

The role of chlorhexidine in reducing catheter associated urinary tract infection: a randomised controlled study

Professor Brett Mitchell

Avondale College of Higher Education

brett.mitchell@avondale.edu.au

Twitter: @1healthau

7th International ACIPC conference, Brisbane



Disclosures

- Funding for this study was provided from a HCF Foundation grant, nationally competitive grant, following competitive application process.
- Cash support from Avondale College of Higher Education
- Funders play no role in the conduct, design, analysis, interpretation or publication of any results

Other disclosures (not relevant to this talk)

- Recipient of grant funding from various bodies, including NHMRC, Ian Potter Foundation, Senner, Norman Foundation.
- Undertaking consulting work for Dept. Foreign Affairs and Trade, Australian Commission on Safety and Quality in Health Care, hospitals
- Editor-in-Chief, Infection Disease and Health

Overview

- Importance of CAUTI prevention & key prevention strategies
- Rationale for the study
- Effectiveness
- Cost-effectiveness

Team

- Professor Brett Mitchell
- Professor Allen Cheng (Monash)
- Professor Peter Collignon (Australian National)
- Dr Oyebola Fasugba (ACU)
- Dr Anne Gardner (QUT)
- Dr Jane Keoner (ACU)
- Professor Nicholas Graves (QUT)
- Victoria Gregory (Avondale)



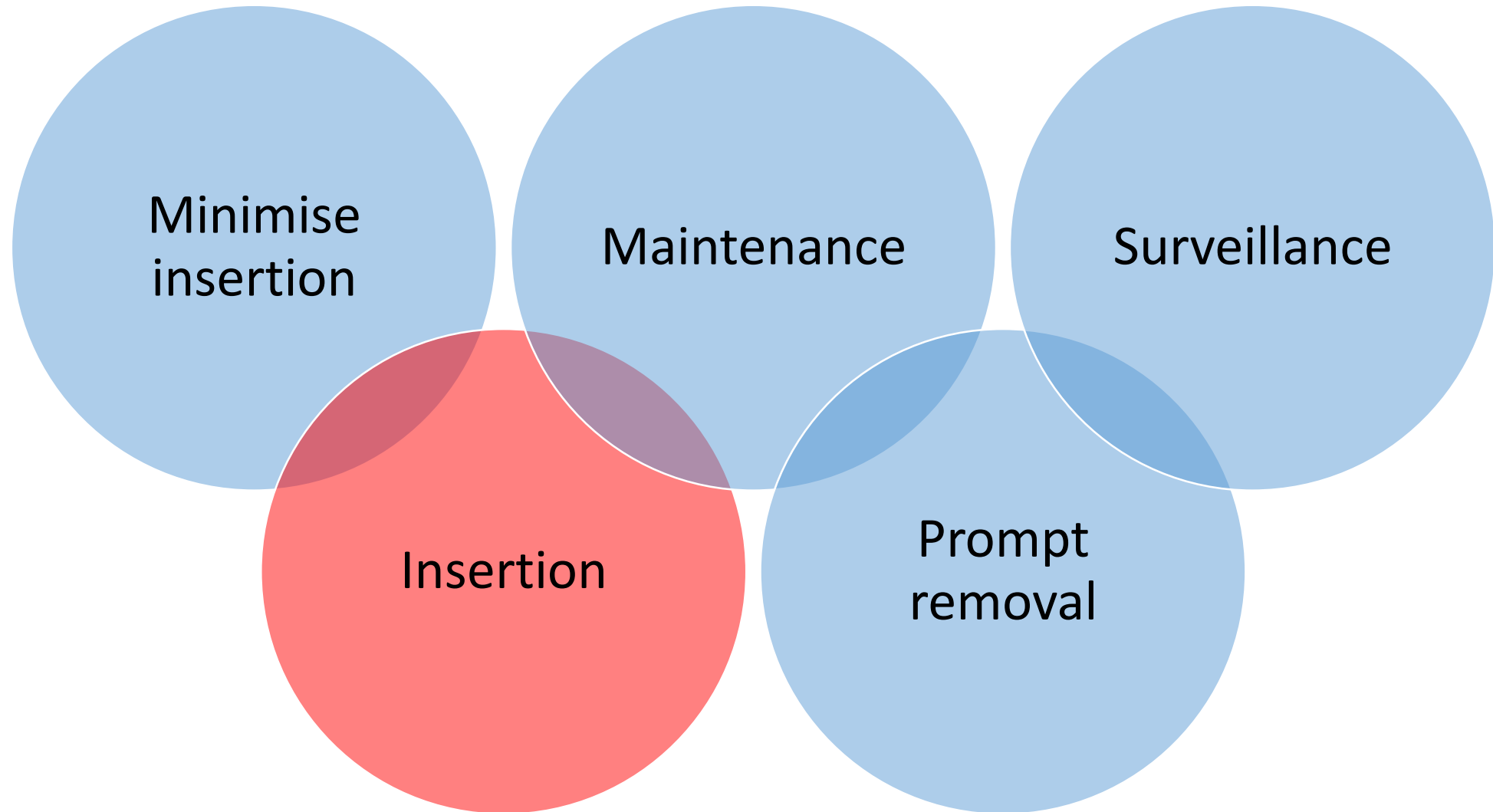
Ethics

- HREC approval Avondale College of Higher Education
- HREC approval for two hospitals under national mutual recognition scheme
- HREC approval by third HREC
- Site special authorisation at three participating hospitals
- Australian and New Zealand Clinical Trial Registry
 - ACTRN12617000373370

Prevention strategies: Why bother?

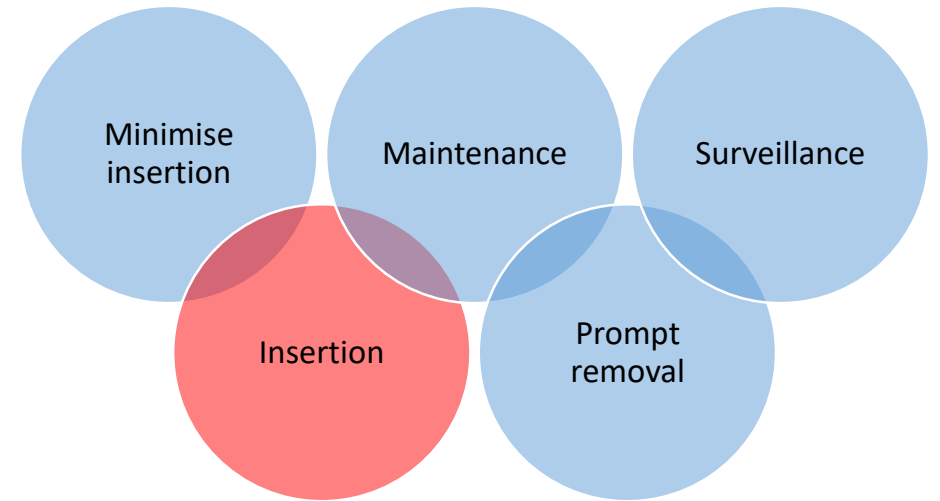
1. Frequency
2. Impact
3. Antimicrobial resistance

Prevention strategies



Prevention strategies: Insertion

- Trained/competent
- Sterile equipment
- Aseptic technique
- Use lubricant
- Clean meatal area....



Loveday, et al, (2014); *Journal of Hospital Infection*, 86, S1-S70.

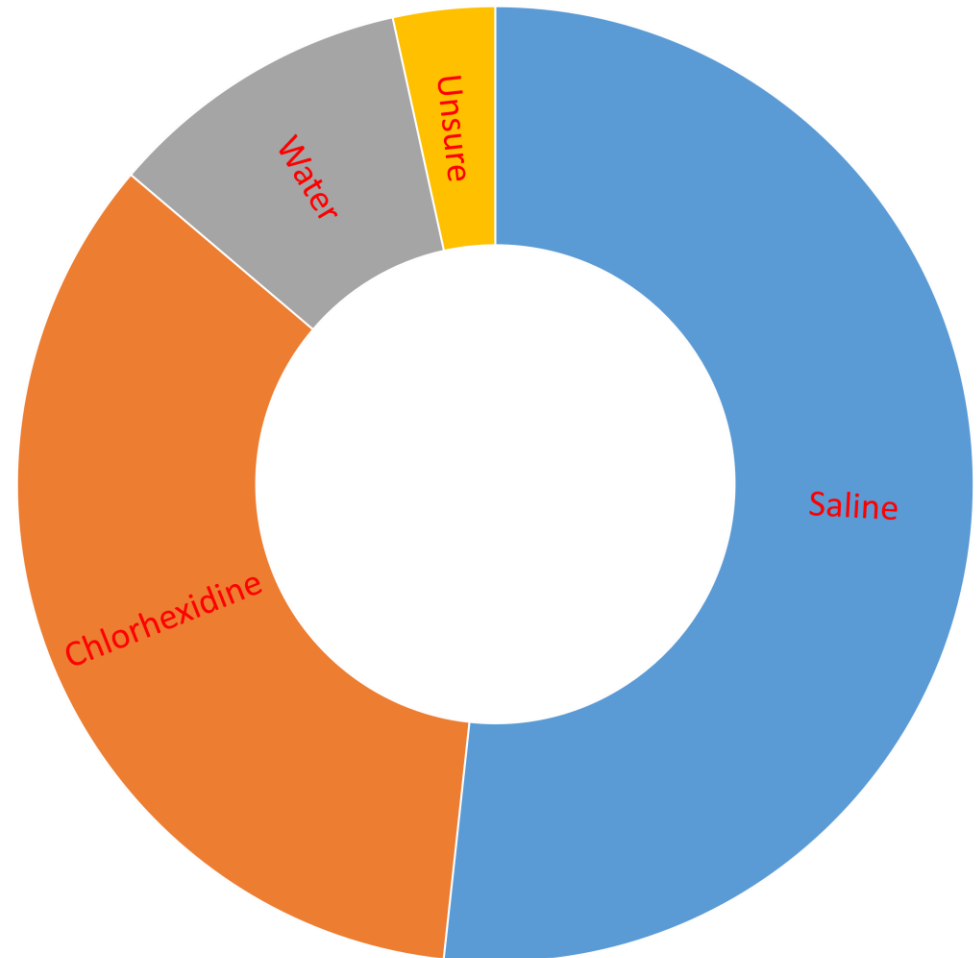
Lo, et al (2014). *Infection Control & Hospital Epidemiology*, 35(5), 464-479.

Meatal cleaning prior to catheter insertion: Practice

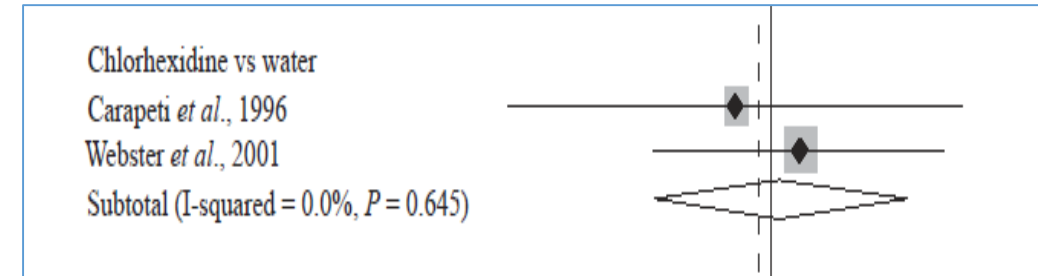
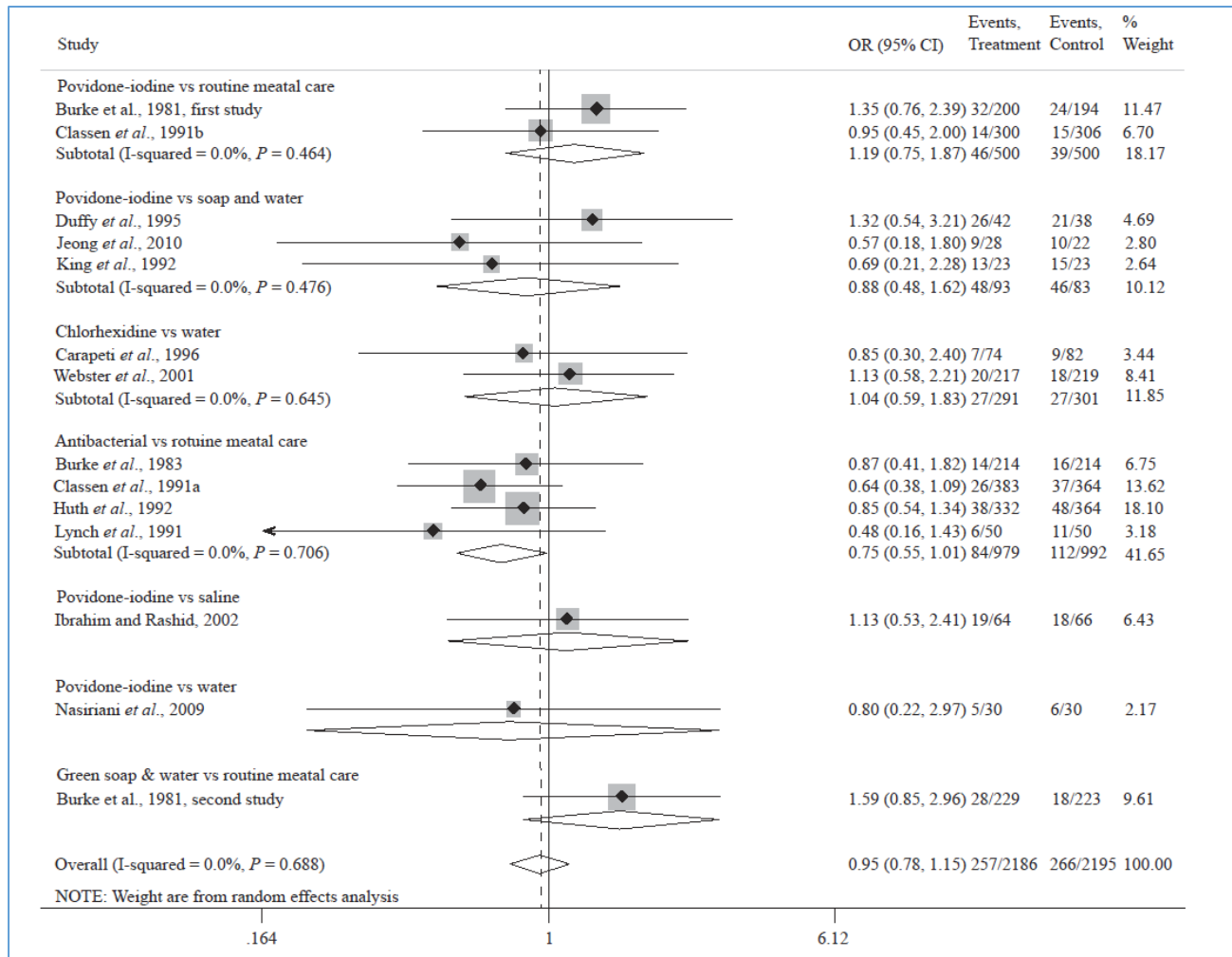
When cleaning the meatal area prior immediately prior to catheter insertion do you?

- A) Use saline
- B) Use chlorhexidine
- C) Use water
- D) Use iodine

Twitter poll in lead up to #IP2018



Meatal cleaning prior to catheter insertion: Evidence



Chlorhexidine V saline for meatal cleaning

Open Access

Protocol

BMJ Open Reducing catheter-associated urinary tract infections in hospitals: study protocol for a multi-site randomised controlled study

Brett G Mitchell,^{1,2} Oyebola Fasugba,^{1,3} Anne Gardner,⁴ Jane Koerner,⁴
Peter Collignon,^{5,6} Allen C Cheng,^{7,8} Nicholas Graves,⁹ Peter Morey,¹⁰
Victoria Gregory¹

Chlorhexidine V saline for meatal cleaning

The role of chlorhexidine in reducing catheter associated urinary tract infection: a randomised controlled study

Hospital acquired infections (& CAUTIs)



The Intervention

CHLORHEXIDINE 0.1% solution



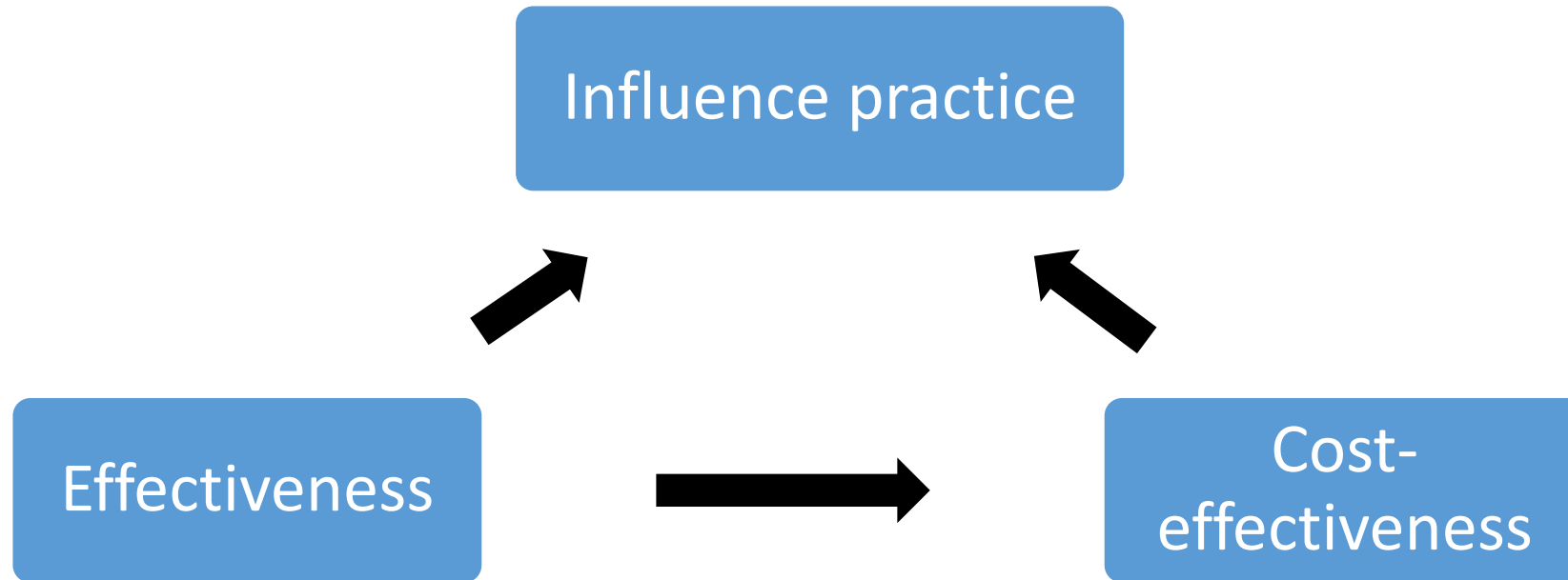
For cleaning the urethral meatal area before catheter insertion

32 week clinical trial



Chlorhexidine V saline for meatal cleaning

Study outcomes



- Incidence of CA-ASB & CAUTI
- Incidence of BSI associated with a urinary tract infection

- Changes to health services costs and quality adjusted life years (QALY) from a decision to adopt the intervention.

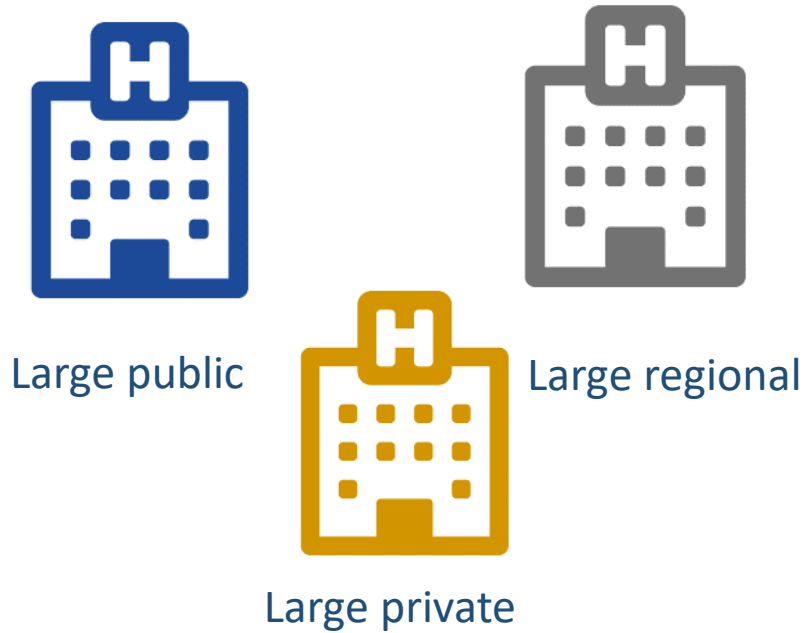
Chlorhexidine V saline for meatal cleaning

Design

Stepped wedge design



3 Australian hospitals



August 2017 - March 2018



Chlorhexidine V saline for meatal cleaning

Intervention



**CHLORHEXIDINE 0.1%
solution**

Vs

SALINE 0.9% solution

- All patients (except theatre patients in some circumstance)
- Training focussed on use of chlorhexidine immediately prior to switch to intervention
- Chlorhexidine incorporated into practice e.g. catheter packs

Chlorhexidine V saline for meatal cleaning

Methods

- Data were prospectively collected by hospital personnel from participants' medical records and microbiology department
- Data on UTI symptoms and signs were used to differentiate between CA-ASB and CAUTI
- A Poisson regression model was used to estimate the effect of the intervention on the outcome.
- Sensitivity analysis: excluding a hospital & logistic regression model
- Cost-effectiveness modelling study

Hospital	2 months	4 months	6 months	8 months
A	Red	Green	Green	Green
B	Red	Red	Green	Green
C	Red	Red	Red	Green

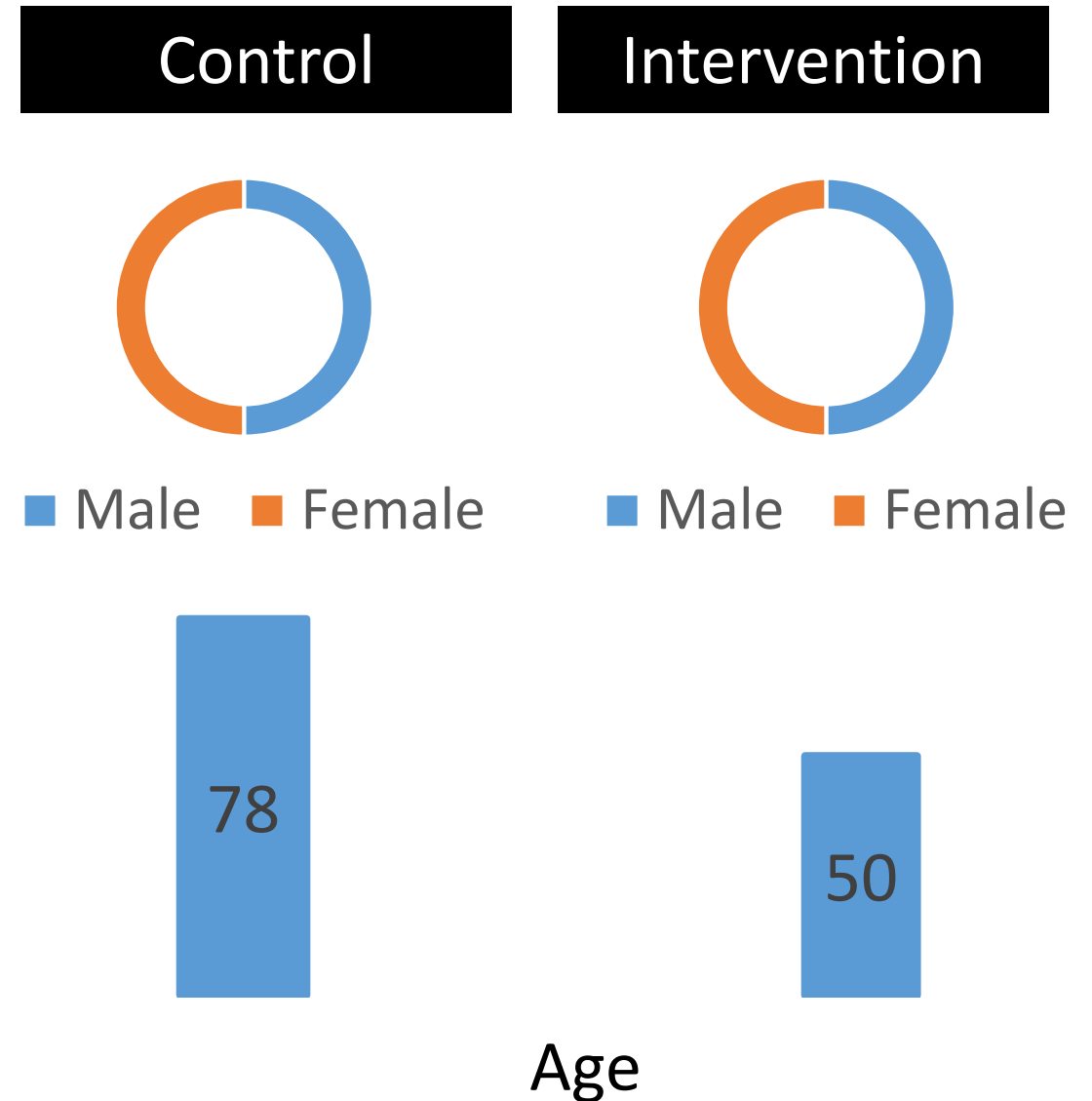
Stepped wedge design
(Red=intervention; green control)

Chlorhexidine V saline for meatal cleaning

Participants

1642 participants
(697 control / 945 intervention)

58% female

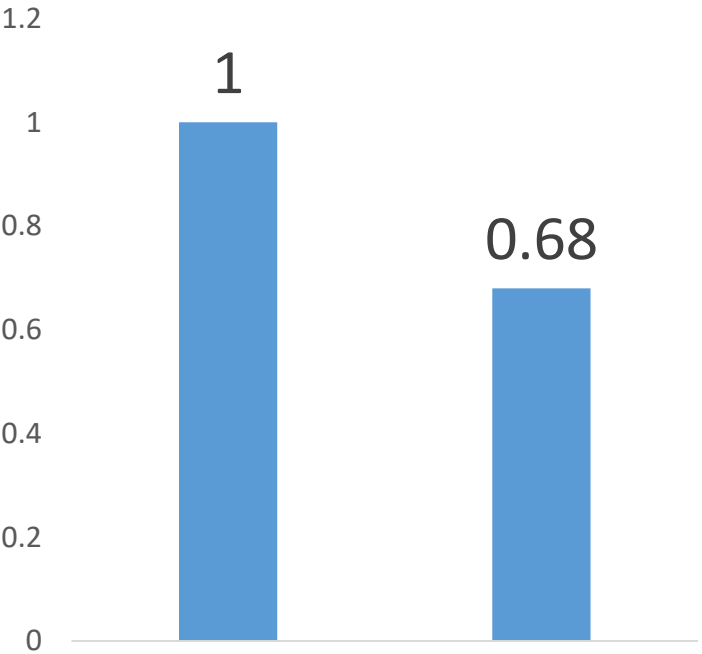


Chlorhexidine V saline for meatal cleaning

Effectiveness results

CA-ASB

(per 100 catheter days)



Control

Intervention

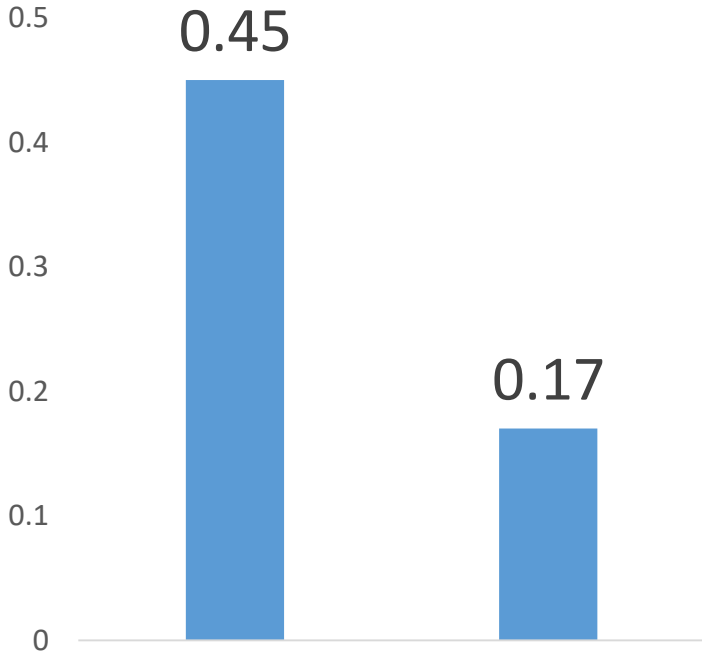
(29 cases) (16 cases)



No blood stream infections

CAUTI

(per 100 catheter days)



Control

Intervention

(13 cases) (4 cases)

Chlorhexidine V saline for meatal cleaning

Effectiveness results

	CA-ASB		CAUTI	
	Incidence rate ratio (95% CI)	p value	Incidence rate ratio (95% CI)	p value
Intervention	0.26 (0.08-0.86)	0.026	0.06 (0.01-0.32)	<0.001
Week	1.02 (0.97-1.07)	0.374	1.07 (0.98-1.16)	0.132
Hospital				
Hospital A	1 (referent)		1 (referent)	
Hospital B	0.35 (0.12-1.03)	0.056	0.17 (0.04-0.73)	0.018
Hospital C	0.27 (0.09-0.78)	0.015	0.14 (0.04-0.51)	0.003

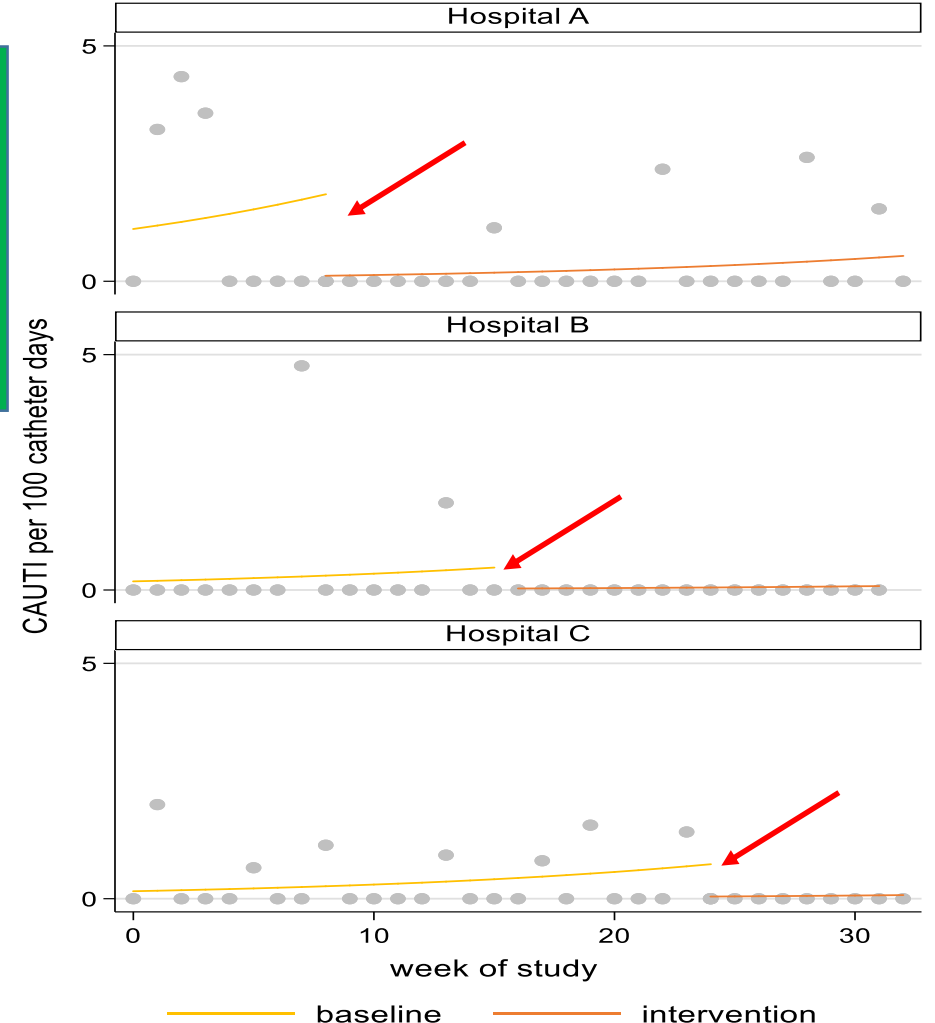
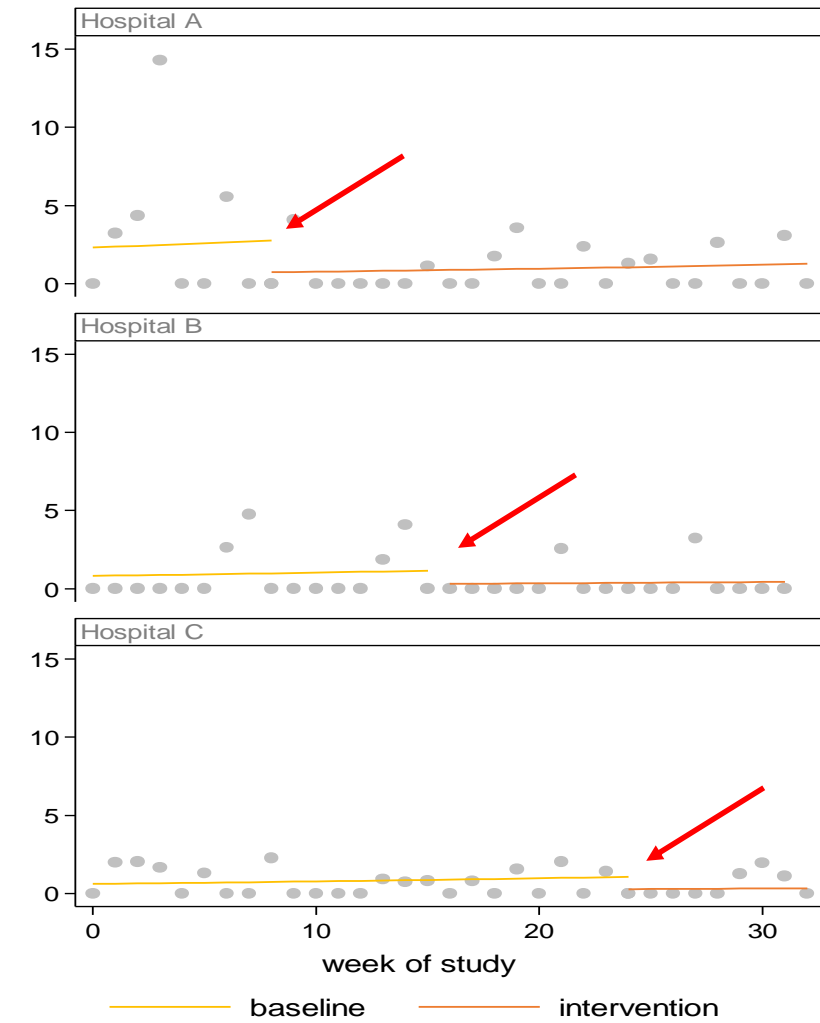
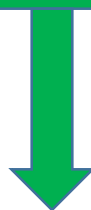
74% reduction of CA-ASB

94% reduction of CAUTIs

Chlorhexidine V saline for meatal cleaning

Effectiveness results

All three hospitals saw a reduction



CA-ASB

CAUTI

Chlorhexidine V saline for meatal cleaning

Effectiveness results – sensitivity

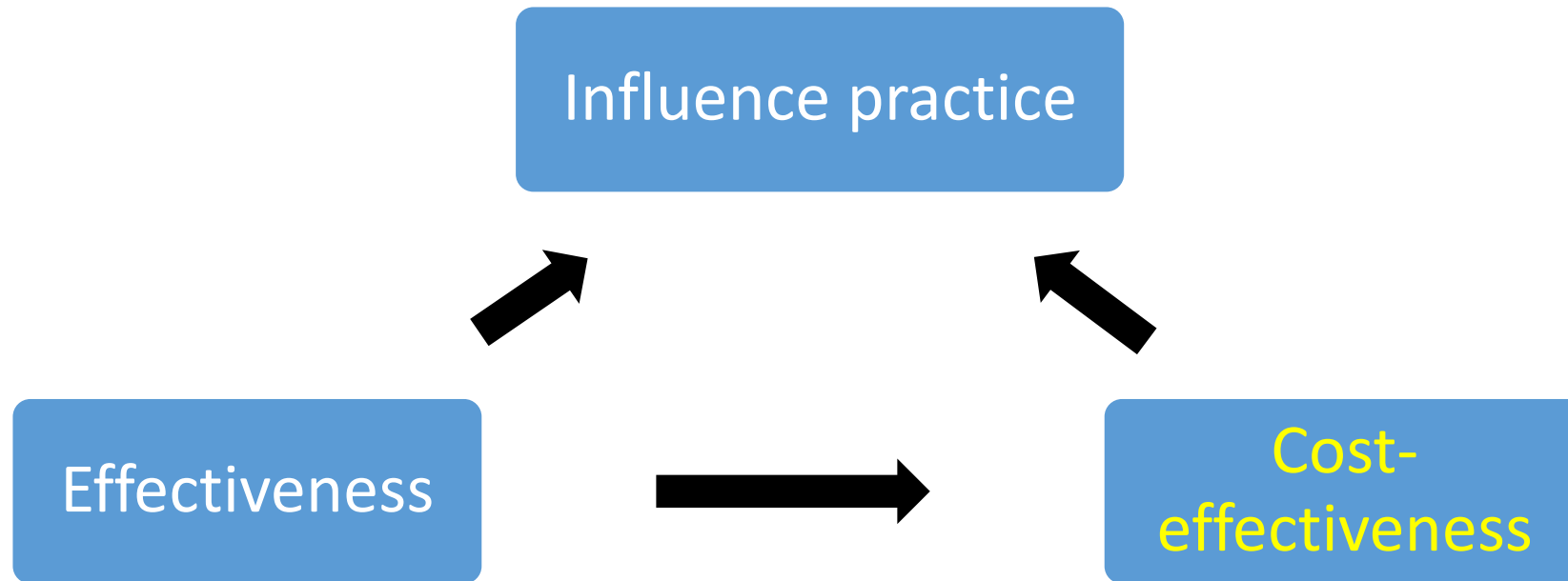
- With exclusion of hospital A, the intervention significantly reduced the risk of CAUTI
- Logistic regression model, adjusting for age, sex, and clustering by hospital, the use of chlorhexidine was associated with a significantly
 - reduced risk of CA-ASB, OR 0.42 (95%CI 0.33-0.53, $p < 0.001$) and
 - CAUTI, OR 0.17 (95%CI 0.05-0.55, $p = 0.003$)

Chlorhexidine V saline for meatal cleaning

Limitations and considerations

- Hawthorn effect
- 7 day follow-up of participants

Chlorhexidine V saline for meatal cleaning



- Incidence of CA-ASB & CAUTI
- Incidence of BSI associated with a urinary tract infection

- Changes to health services costs and quality adjusted life years (QALY) from a decision to adopt the intervention.

Chlorhexidine V saline for meatal cleaning

Concluding thoughts

The outcomes will:

- ✓ help patients
- ✓ inform clinical policy and practice
- ✓ national and international impact



Chlorhexidine V saline for meatal cleaning

Acknowledgments

- Infection prevention and control co-ordinators at participating hospitals
- Data collectors / infection control staff at participating hospitals
- HCF Foundation
- Avondale College of Higher Education

The role of chlorhexidine in reducing catheter associated urinary tract infection: a randomised controlled study

Professor Brett Mitchell

Avondale College of Higher Education

brett.mitchell@avondale.edu.au

Twitter: @1healthau

7th International ACIPC conference, Brisbane

