

**Implementing a care bundle to reduce  
*Staphylococcus aureus* bloodstream  
infections associated with peripheral  
intravenous cannulae: experience at a large  
Australian health service**

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ACIPC Conference

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## **Conflicts of interest**

None to declare

# Acknowledgements

Alfred Health Patients & Clinical Staff

Mr. Andrew Way (CEO)

Alfred Health Infection Prevention Committee

Infection Prevention & Healthcare Epidemiology Unit

# Alfred Health



- Metropolitan health service
- 860 beds
- 3 campuses

## ***Staphylococcus aureus* bacteraemia (SAB)**

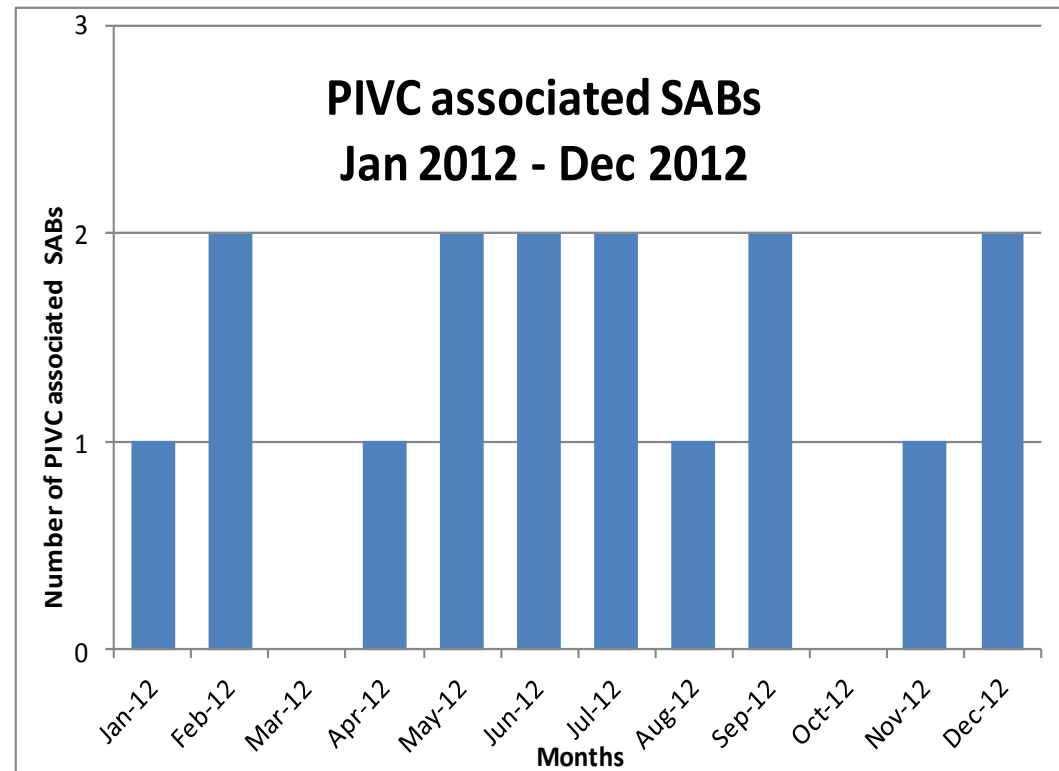
- Morbidity and mortality
- Impact on healthcare resources
- Healthcare associated (HA-SAB)
- Signal event letters (root cause analysis)

## Definitions – PIVC associated HA-SAB

- Infectious Diseases Physician review
  - PIVC insitu or removed within 48 hours
  - No other site of *S. aureus* infection
  - Swab not needed to fit definition
  - Presence of phlebitis not a determinant

## Background - 2012

- Emerging trend
- 40 HA-SABs
- 40% PIVC associated (16)



# Aims & Objectives

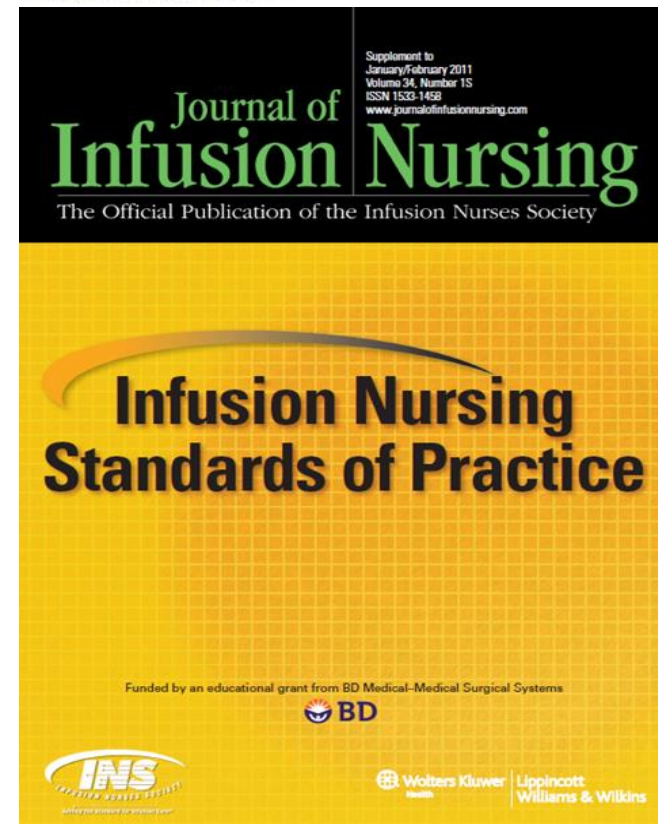
## ➤ Prevent PIVC associated SABs

- Evidence based literature review
- Examine insertion & management
- Implement improvements
- Streamline PIVC insertion training



## Guidelines for the Prevention of Intravascular Catheter-Related Infections, 2011

Naomi P. O'Grady, M.D.<sup>1</sup>, Mary Alexander, R.N.<sup>2</sup>, Lillian A. Burns, M.T., M.P.H., C.I.C.<sup>3</sup>, E. Patchen Dellinger, M.D.<sup>4</sup>, Jeffery Garland, M.D., S.M.<sup>5</sup>, Stephen O. Heard, M.D.<sup>6</sup>, Pamela A. Lipsett, M.D.<sup>7</sup>, Henry Masur, M.D.<sup>8</sup>, Leonard A. Mermel, D.O., Sc.M.<sup>9</sup>, Michele L. Pearson, M.D.<sup>9</sup>, Issam I. Raad, M.D.<sup>10</sup>, Adrienne Randolph, M.D., M.Sc.<sup>11</sup>, Mark E. Rupp, M.D.<sup>12</sup>, Sanjay Saint, M.D., M.P.H.<sup>13</sup> and the Healthcare Infection Control Practices Advisory Committee (HICPAC)<sup>14</sup>.





# Methods

- Executive approval
- Project co-ordinator
  - ✓ 0.5 EFT x 2 years
- Working group (key areas)
- Audit & interventions



## Pre-intervention - insertion audit

Wards (excluding Operating Theatres) n = 32	Compliance%
Trolley cleaned before use	14%
Dressing pack use	84%
Chlorhexidine w 70% alcohol skin prep	81%
Insertion site not touched after cleaning	77%
Hand hygiene – Moment 2	53%

# Pre-intervention – management audit

- Point prevalence
- All inpatients
- 2 – 3 weeks of auditing

PIVC Management Audit Tool PRE-INTERVENTION							
Date: _____		Auditor: _____					
Ward: _____		No. of ward patients: _____		DOA: _____		DOA: _____	
Total number of pts with PIVCs on ward: _____				UNIT: _____		UNIT: _____	
Cannula & line inspection				Bed:		Bed:	
Side				L R		L R	
Site used Use key							
Size insitu Use key							
Calibre of dressing Use key							
Type of dressing Use key							
Dressing is legibly marked with insertion date				Y N		Y N	
Cannula attachments Use key							
All ports are covered with NADs, caps or lines				Y N		Y N	
The cannula, caps/bungs and lines are visibly free of blood				Y N		Y N	
Tubing effectively secured				Y N N/A		Y N N/A	
Patient bedspace free of disconnected lines				Y N		Y N	
All lines are labelled (pt's name, date & time)				Y N N/A		Y N N/A	
All infusion bags are labelled (pt's name, date & time)				Y N N/A		Y N N/A	
Lines <b>not</b> overdue for replacement				Y N N/A		Y N N/A	
The phlebitis score (auditors assessment)				0 1 2 3 4		0 1 2 3 4	

## Education – by Infection Prevention



- Cannulation training
  - ✓ Interim e-learning package
  - ✓ DVD
  - ✓ Nursing Education handover
- Intern orientation
- Assessor refresher
- Audit result feedback

# Phlebitis Score:

For the assessment of peripheral IV cannulae.

**Alfred**Health

**No pain, heat, redness or swelling.**

**0**

Remove cannula if not required.  
Monitor cannula site every shift  
and when accessing line.

**Slight pain, slight redness (<2cm)  
at cannula site.**

**1**

Remove cannula if not required,  
or consider replacement.  
Monitor cannula site every shift  
and when accessing line.

**Pain with redness, heat  
or swelling at cannula site.**

**2**

**PHLEBITIS**  
Remove cannula.  
Notify Medical Team.

**Pain, redness, heat or swelling with  
exudate, hardening, a palpable venous  
cord, or tissue damage at cannula site.**

**3**

**SEVERE PHLEBITIS**  
Remove cannula. Notify medical team.  
Send swab of exudate and blood  
cultures if clinically indicated.  
**Submit Riskman.**

Adapted from A. Jackson's VIP Score. *Nursing Times* Jan 28, Vol.94. No 4, 1998.

# Insertion documentation

<b><u>Peripheral IV Cannulation</u></b>		
Size/colour: <input type="text"/>		
<input type="checkbox"/> <b>LEFT</b>	<input type="checkbox"/> <b>RIGHT</b>	
<input type="checkbox"/> Hand	<input type="checkbox"/> Wrist	<input type="checkbox"/> ACF
<input type="checkbox"/> Forearm	<input type="checkbox"/> Lower forearm	
<input type="checkbox"/> Upper forearm	<input type="checkbox"/> Upper arm	
<input type="checkbox"/> Other	<input type="text"/>	
Inserted by (sign) <input type="text"/>		
Date: <input type="text"/>	Time: <input type="text"/>	

☐ Alfred ☐ Sandringham ☐ Caulfield

Unit: .....

## PERIPHERAL IV CANNULATION OBSERVATIONS - ADULT

Chart ☐ of ☐

Unit:

Family Name:

Given Names:

Address:

Date of Birth:  Gender: ☐ Male ☐ Female



### IMPORTANT

Remove within 24hrs if not inserted at Alfred Health, or if asepsis not guaranteed.  
Avoid lower limb cannulation - remove/replace as soon as possible.  
Remove/replace within 48 hrs if used for chemotherapy.



Phlebitis Score: Adapted from A. Jackson's VP Score. Nursing Times Jan 28, Vol 94, No 4, 1998

No pain, heat, redness or swelling.	0	Remove cannula if not required. Monitor cannula site every shift and when accessing line.
Slight pain, slight redness (<2cm) at cannula site.	1	Remove cannula if not required, or consider replacement. Monitor cannula site every shift and when accessing line.
Pain with redness, heat or swelling at cannula site.	2	<b>PHLEBITIS</b> Remove cannula. Notify Medical Team.
Pain, redness, heat or swelling with exudate, hardening, a palpable venous cord, or tissue damage at cannula site.	3	<b>SEVERE PHLEBITIS</b> Remove cannula. Notify Medical Team. Send swab of exudate & blood cultures if febrile. Submit Riskman.

**Peripheral IV Cannulation**

Size/colour:

☐ LEFT ☐ RIGHT

☐ Hand ☐ Wrist ☐ ACF

☐ Forearm ☐ Lower forearm

☐ Upper forearm ☐ Upper arm

☐ Other:

Inserted by (sign)

Date:  Time:

Observations		Score and Sign			
ACTIVITY	DATE	AM	PM	ND	
Date inserted	/ /	/	/	/	
	/ /	/	/	/	
Plan to resite tomorrow if score >1	/ /	/	/	/	
RESITE TODAY if access still required	/ /	/	/	/	
Removal Date: / /	Time: : :	Sign: <input type="text"/>			

Peripheral IV cannula # \_\_\_\_\_

Size / colour: \_\_\_\_\_

☐ LEFT ☐ RIGHT

☐ Hand ☐ Wrist

☐ Forearm ☐ Lower Forearm

☐ Upper Forearm ☐ Upper arm

☐ ACF ☐ Other:

Observations		Score and Sign			
ACTIVITY	DATE	AM	PM	ND	
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Peripheral IV cannula # \_\_\_\_\_

Size / colour: \_\_\_\_\_

☐ LEFT ☐ RIGHT

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☐ Forearm ☐ Lower Forearm

☐ Upper Forearm ☐ Upper arm

☐ ACF ☐ Other:

Observations		Score and Sign			
ACTIVITY	DATE	AM	PM	ND	
Date inserted	/ /	/	/	/	
	/ /	/	/	/	
Plan to resite tomorrow if score >1	/ /	/	/	/	
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Removal Date: / /	Time: : :	Sign: <input type="text"/>			

## 24 hour removal sticker







## Peripheral Intravenous Cannulation &amp; Ongoing Management

Title Guideline : Adults

## TARGET AUDIENCE

Alfred Health clinical staff, visiting medical officers and selected students who will be responsible for performing peripheral intravenous cannulation, and those staff who manage patients receiving peripheral intravenous therapy.

## PURPOSE

This guideline describes the recommendations and expected practice related to the insertion and management of peripheral intravenous cannulae.

Clinicians wishing to perform peripheral intravenous cannulation at Alfred Health must familiarise themselves with the requirements outlined in Appendices I & II.

## DEFINITION

Peripheral intravenous cannulation (PIVC) refers to the insertion of an indwelling, short, hollow plastic tube into a vein to enable direct access to the bloodstream.

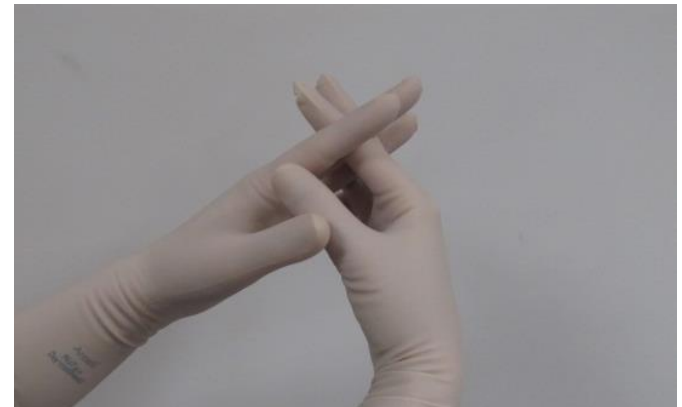


PIVC is one of the most commonly performed invasive procedures for hospitalised patients. It is associated with a risk of harm, as well as physical and sometimes psychological discomfort and should only be undertaken when necessary.

PIVC also poses potential risks to healthcare workers (HCWs) through the exposure to blood/body fluids. The following guidelines available on PROMPT present strategies for the minimisation of this risk:

- [Personal Protective Equipment \(PPE\) for Preventing Healthcare Associated Infection](#)
- [Management of Occupational Blood or Body Fluid Exposures at Alfred Health](#)
- [Alfred Health Waste Management](#)

AlfredHealth



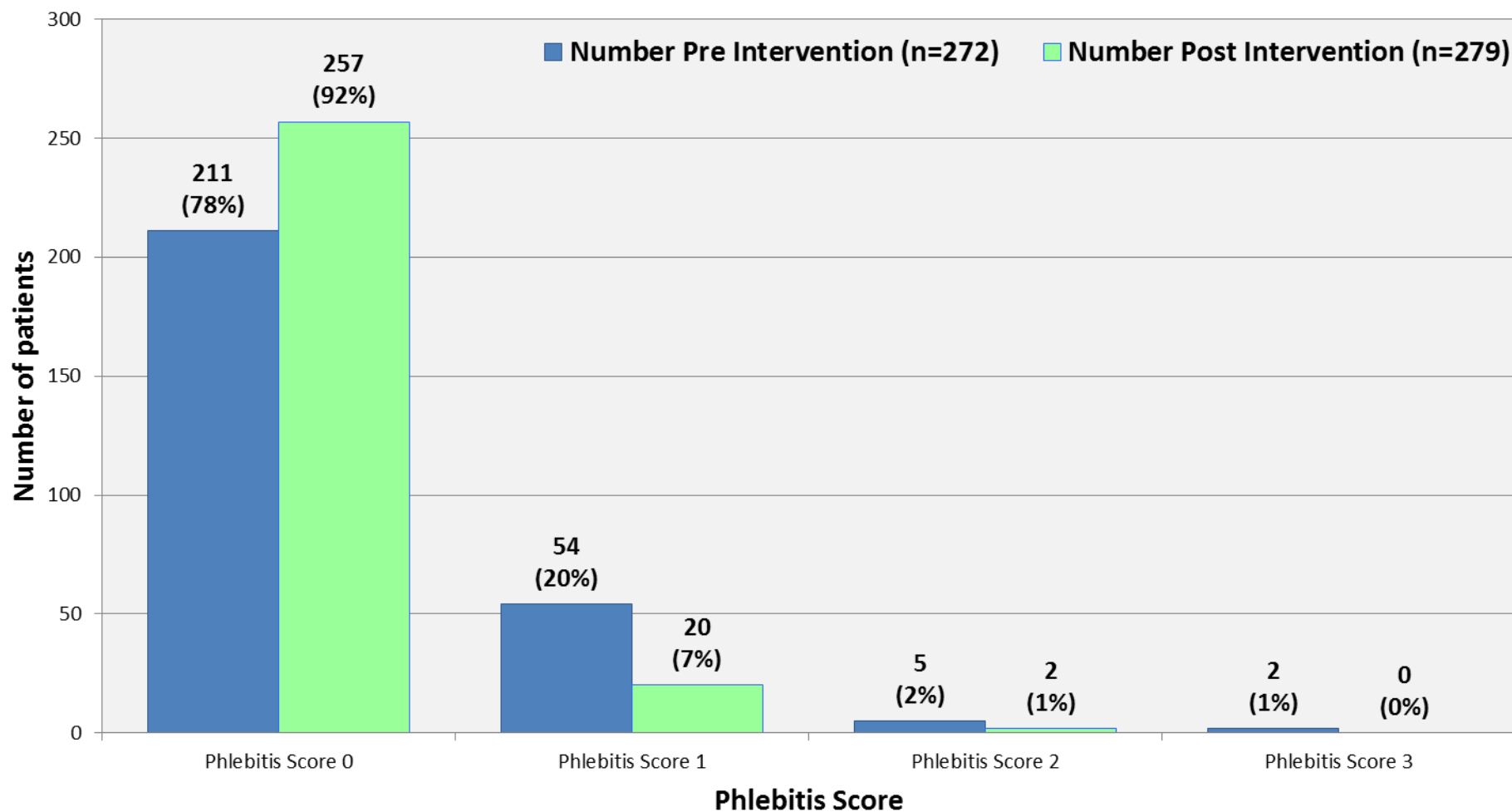
## KEY PARTS

Critical parts of equipment that can introduce pathogens into a patient

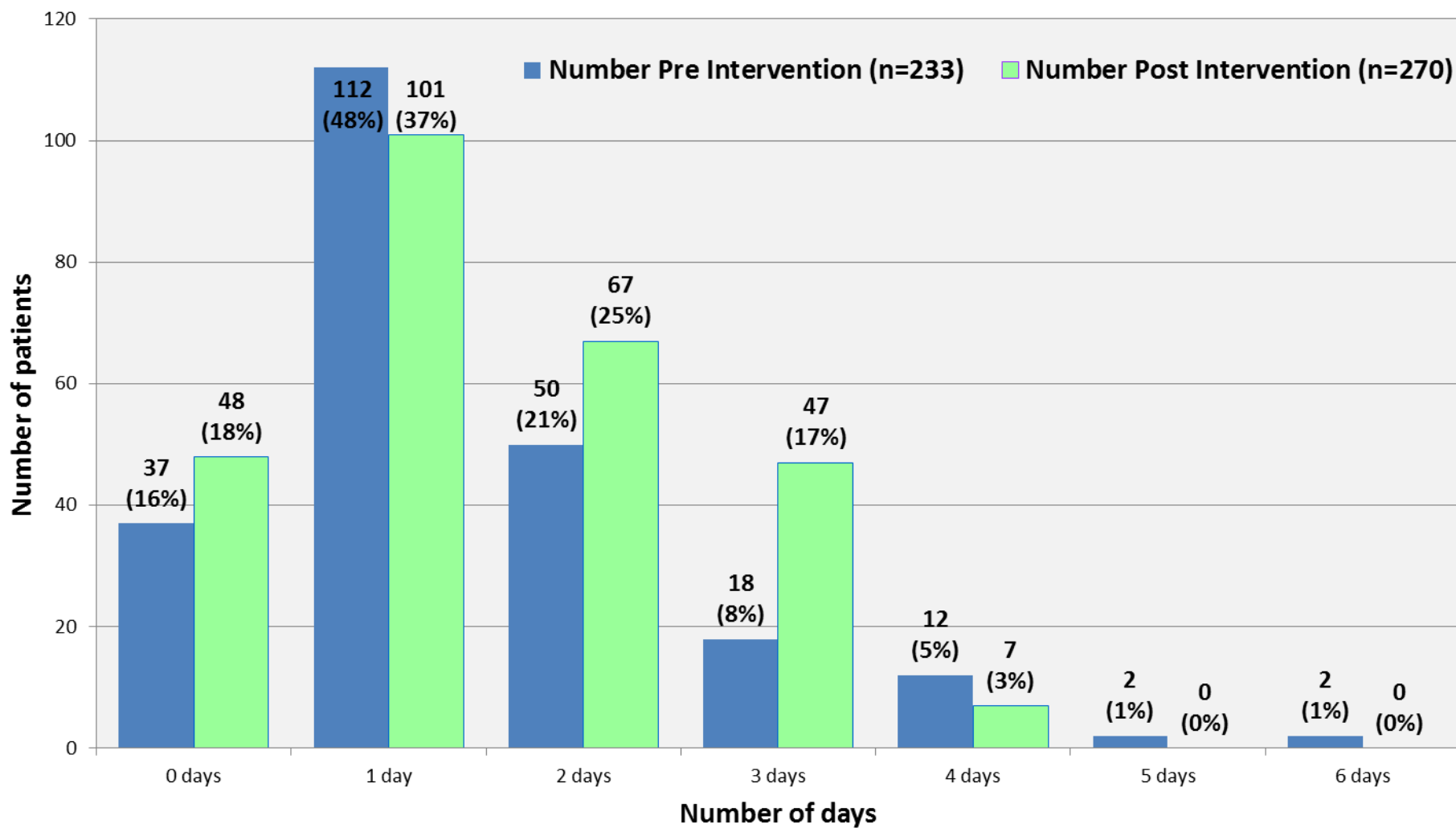
## Results: Processes

Criteria	Pre-intervention	Post-intervention	p value
Insertion date on dressing	60/272 (22.1%)	86/279 (30.8%)	<0.05
Name of HCW inserting PIVC recorded	55/272 (20.2%)	87/279 (31.2%)	<0.05
PIVC observation chart commenced	107/256 (41.8%)	161/241 (66.8%)	<0.05
Avoidance of cubital fossa	102/273 (37.4%)	88/279 (31.5%)	0.15

## PIVC Management Audit 2013/2014 - Pre and Post Comparison Phlebitis Score (Auditor Assessment)

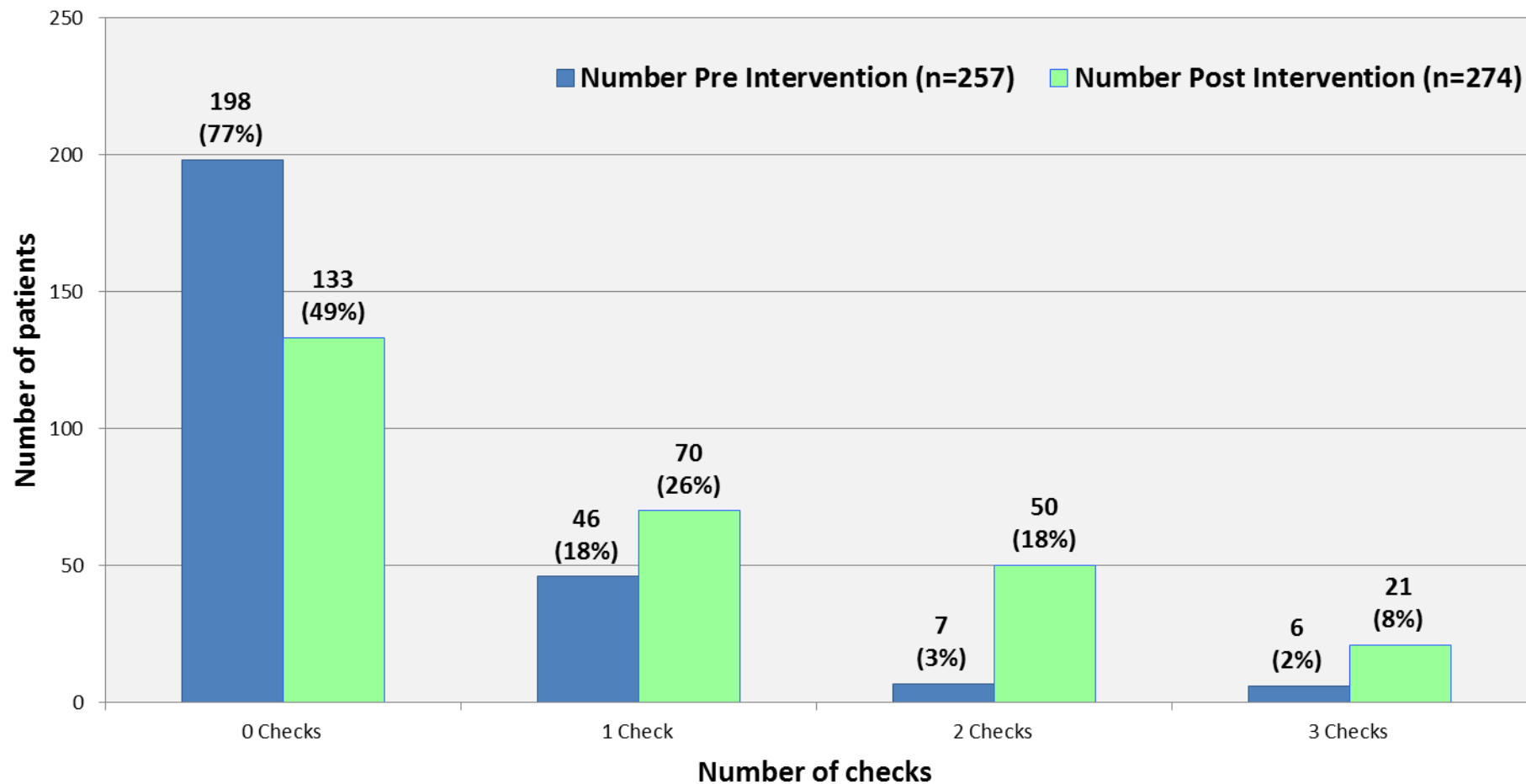


## PIVC Management Audit 2013/2014 - Pre and Post Number of Days Insitu

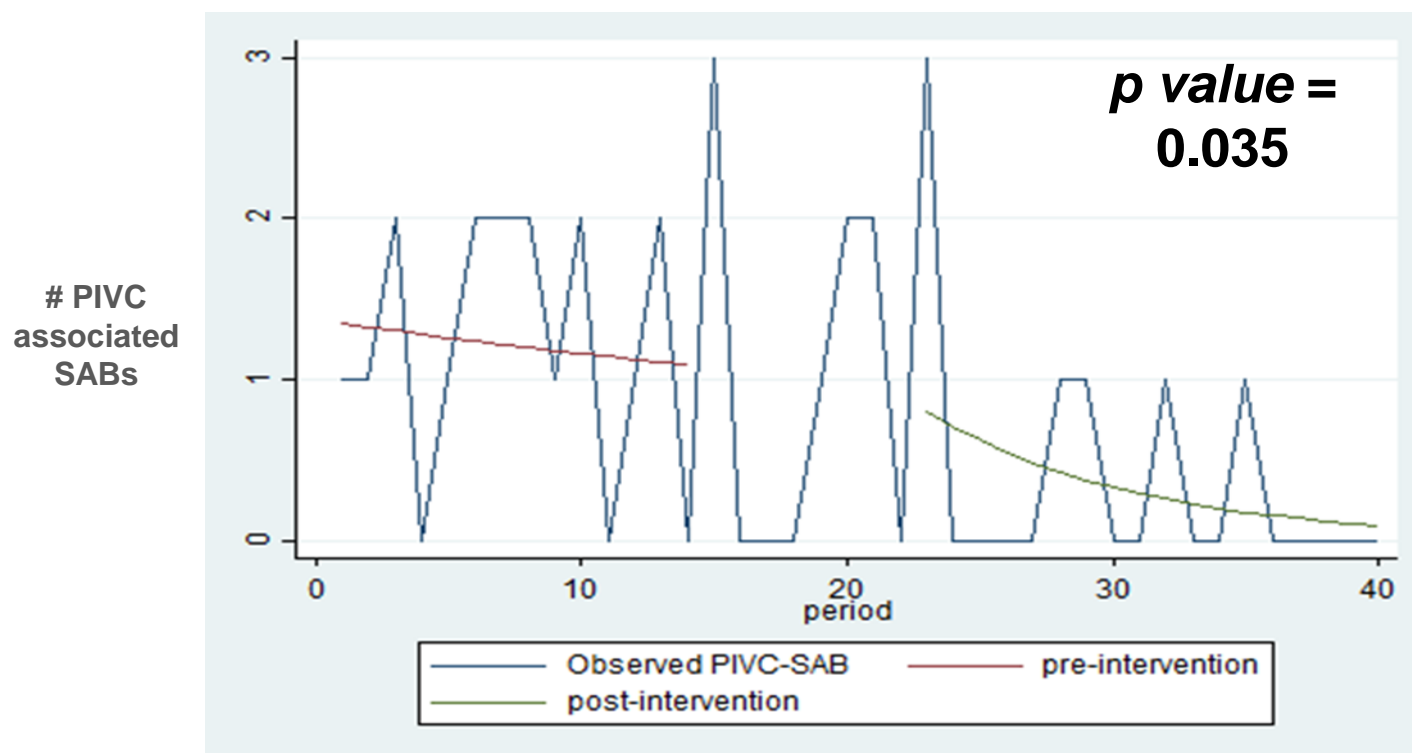


## PIVC Management Audit 2013/2014 - Pre and Post Comparison

### Number of Recorded Phlebitis Checks in the Last 24 Hours



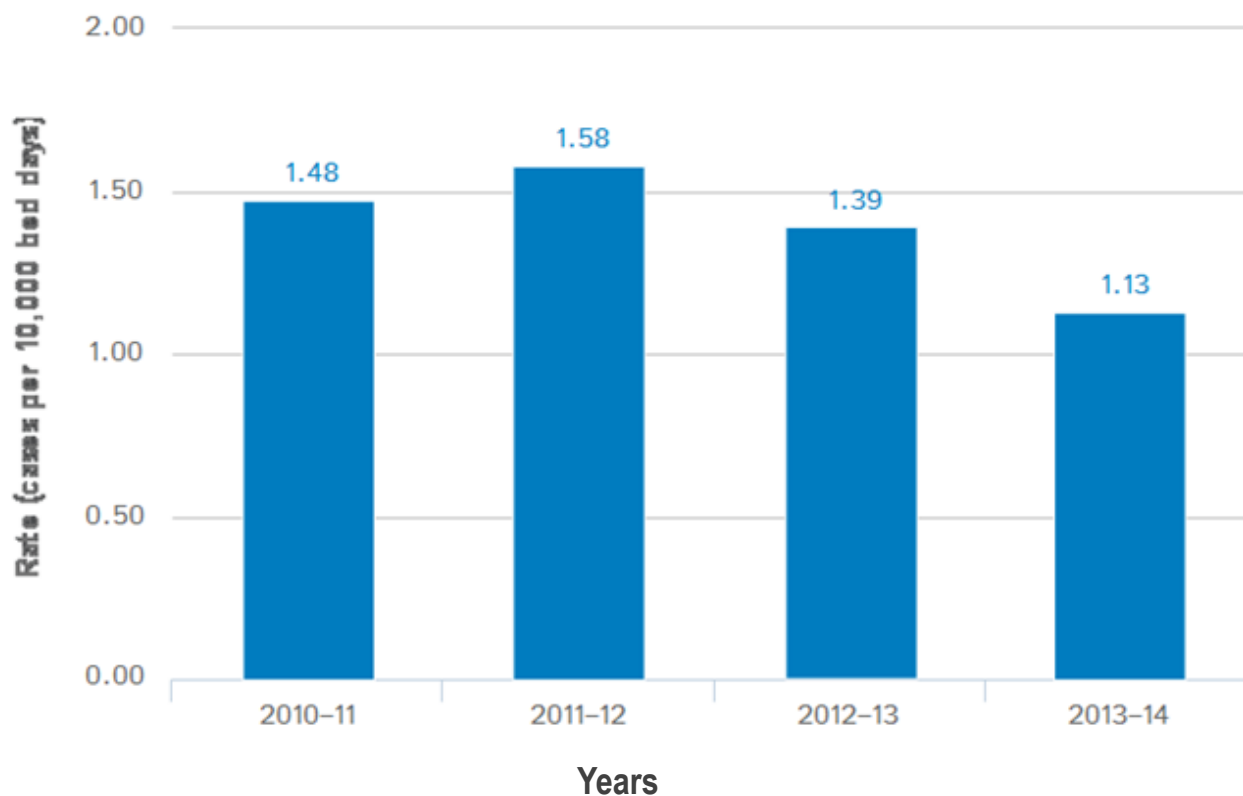
## Results: Outcome



40 HA-SABs  
40% PIVC associated

32 HA-SABs  
18.8% PIVC associated

*Staphylococcus aureus* bloodstream infections



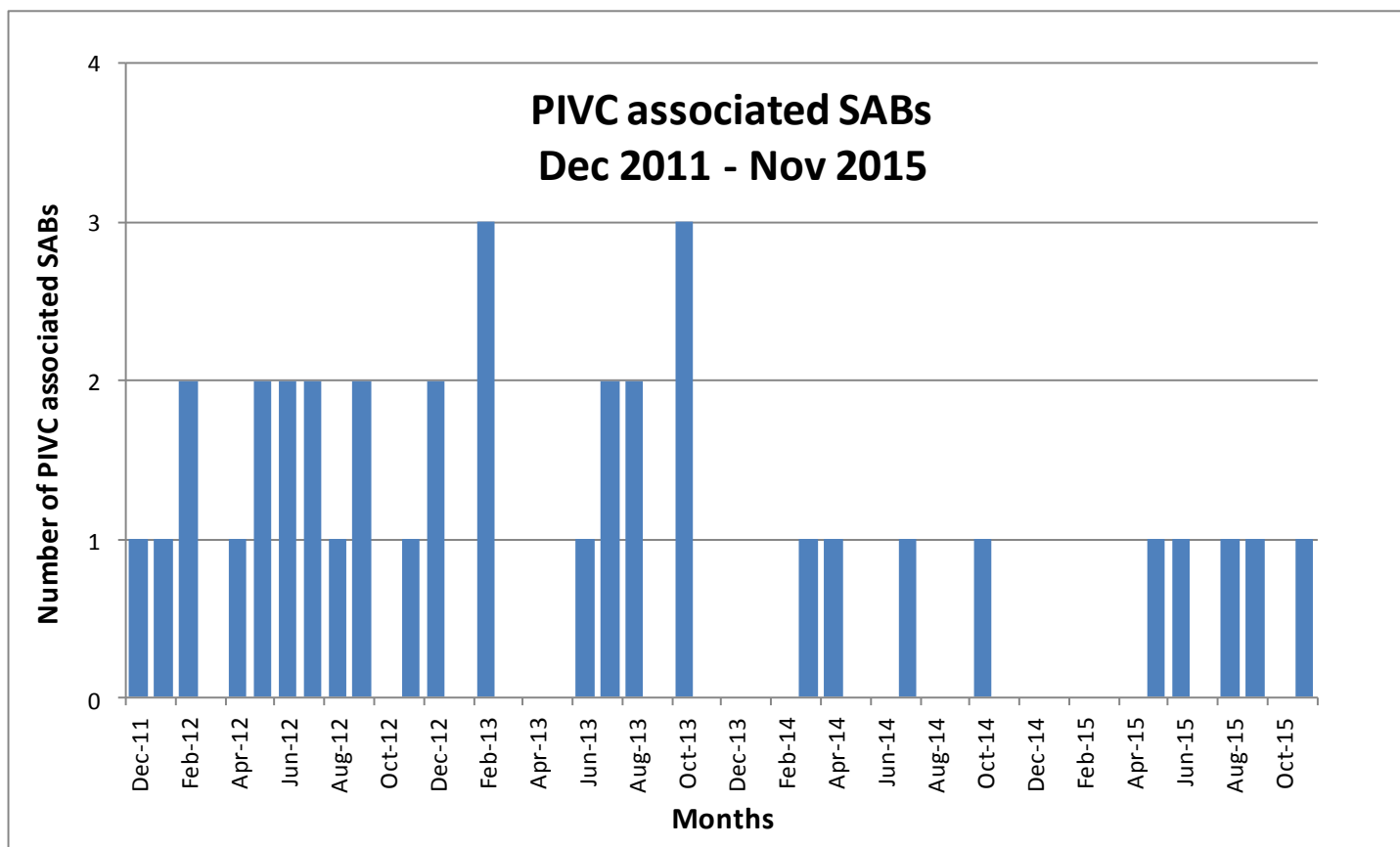




## **Challenges & Limitations**

- Staff turnover
- 72 hour rule
- Failure to comply with insertion recommendations
- What was it that worked?

# PIVC associated SABs





## Looking forward...

- Embedding of new guideline
- Auditing and feedback: insertion and management
  - Point of care audits
  - Project sustainability role
- Implementation of the new training module

## Did we meet our aims & objectives?

Implement improved processes	Successful
Streamlined PIVC insertion training	Ready to go!
Prevented 10 SABs in 12 months	Saved \$105,000 <sup>1</sup> (net)

<sup>1</sup>Stuart RL, Cameron DR, Scott C, et al. Peripheral intravenous catheter-associated Staphylococcus aureus bacteraemia: more than 5 years of prospective data from two tertiary health services. The Medical journal of Australia. Jun 3 2013;198(10):551-553.

# Thank you!

- Gavin Hawkins – Public Affairs
- Andrew Jackson (RN)
- Peter Holloway – Holloway Productions



**COVIDIEN**

