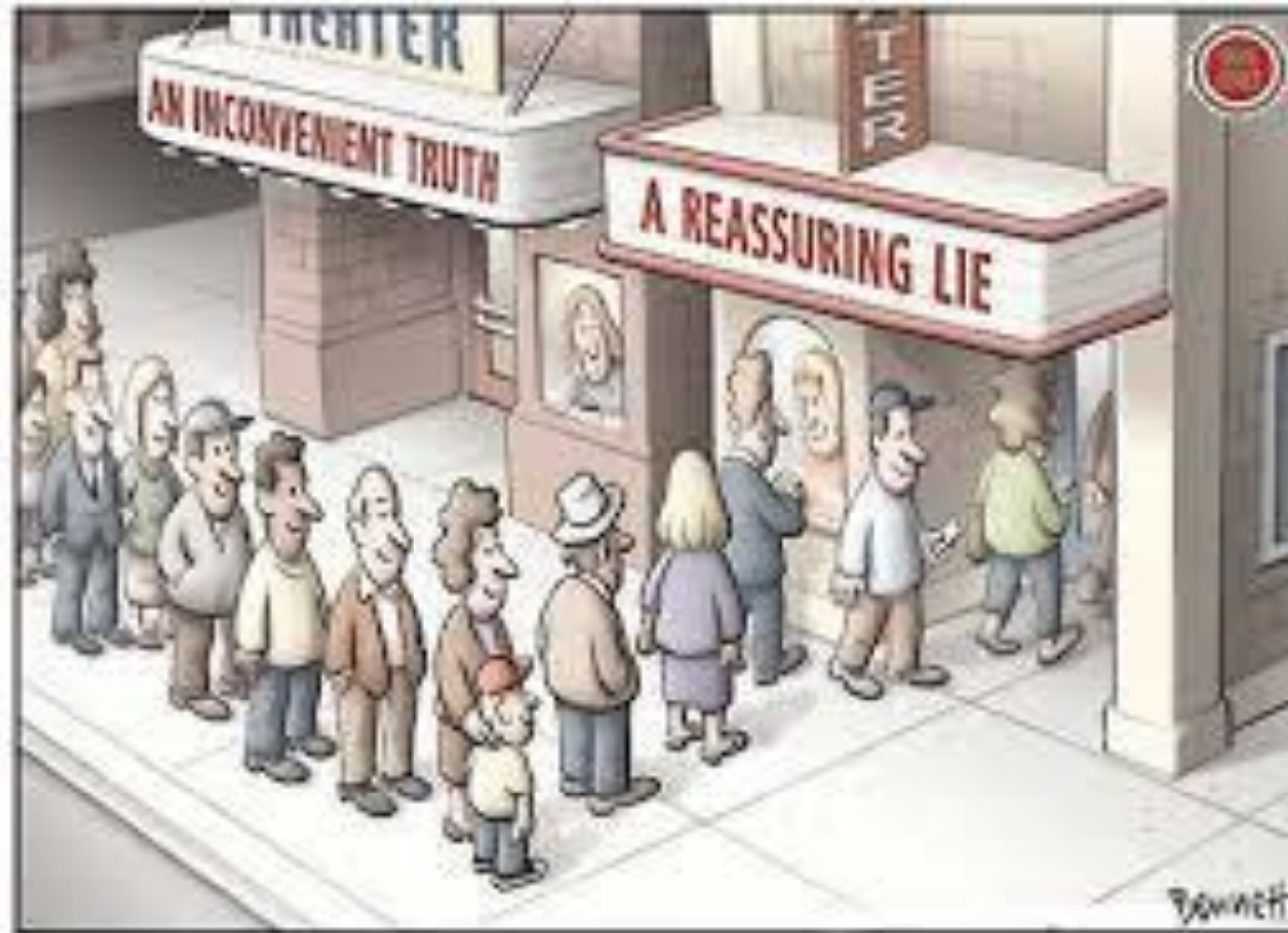




# Minus the confirmation bias filter I used when I first talked about how to use this result...



- “Pooled data from the three multifactorial studies in hospitals (Cumming 2008; Haines 2004; Stenvall 2007) that reported data on risk of falling showed a significant reduction. **These pooled data may not be applicable to hospital settings where there are short lengths of stay. Also, the interpretation of the multifactorial interventions is complex because their component parts vary.**”



## Stability of evidence over time







## Preventing Falls and Harm From Falls in Older People

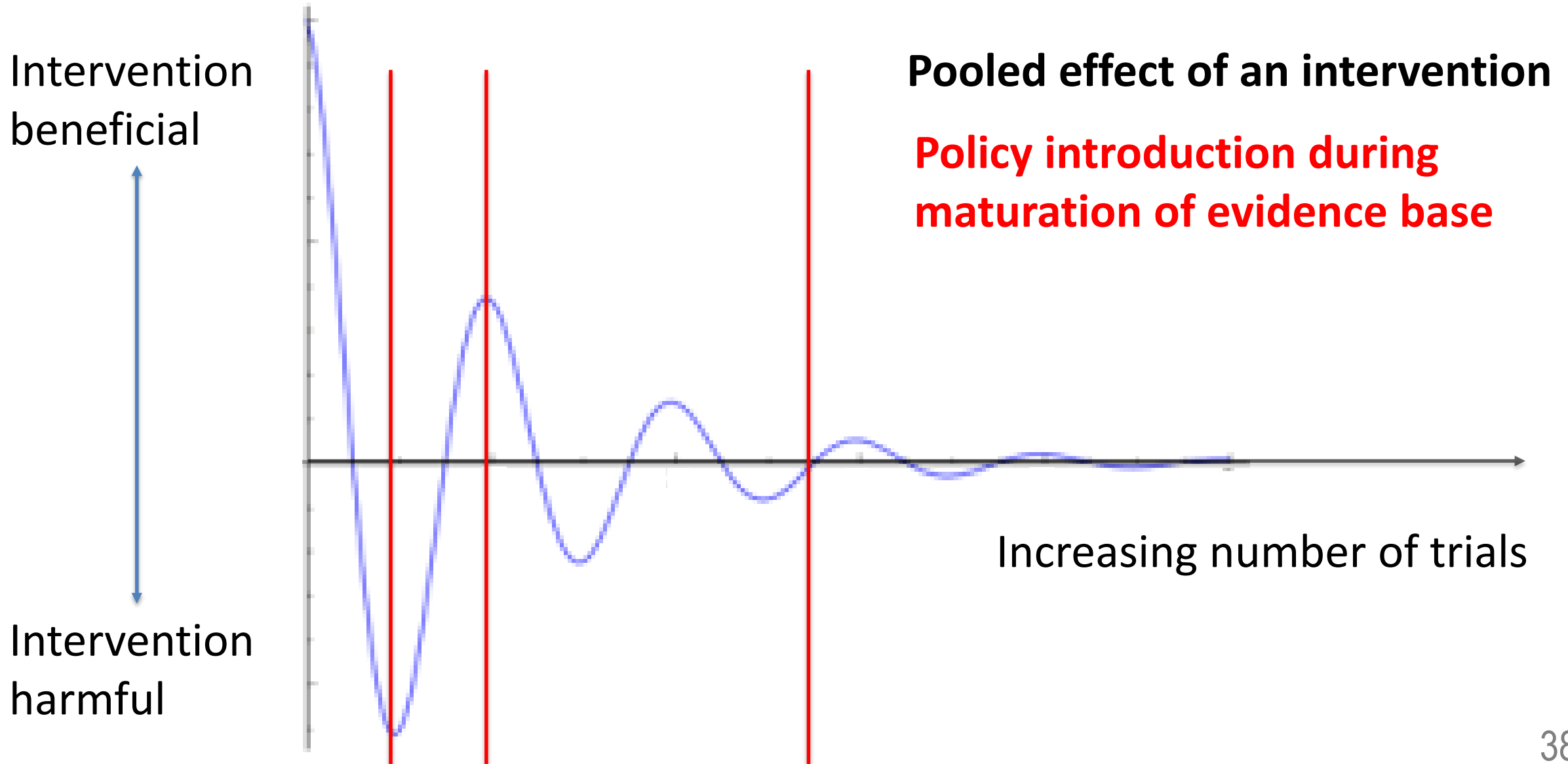
Best Practice Guidelines  
for Australian Residential Aged Care Facilities  
2009



## Preventing Falls and Harm From Falls in Older People

Best Practice Guidelines  
for Australian Hospitals  
2009







- “We are uncertain of the effect of these interventions on risk of falling.”

Cochrane Database of Systematic Reviews

## Interventions for preventing falls in older people in care facilities and hospitals

Cochrane Systematic Review - Intervention | Version published: 07 September 2018 [see what's new](#)



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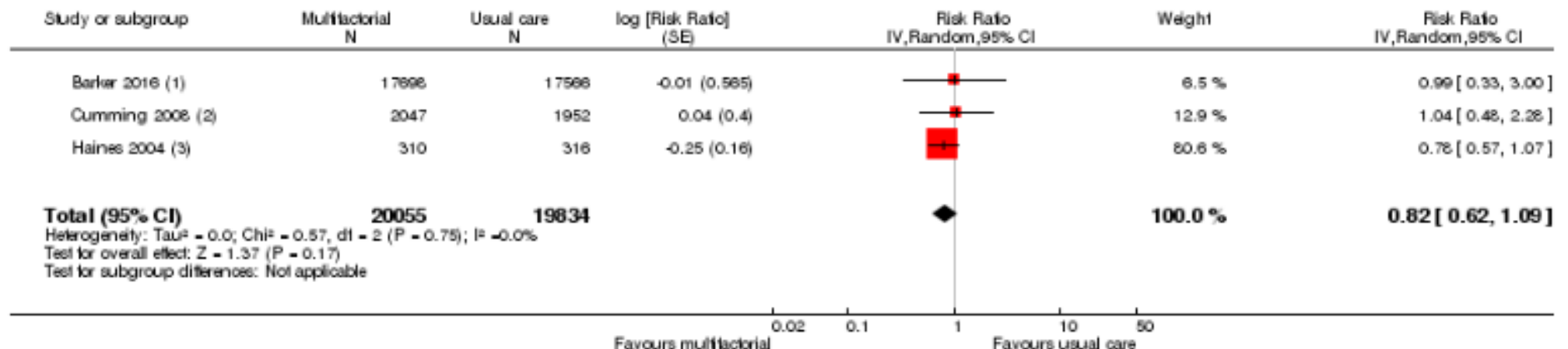
✉ [Ian D Cameron](#) | [Suzanne M Dyer](#) | [Claire E Panagoda](#) | [Geoffrey R Murray](#) | [Keith D Hill](#) | [Robert G Cumming](#) | [Ngaire Kerse](#)

### Analysis 21.2

[Open in figure viewer](#)

[Download as PowerPoint](#)

Review: Interventions for preventing falls in older people in care facilities and hospitals  
Comparison: 21 Hospitals: Multifactorial interventions vs usual care  
Outcome: 2 Number of falls



## ■ 2010

- For multifactorial interventions in care facilities, the rate of falls (**RaR 0.78**, 95% CI 0.59 to 1.04; 7 trials, 2876 participants) and risk of falling (**RR 0.89**, 95% CI 0.77 to 1.02; 7 trials, 2632 participants) suggested possible benefits, but this evidence was not conclusive.

## ■ 2018

- We are uncertain of the effect of multifactorial interventions on the rate of falls (**RaR 0.88**, 95% CI 0.66 to 1.18; 3439 participants, 10 studies;  $I^2 = 84\%$ ; very low-quality evidence). They may make little or no difference to the risk of falling (**RR 0.92**, 95% CI 0.81 to 1.05; 3153 participants, 9 studies;  $I^2 = 42\%$ ; low-quality evidence).



Figure 1  
Steps in Evidence-Based Policymaking



Evidence-Based Policymaking: A guide for effective government. A report from the Pew-MacArthur Results First Initiative, Nov 2014, <https://www.pewtrusts.org/~media/assets/2014/11/evidencebasedpolicymakingaguideforeffectivegovernment.pdf>

# Confirmation bias

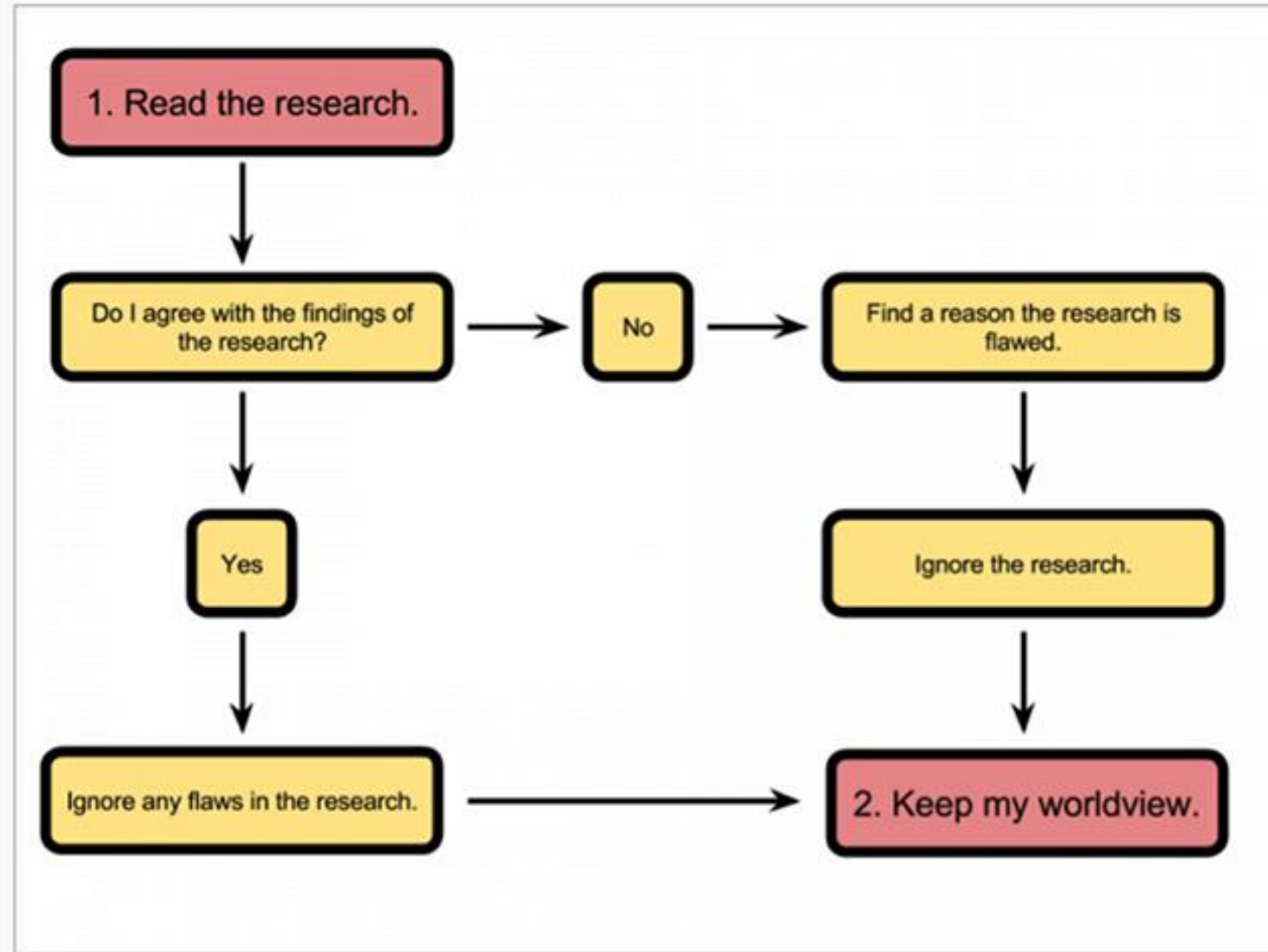




- Confirmation bias

- The tendency to search for, interpret, favor, and recall information in a way that confirms one's preexisting beliefs or hypotheses.

## THE CONFIRMATION BIAS CYCLE



- Premise: Residents of Aged Care Facilities in Australia typically use a “continuity” approach to accessing a general practitioner
- Premise: This approach results in GPs seeing patients predominantly after hours, leading to delays in service provision or responsibility being transferred to a hospital
  - Swannell C: Aged care “broken”. MJA Insight 2014, 12.
- Inference: Improving access to general practitioners will improve the health of older adults in aged care facilities, lead to fewer hospital transfers and prevent falls



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Audience participation time!!!!!!



GROUP  
OF EIGHT  
AUSTRALIA



- Premise: Residents of Aged Care Facilities in Australia typically use a “continuity” approach to accessing a general practitioner
- Premise: This approach results in GPs seeing patients predominantly after hours, leading to delays in service provision or responsibility being transferred to a hospital
  - Swannell C: Aged care “broken”. MJA Insight 2014, 12.
- Inference: Improving access to general practitioners will improve the health of older adults in aged care facilities, lead to fewer hospital transfers and prevent falls



# Improving care through imbedding general practitioners within residential aged care facilities

Prof Terry Haines, Monash University / Monash Health

Prof Andrew Robinson, UTAS

Prof Andrew Palmer, UTAS

Petra Tierney, BUPA Aged Care



MonashHealth

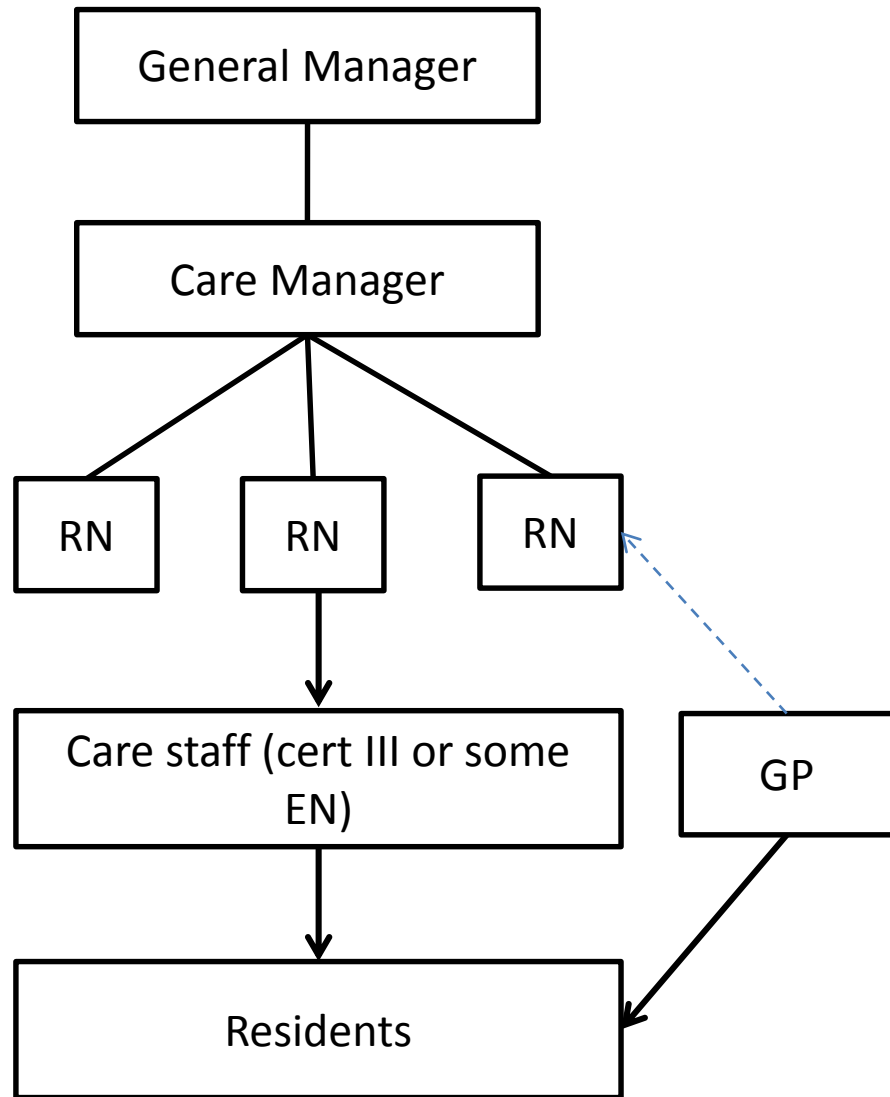


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& EDUCATION CENTRE

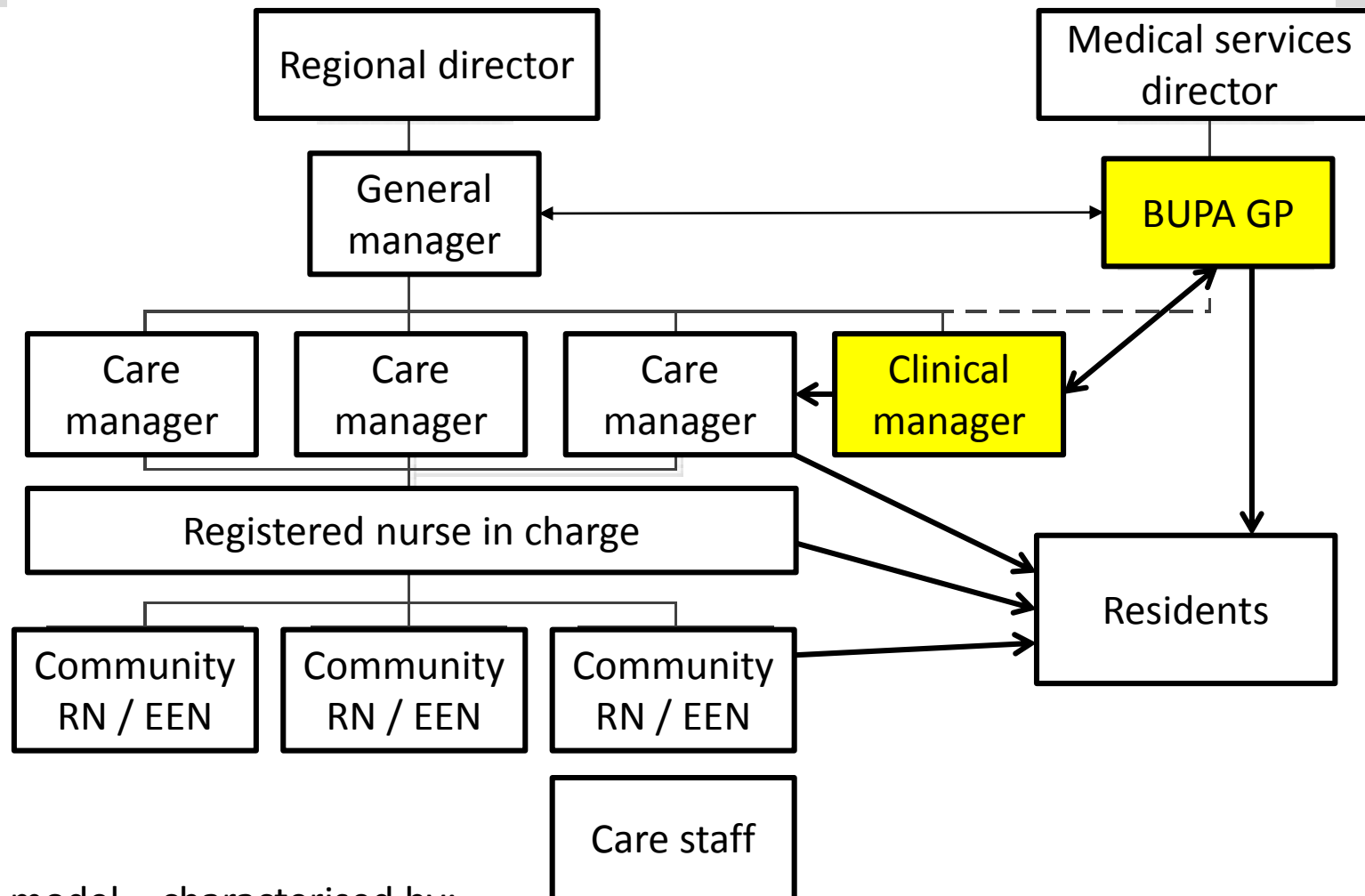






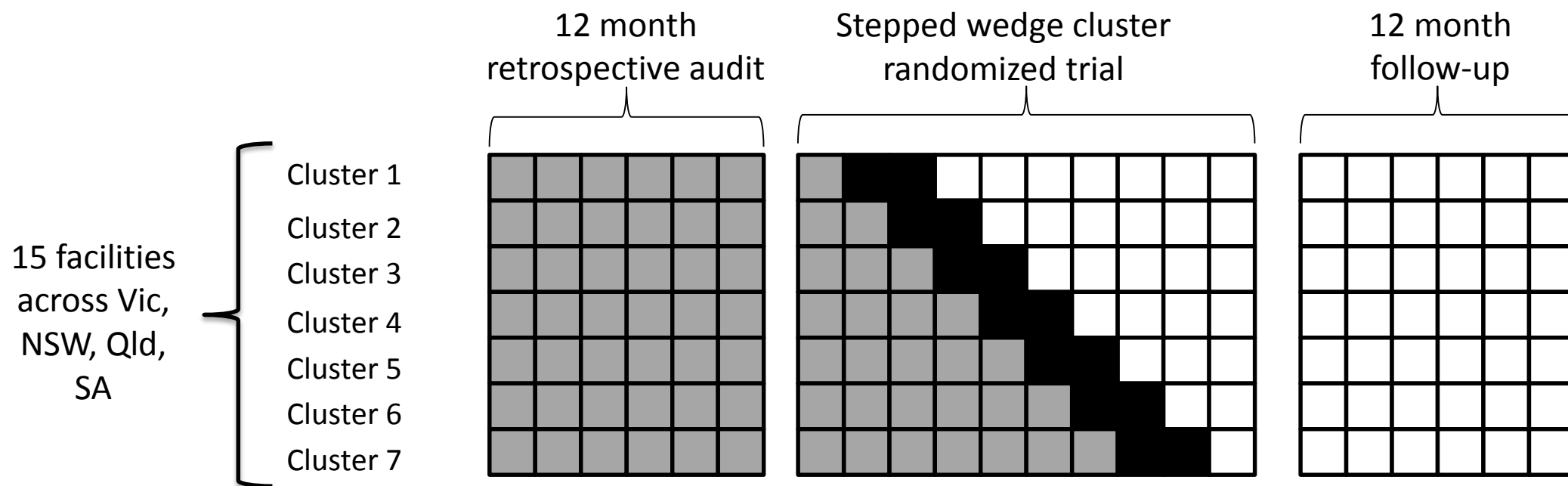
Old model of care characterized by:

1. Direct resident care being provided care staff
2. GP's not being directly linked to staff within the home
3. Care manager – predominantly administrative role across facility
4. RN – Medication rounds, minimal direct care, some more complex procedural care (wound dressings)
5. GP informal communications with registered nurse



New model – characterised by:

1. Care manager now responsible for 1 unit in home (~40 residents). More directly involved with care planning and ax)
2. RN in charge – takes role of care manager when care manager not there. Direct resident care, comprehensive health assessments.
3. Care staff now skilled to assist residents with medications.
4. Creation of the clinical manager role to link Care managers and general manager to GP



**Figure 1.** Trial design. Each column represents a 9 week period.

**Key:** Grey = control period. Black = 18 week roll-out period. White = intervention period.

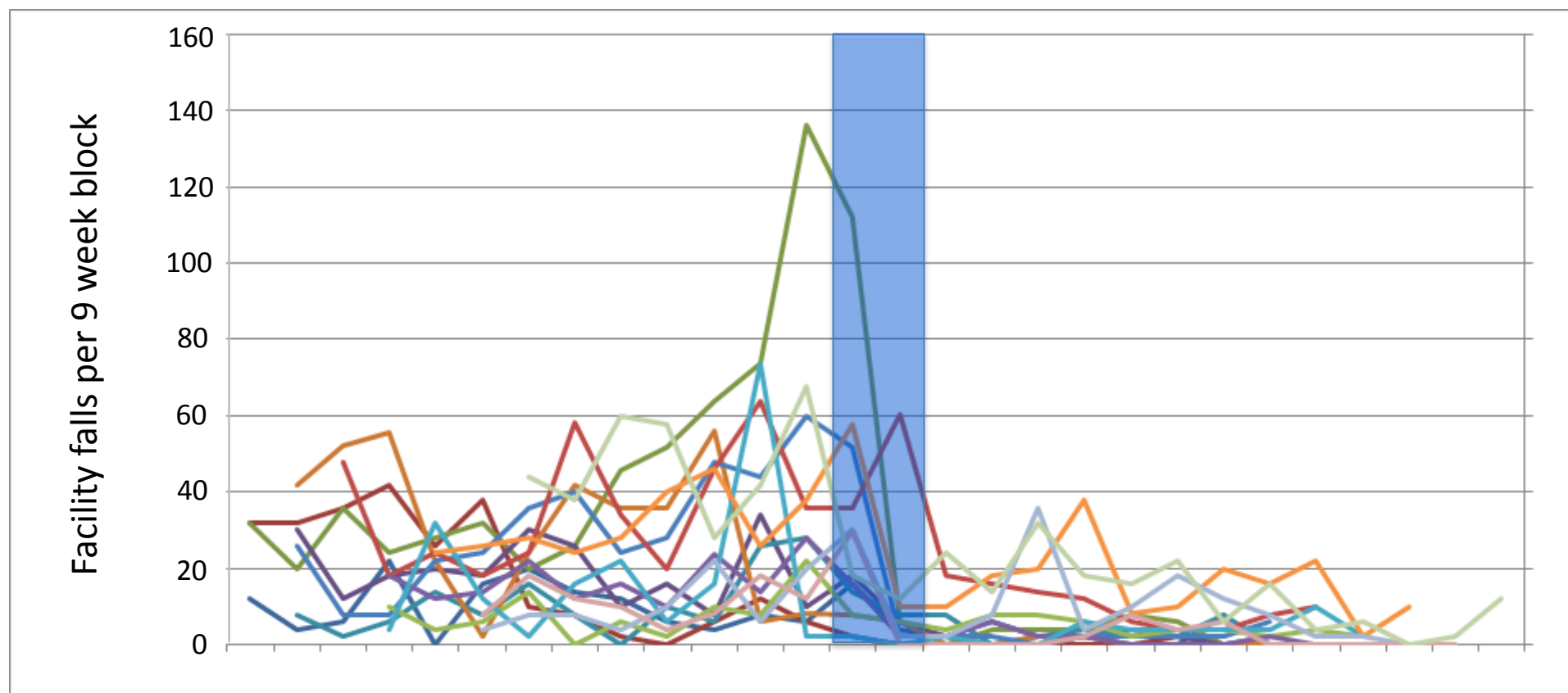
- **Unplanned hospital transfers**
  - Rate of transfer per 1000 resident days
  
- **Falls**
  - Rate of falls per 1000 resident days
  
- **Polypharmacy**
  - Proportion of residents taking >5 medications

## Facility demographics prior to commencement of stepped wedge component of study

Facility characteristic	Mean (sd)
Facility beds	98 (31)
Falls / facility / 9 week block	50 (24)
Fall-related fractures / facility / 9 week block	0.3 (0.7)
Unplanned hospital transfers / facility / 9 week block	18 (7)
Unplanned hospital admissions / facility / 9 week block	12 (5)
Resident days spent in hospital for unplanned admission / facility / 9 week block	96 (56)
Percentage of residents with polypharmacy / site*	73% (11%)



Site\block	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1										1	1	1	1	1	1	1	1	1	1	1	1	1
2										1	1	0	0	0	0	0	0	0	0	0	0	0
3										1	1	0	0	0	0	0	0	0	0	0	0	0
4											1	1	1	1	1	1	1	1	1	1	1	1
5											1	1	1	1	1	1	1	1	1	1	1	1
6											0	0	0	0	1	1	1	1	1	1	1	1
7											0	0	0	0	0	0	0	0	0	0	0	0
8												0	0	0	0	0	0	0	0	0	0	0
9													1	1	0	0	0	0	0	1	1	1
10													1	1	1	1	1	1	1	1	1	1
11													1	1	1	1	1	1	1	1	1	1
12														1	1	1	1	1	1	1	1	1
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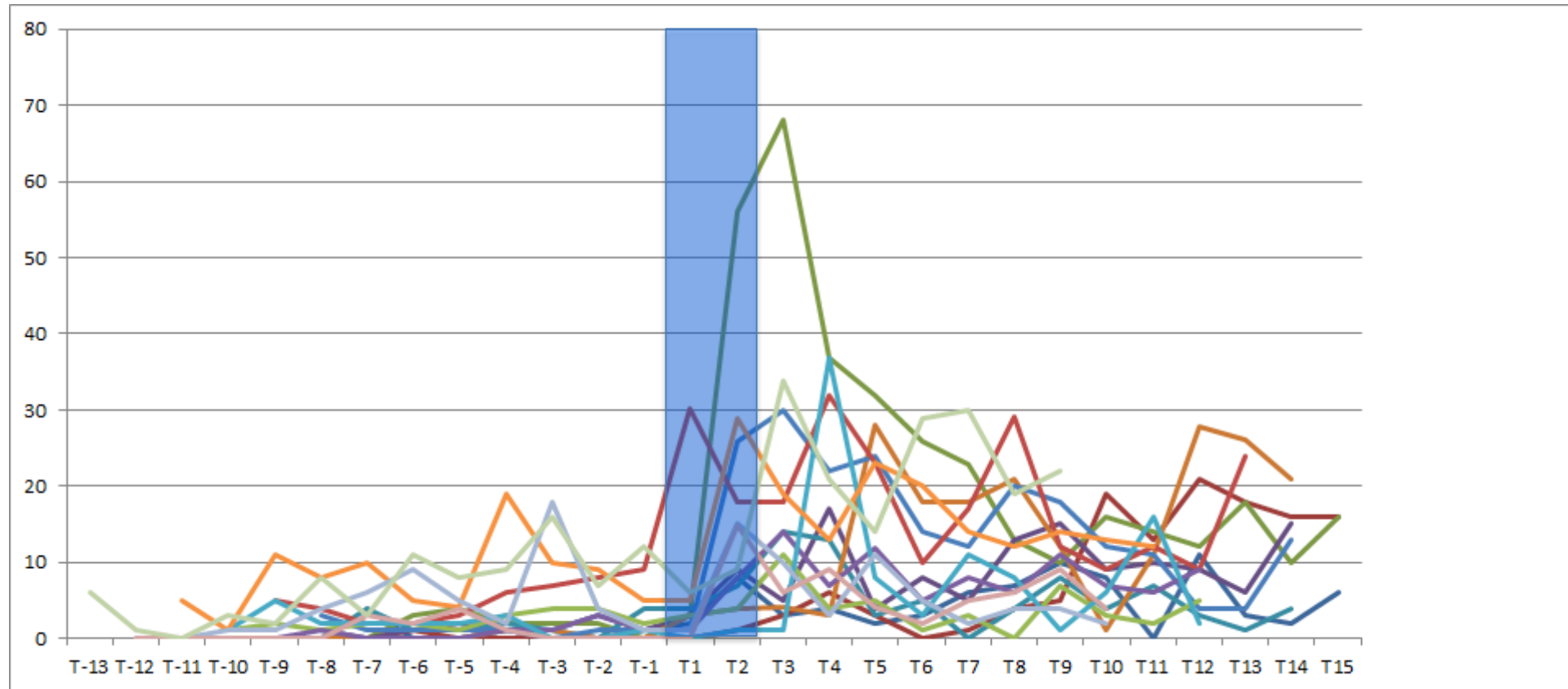


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Audience participation:

Please describe a mechanism of action that would explain this result





## Medication errors



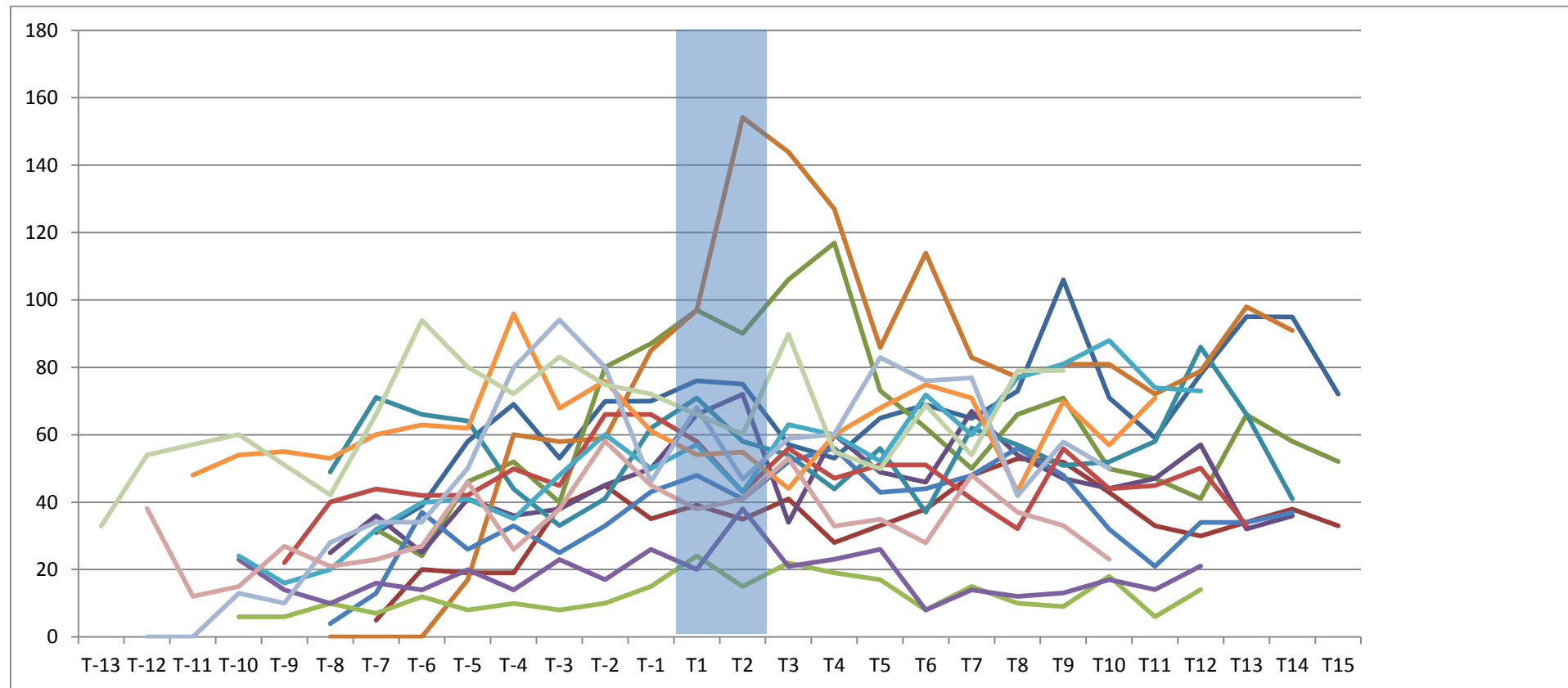


Please describe a mechanism of action that would explain this result

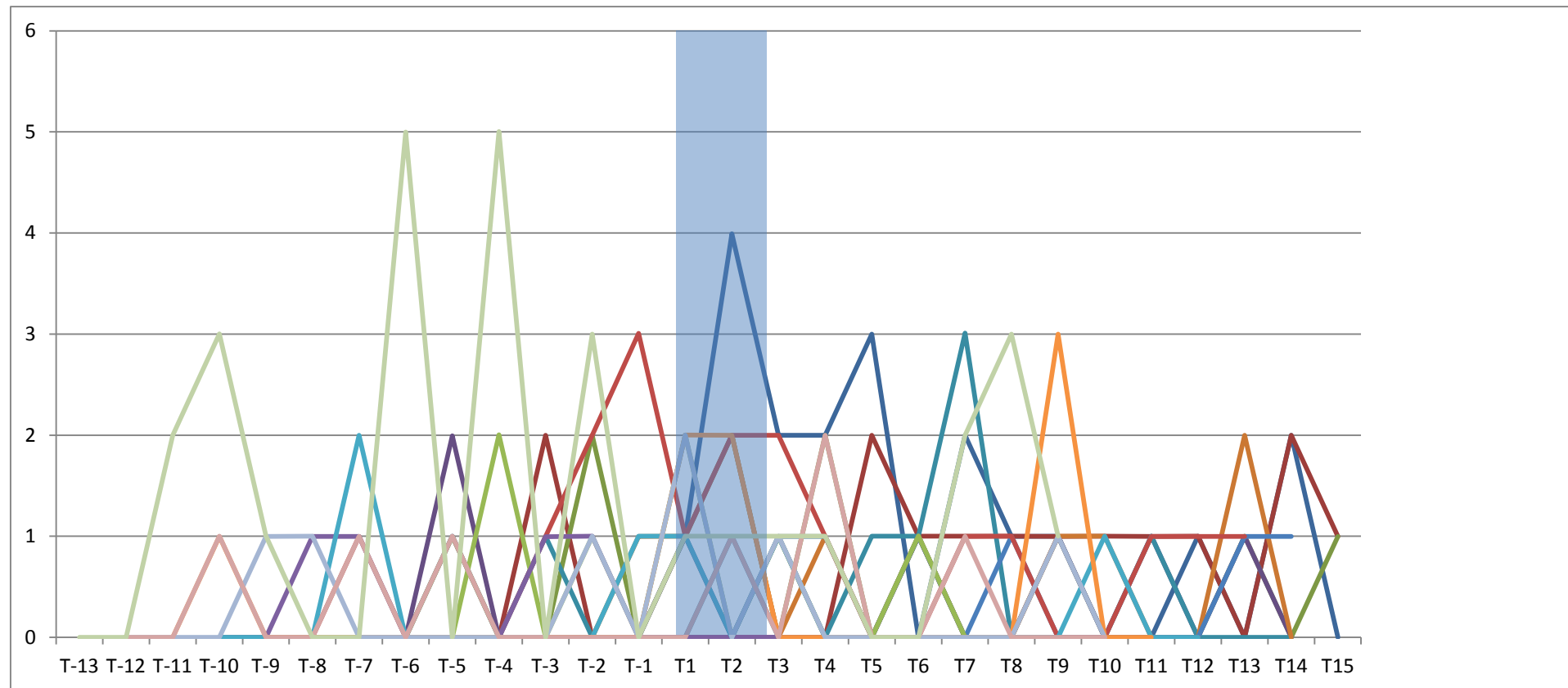




- Number of falls per 9 week block per facility



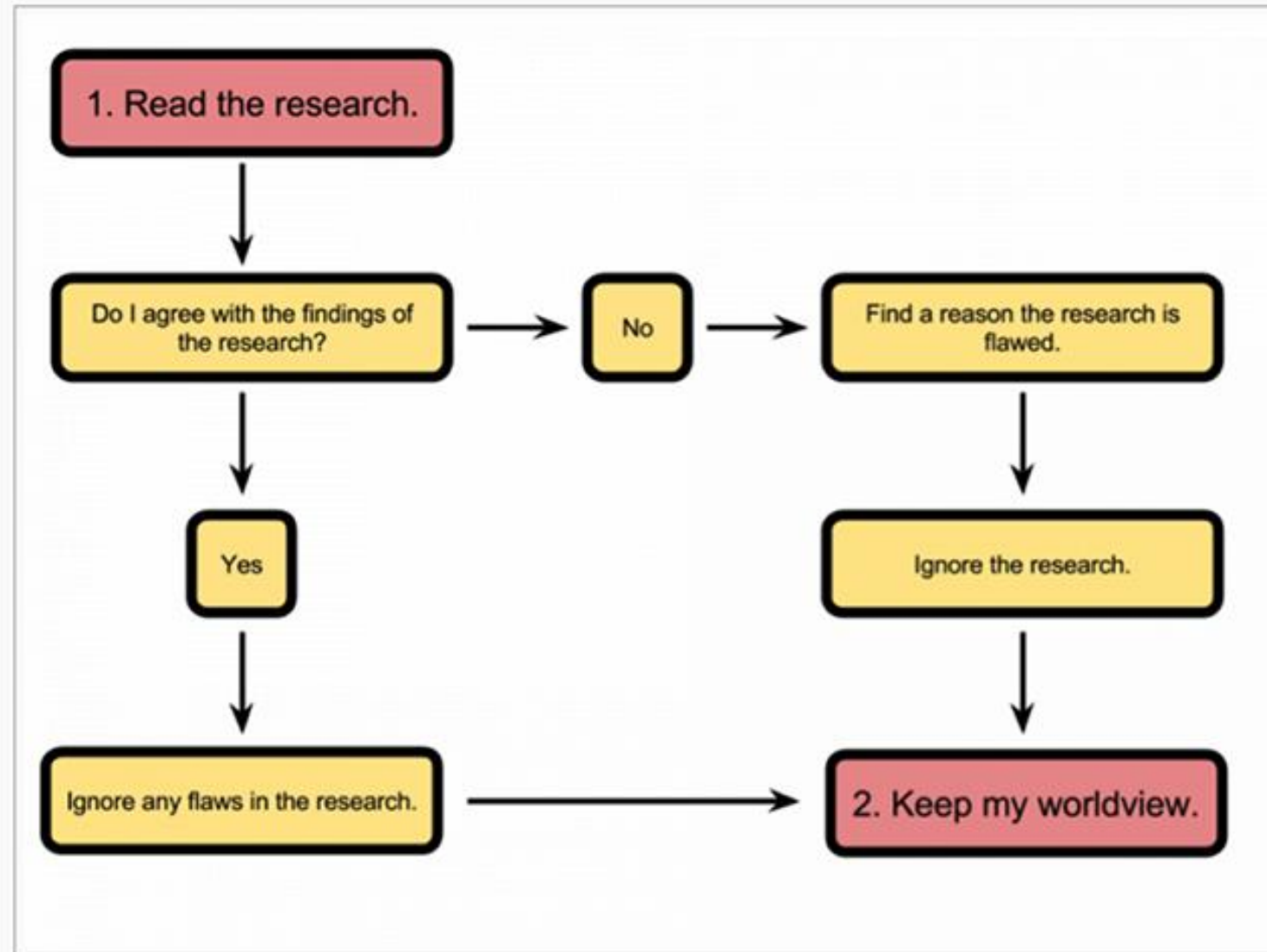
- Number of fall-related fractures per 9 week block per facility



- Beware: Confirmation bias is hard to resist!



## THE CONFIRMATION BIAS CYCLE



- Strong forces oppose our attempts to appropriately understand and use evidence in clinical practice, policy formation, adoption of innovation
  - Confirmation bias
  - Sunk cost bias
  - Cognitive dissonance, particularly with accepting results of negative trials
  - Wanting to implement watered down versions of research-based interventions
  - Fooling ourselves with use of faulty deductive reasoning
- Even when we do this, the evidence base can change beneath us, particularly if the evidence base is still emerging
- Making sound, evidence-based policy decisions is not an easy task!