PIVC Bundles: Science or Serendipity?

ACIPC conference, Hobart

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Dr Gillian Ray-Barruel, RN, PhD

University of Queensland School of Nursing, Midwifery and Social Work;
UQ Centre for Clinical Research; Herston Infectious Diseases Institute, Metro North HHS;
Alliance for Vascular Access Teaching and Research (AVATAR); Griffith University (Adjunct)

Acknowledgement of Country

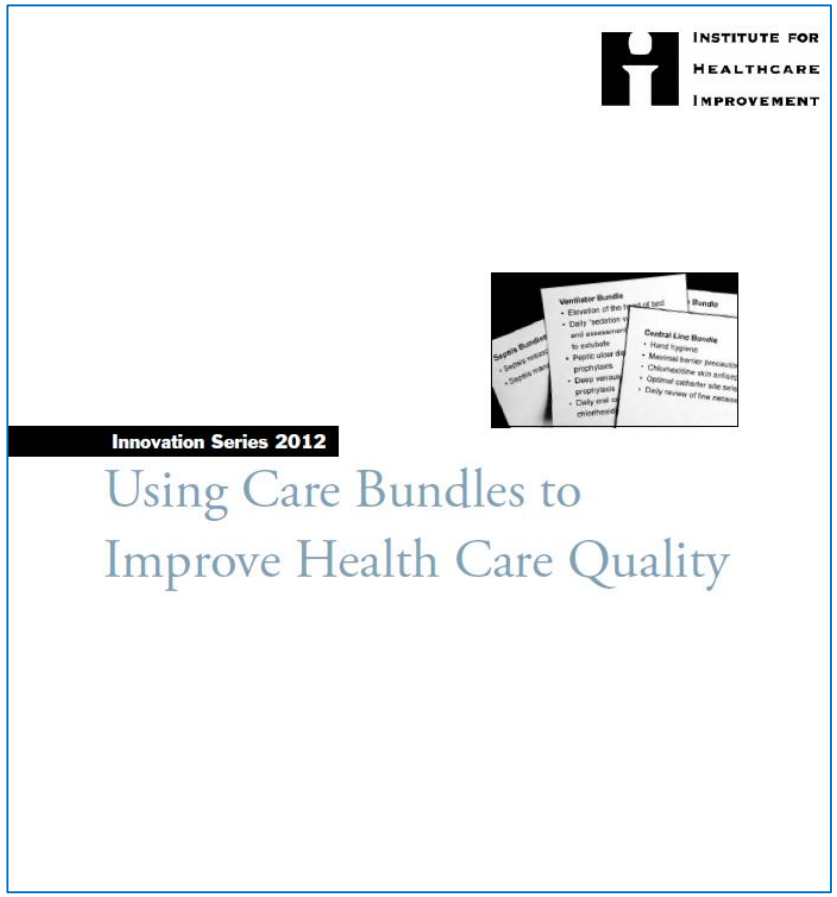
We acknowledge the Traditional Owners and their custodianship of the lands on which we meet.

We pay our respects to their Ancestors and their descendants, who continue cultural and spiritual connections to Country.

We recognise their valuable contributions to Australian and global society.

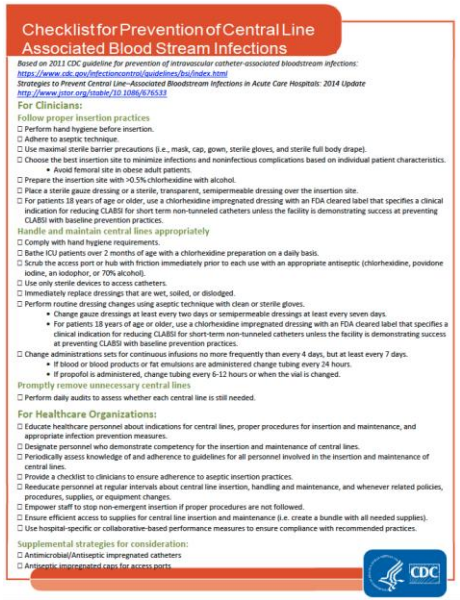
The Brisbane River pattern from *A Guidance Through Time* by Casey Coolwell and Kyra Mancktelow.

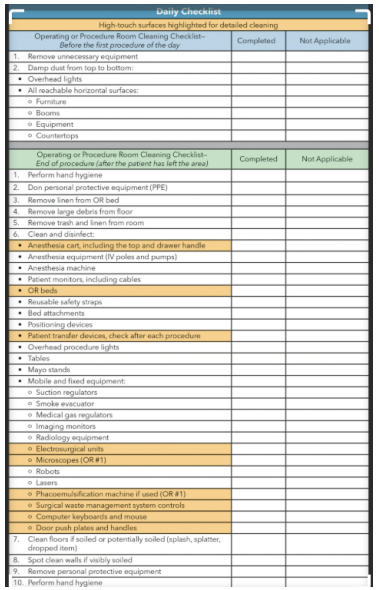
Care Bundles



"A small set of evidence-based interventions for a defined patient population and care setting that, when implemented together, will result in significantly better outcomes than when implemented individually."

(IHI, 2012)





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What makes a good bundle?

All components evidence-based	Allow for clinical judgement	Each component considered for every patient in that population & location
Compliance measured and reported	Repeated measures over time	Outcomes fully reported (raw data & percentages)
Implementation strategy clearly described	Outcomes clearly demonstrate improvement	

(IHI, 2012)

PIVC Bundles – only one systematic review

Infection, Disease & Health (2019) 24, 152–168

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: http://www.journals.elsevier.com/infection-disease-and-health/

ELSEVIER

Review

Effectiveness of insertion and maintenance bundles in preventing peripheral intravenous catheter-related complications and bloodstream infection in hospital patients: A systematic review

Gillian Ray-Barruel [a,b,c,d,e,*], Hui Xu [a,f], Nicole Marsh [a,b,d], Marie Cooke [a,b], Claire M. Rickard [a,b,d,e]

All 13 studies implemented different bundles.

Many bundle components were not evidence-based.

Follow-up ranged from 4 months to 14 years.

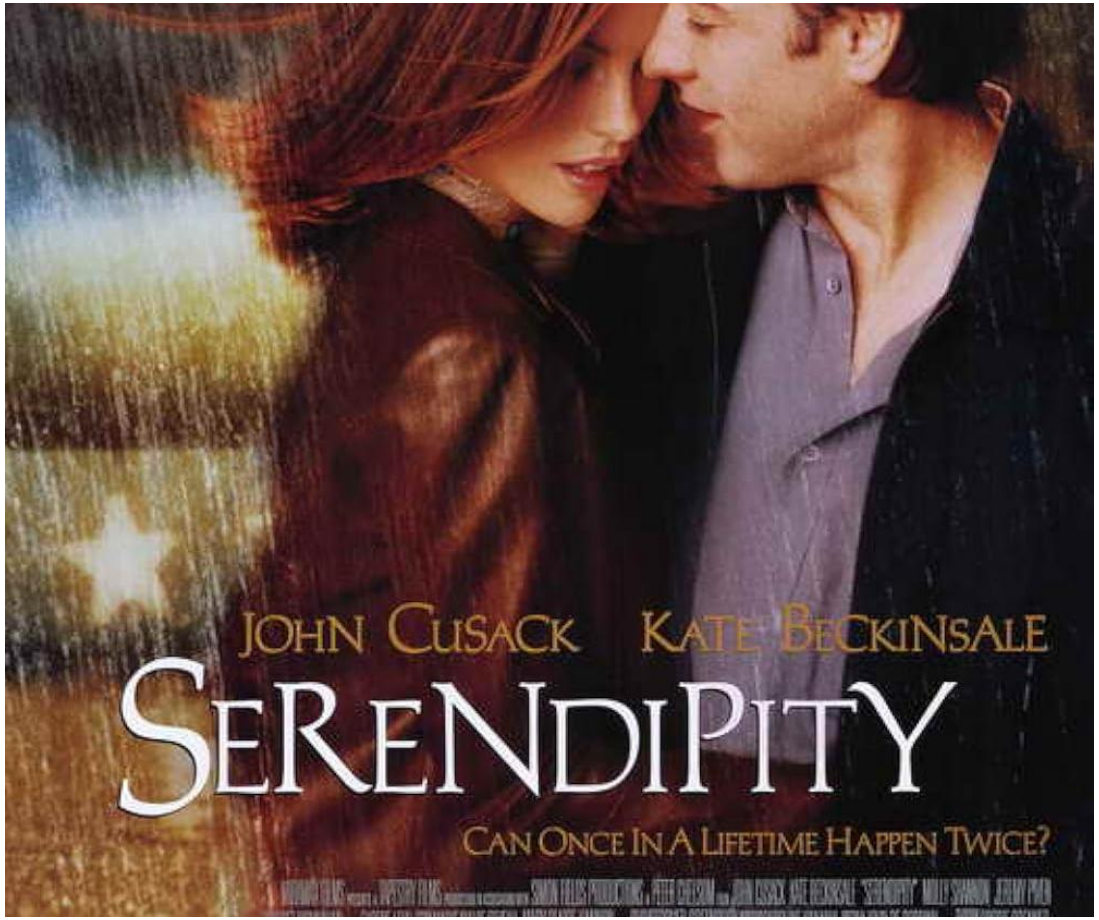
Quality assessment:

POOR (7 studies)

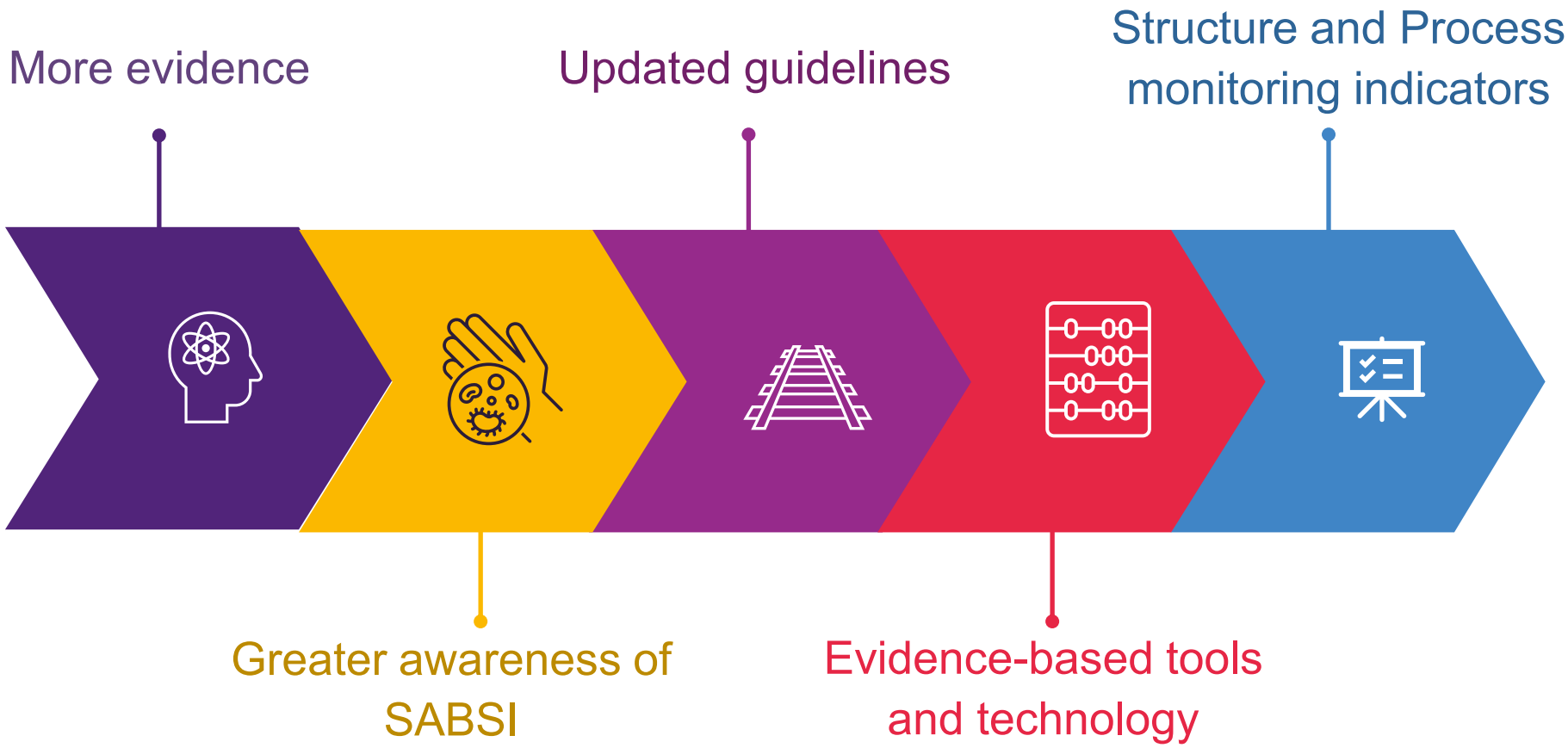
FAIR (6 studies)

What's changed since 2019?

VS

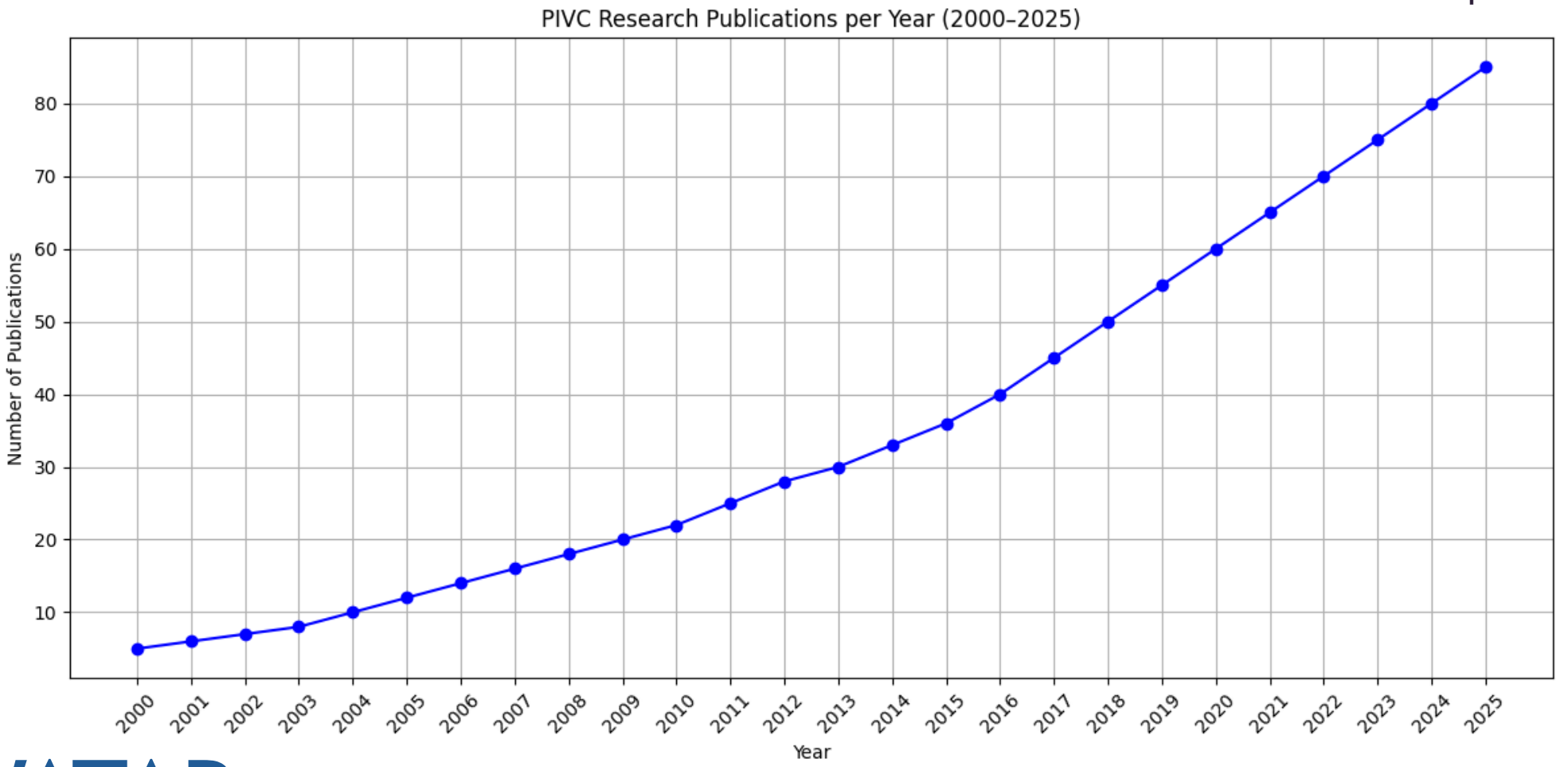


A lot has changed since 2019!

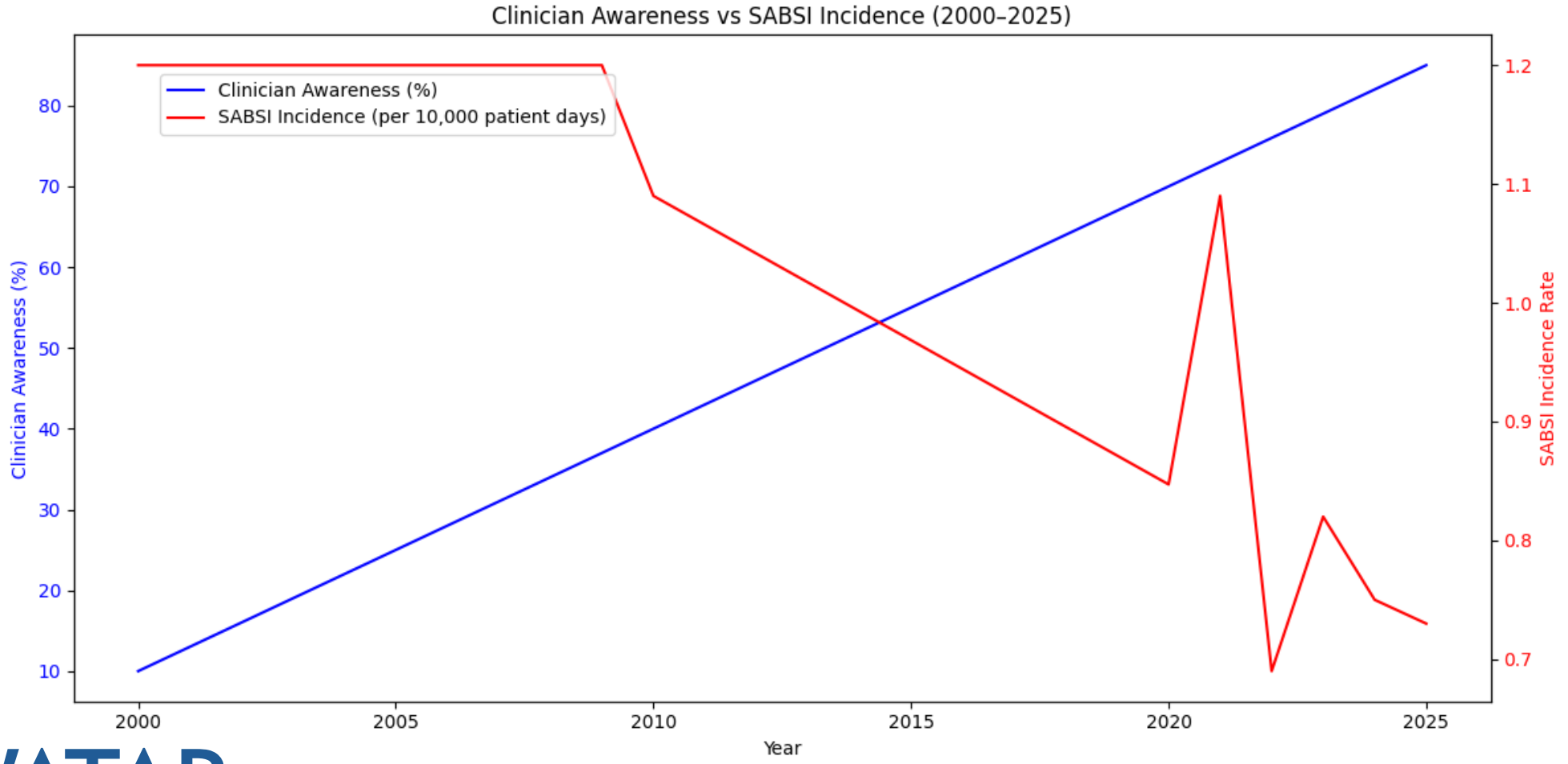


PIVC Research Articles per year since 2000

Data from April 2025!



Clinician Awareness of SABSI vs SABSI Incidence (2000–2025)



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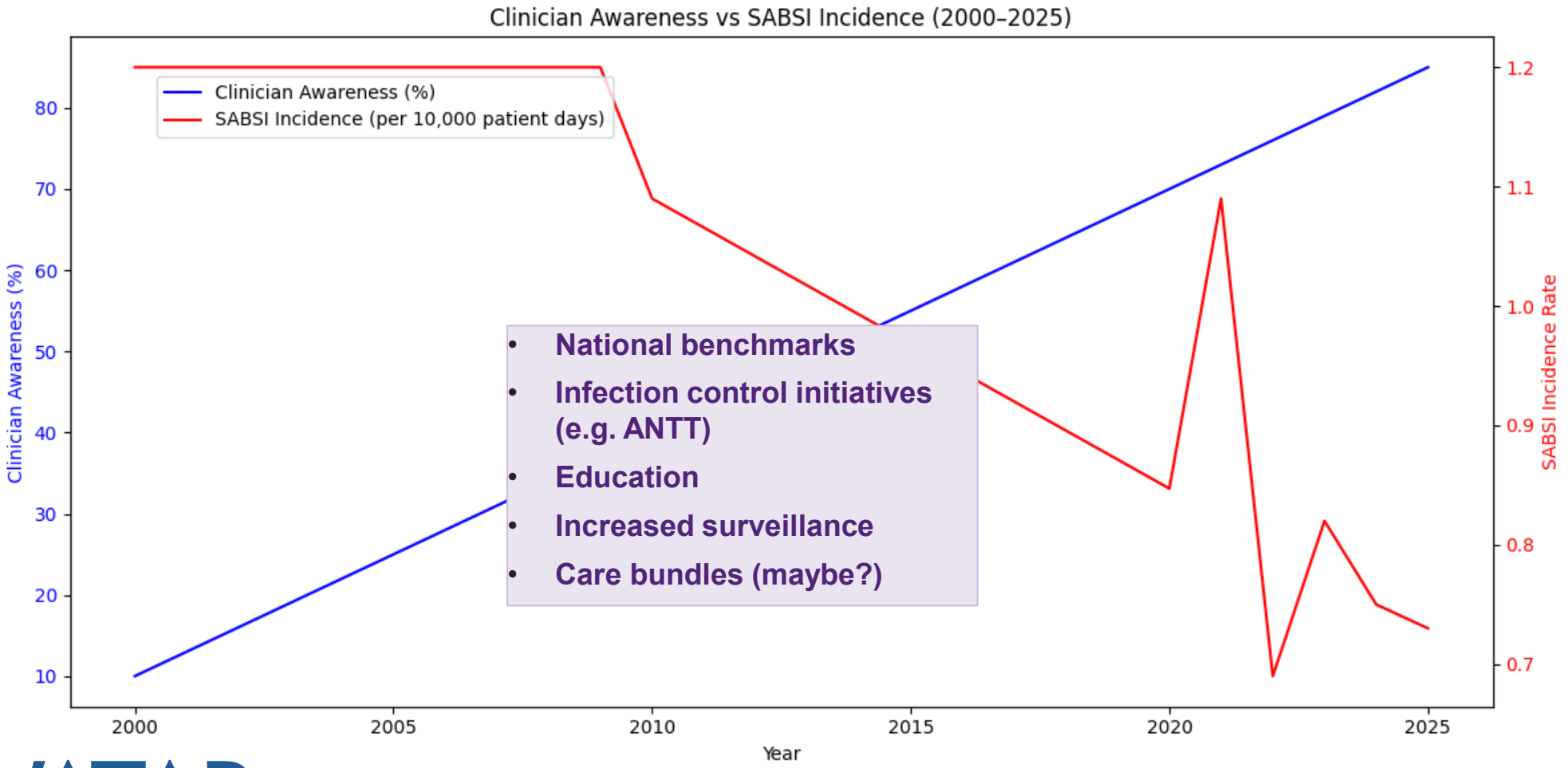
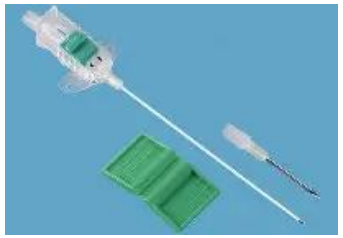
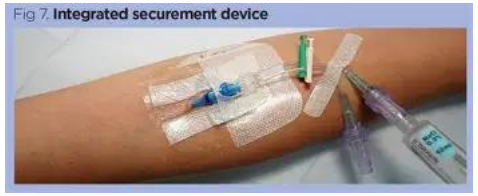


Technology and Innovation

- Use of visual aids (ultrasound, near-infrared) for difficult IV access
- Use of virtual/augmented/mixed reality for training
- Integrated closed system catheters
- Longer peripheral catheters, including midline catheters
- Anti-reflux valves in catheters
- Improved dressings and securement: engineered dressings, cyanoacrylate glue, gum mastic liquid
- Greater focus on vascular access specialists and teams





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Standardised tools to reduce variations in care and improve patient safety

THE UNIVERSITY OF QUEENSLAND AUSTRALIA

	The PIV Five Rights	Description	Evidence-Based Support
P	Right Proficiency	A skilled inserter who demonstrates 1st needlestick success at least 90% of the time and is proficient in ultrasound-guided peripheral catheter assessment and placement.	10 Publications*
I	Right Insertion	The use of ultrasound or vein viewer equipment for vessel selection and needle guidance to avoid "blind sticks." The use of an evidence-based aseptic no touch insertion technique (ANTT) to minimize site contamination.	53 Publications
V	Right Vein	Place peripheral catheter in the forearm cephalic vein about 3" below the antecubital fossa and 2" above the wrist whenever possible to avoid joints and danger zones as well as optimize vessel health and adequate hemodilution.	22 Publications
5	Right 5 Supplies & Technology	Procedural kit for protocol compliance; 22g/1.75" or longer catheter (forearm) to optimize the vein to catheter ratio; CHX Antimicrobial bordered securement dressing to reduce infection and dislodgement; Anti-reflux needleless connector designed to eliminate occlusions; Alcoholic chlorhexidine skin preparation and alcohol disinfecting cap to provide immediate bacterial reduction.	44 Publications
R	Right Review	Routine assessment by proficient nurse to avoid unnecessary catheter replacements leaving in place until clinically indicated to remove. Hub disinfection with passive port protectors between access, routine pulsatile flushing, and dressing changes at 7 days for all catheters to maintain the life of the catheter.	13 Publications

At the Lady Cilento Children's Hospital (LCCH) 48% of Peripheral Intravenous Cannulas (PIVC) fail prior to completion of treatment. Our aim is to reduce the incidence of PIVC complications. A *Care bundle* is a structured way of improving processes of care and patient outcomes. It is a straightforward set of practices that, when performed collectively, reliably and continuously will help improve patient outcomes.

Action: Improve PIVC insertion

S **Skills of the inserter**
- Consider the location and condition of veins
- Start upper limb and avoid Antecubital Fossa
- Smallest cannula gauge that allows flow rate

U **Understand and prepare** for patient needs (site assessment). Consider:
- what is the intended use?
- alternative route – are oral medications an option?
- duration and type of therapy – is PIVC appropriate?
- ***Access Device Decision Tree CHQ-PROC-03450***
- pain relief – use Topical Anaesthetics and Sucrose
- availability of necessary equipment, environment and staff support – involve parents and carers in holding and supporting – refer to ***CHQ-NS-62111***

C **Consent**
Obtain verbal consent – involve patients and parents in decision making – refer to ***Caring for an Intravenous (IV) Cannula*** brochure on CHQ website

C **Clean site**
- 20 second scrub with friction and allow to air dry completely
- If re-palpation is necessary, use sterile gloves

E **Escalate**
- After two attempts seek assistance
- Consider vein quality and use of ultrasound guided technology
- Consult ***Difficult Intravenous Access Guidelines***

S **Secure**
- Ensure the skin is clean and dry before tapes are applied
- Secure as per ***CHQ-PROC-03456***
- Ensure adequate pressure area prevention from PIVC hub and tapes

S **Sign and document**
- Ensure ieMR, Care Pathways and Daily Record forms are updated daily – date, time, site, cannula gauge, number of attempts, cannulator
- Document insertions, re-sites and removals – include reason for removal

Action: Improve PIVC management

P **Prompt removal**
- Evaluate clinical indication daily in consultation with medical/surgical team
- Remove under aseptic conditions
- Document removal and reason for removal

I **Inspect HOURLY**
- Hourly site checks during infusion – refer to ***CHQ-PROC-03450***
- Be aware of possible extravasation injury – refer to ***CHQ-PROC-60579*** for guidelines
- Touch, look, compare "TLC"

V **Vein patency**
- Ensure medication order for continuous infusion or intermittent flush is prescribed
- Visualise site whilst administering flush and consider the rate of delivery
- Should be pain free – pain is indicative of cannula failure

C **Clean hands**
Use Aseptic Non-Touch Techniques (ANTT) and remember hand hygiene

S **SCRUB THE HUB!!!**
- Technique is important – use ANTT
- Treat PIVCs with as much respect as CVADs

AUSTRALIAN COMMISSION ON SAFETY AND QUALITY IN HEALTH CARE

Clinical Care Standards

IV-WISE patient discussion tool

This tool* provides key discussion points for clinicians and patients to help involve patients in their care and prevent PIVC-related complications.

What clinicians should discuss with patients:	What patients can ask and do:
I Intravenous access needs	
▪ Discuss why IV fluids or medicines are needed ▪ Explain how the PIVC will be inserted ▪ Ask patients about their PIVC history and any current needs.	Tell your healthcare team about your past experiences including: ▪ Difficulty inserting a PIVC ▪ Anything that has worked well ▪ Your preference or any physical problems that could affect where the PIVC is placed ▪ Any allergies you have, such as to tapes and dressings.
V Vascular access checks	
▪ Advise that the PIVC will be checked regularly ▪ Ask patients to report any concerns or any problems they notice (e.g. redness, swelling).	▪ Your clinician will regularly check your PIVC ▪ Tell your clinician if you have any concerns or notice any problems.
W What patients can do to reduce the risk of complications	
▪ Advise patients what they can do to help reduce the risk of PIVC-related complications and infection ▪ Provide patients with the 'Looking after your cannula' information sheet.	To help to look after your PIVC: ▪ Protect the PIVC from knocks or being pulled ▪ Wear loose clothing so that the PIVC does not get caught ▪ Keep the PIVC dry while washing and showering ▪ Ensure that the protective dressing stays in place.
I Infection risk	
▪ Discuss how to prevent infection.	To prevent infection: ▪ Keep your hands clean by washing with soap or using sanitiser ▪ Do not touch, fiddle with, or move the device.
S Signs and symptoms of complications	
▪ Discuss the signs and symptoms to look out for ▪ When removing the PIVC, advise patients that symptoms can occur up to 48 hours later and what to do.	Tell your clinician as soon as possible about: ▪ Redness, pain or swelling at the insertion site ▪ Feeling hot, cold or shivery ▪ Leakage from the device ▪ The dressing getting wet, bloodstained or loose.
E Expected removal	
▪ Tell patients when the PIVC is expected to be removed (e.g. when therapy is finished).	▪ If your PIVC has not been used in the last 24 hours, ask if you still need it ▪ If you are going home and your PIVC is still in place, ask your clinician if it can be removed.

*Developed by the Australian Commission on Safety and Quality in Health Care, 2021.

safetyandquality.gov.au

IV-WISE patient discussion tool | 1

iDECIDED®

device assessment and decision tool

I **IDENTIFY if a device is present**

D **DOES the patient need the device?**
If no longer in active use, consider device removal.

E **EFFECTIVE function?**
Is the device functioning as intended?
If not, troubleshoot as per policy or remove device.

C **COMPLICATION-FREE?**
If complications are noted, troubleshoot or remove device.

I **INFECTION prevention**
Hand hygiene before and after patient and device care.
Careful handling and disinfection of device access points.

D **DRESSING & securement**
Ensure dressings are clean, dry and intact.
Secure devices to prevent tugging or patient injury.

E **EVALUATE & EDUCATE**
Discuss device plan with patient & family. Educate as needed.

D **DOCUMENT your decision**
Continue, troubleshoot, change dressing, or remove device.

Always consider local policy,
and consult with team & patient as required.

AVATAR Alliance for Vascular Access Teaching and Research

Griffith UNIVERSITY Queensland, Australia

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New and Updated Vascular Access Guidelines

THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

Association of Anaesthetists guidelines: safe vascular access (2025)

UK Kidney Association Clinical Practice Guideline on Vascular Access for Haemodialysis (2025)

AVA PIVC Standards of Care: Evidence Based Expert Consensus (2024)

WHO guidelines for the prevention of bloodstream infections and other infections associated with the use of intravascular catheters (2024)

ESPEN practical guideline: Home parenteral nutrition (2023)

European recommendations on the proper indication and use of peripheral venous access devices (the ERPIUP consensus): A WoCoVA project (2023)

Safer Care Victoria - Decreasing infections associated with peripheral intravenous cannulas (2022)

SHEA A Compendium of Strategies to Prevent Healthcare-Associated Infections in Acute-Care Hospitals (2022)

SHEA/IDSA/APIC Strategies to prevent central line-associated bloodstream infections in acute-care hospitals (2022)

Cancer Nurses Society of Australia (CNSA) vascular access guidelines (2024)

ECO-SEOM-SEEO safety recommendations guideline for cancer patients receiving intravenous therapy (2024)

Infusion Therapy Standards of Practice, 9th Edition (2024)

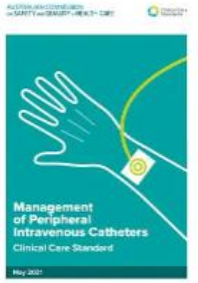
The INS guidelines are free for INS members. Non-members can purchase the guidelines from the INS website.

Registered Nurses' Association of Ontario (RNAO) best practice guideline on the assessment and management of vascular access devices (2023)

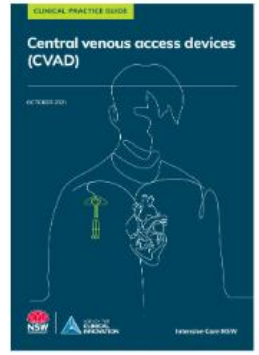
CDC Recommendations for Prevention and Control of Infections in Neonatal Intensive Care Unit Patients: Central Line-associated Blood Stream Infections (2022)

Guidelines of the Italian Association of Pediatric Hematology and Oncology for the management of the central venous access devices in pediatric patients with onco-hematological disease (2022)

Australian Commission on Safety and Quality in Health Care Management of Peripheral Intravenous Catheters Clinical Care Standard (2021)



ACI Central Venous Access Device: Post Insertion Management (2021)



Central venous catheter-related infections in hematology and oncology (2020)

AVATAR Alliance for Vascular Access Teaching and Research

www.avatargroup.org.au/clinical-practice-guidelines.html

AUSTRALIAN COMMISSION ON SAFETY AND QUALITY IN HEALTH CARE

Clinical Care Standards

The PIVC Clinical Care Standard

PUBLISHED 2021: To address suboptimal care

GOAL: To promote judicious PIVC use, reduce complications

SCOPE: All ages, all healthcare settings

https://www.safetyandquality.gov.au/sites/default/files/2021-05/pivc_ccs_launch_slides_0.pdf

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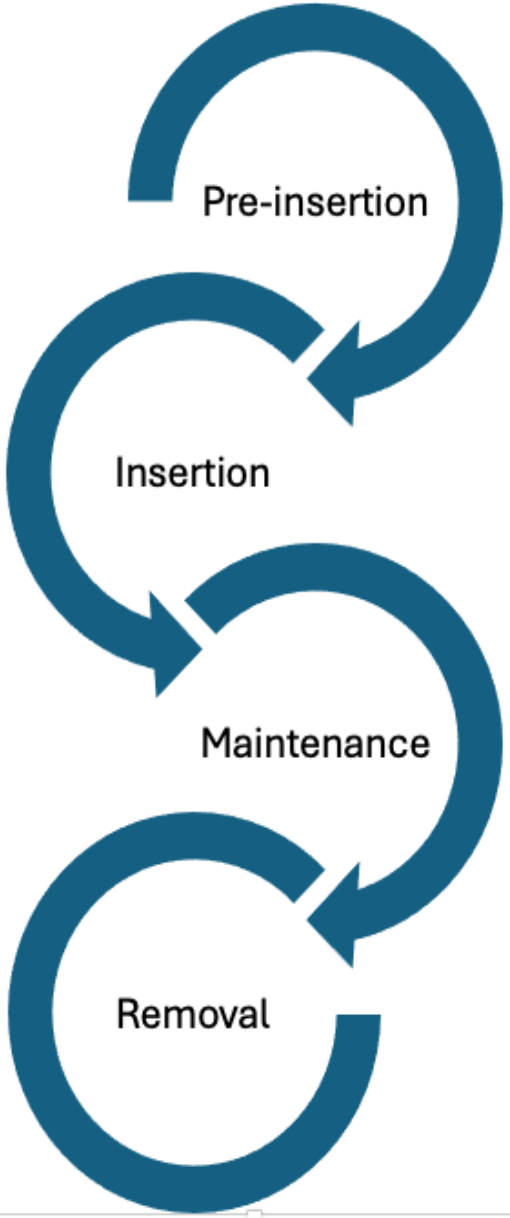
10 Quality Statements



1 Assess intravenous access needs

A patient requiring medicines or fluids is assessed to identify the most appropriate route of administration for their clinical needs.

2 Inform and partner with patients

A patient requiring intravenous access receives information and education about their need for the device and the procedure. Their consent is obtained and they are advised on their role in reducing the risk of device-related complications.

3 Ensure competency

A patient's PIVC is inserted and maintained by clinicians who are trained and assessed as competent in current evidence-based practices for vessel health preservation and preventing device-related complications, relevant to their scope of practice. Insertion by a clinician working towards achieving competency is supervised by a clinician who is trained and assessed as competent.

4 Choose the right insertion site and PIVC

A patient requiring a PIVC is assessed to identify the most suitable insertion site and PIVC (length and gauge) to meet their clinical needs and preferences for its location.

5 Maximise first insertion success

The likelihood of inserting a PIVC successfully on the first attempt is maximised for each patient, according to the health service organisation's process for maximising first-time insertion success.

6 Insert and secure

A clinician inserting a patient's PIVC uses standard precautions, including aseptic technique. The device is secured and a sterile, transparent, semipermeable dressing is applied unless contraindicated.

7 Document decisions and care

A patient with a PIVC will have documentation of its insertion, maintenance and removal, and regular review of the insertion site.

8 Routine use: inspect, access and flush

A patient's PIVC and insertion site is inspected by a clinician for signs of complications at least once per shift or every eight hours, when accessing the device, and if the patient raises concerns. Standard precautions including aseptic technique are used when performing site care and accessing the PIVC. Patency is checked and flushing is performed at intervals according to local policy to assess device function and minimise risk of device failure.

9 Review ongoing need

The ongoing need for a patient's PIVC is reviewed and documented at least daily, or more often if clinically indicated.

10 Remove safely and replace if needed

A patient with a PIVC will have it removed when it is no longer needed or at the first sign of malfunction or local site complications. A new PIVC will be inserted only if ongoing peripheral vascular access is necessary, consistent with the replacement recommendations in the current version of the *Australian Guidelines for the Prevention and Control of Infection in Healthcare*.

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Monitoring indicators

"The following indicators will support health service organisations to monitor how well they are implementing the care recommended in this clinical care standard and are intended to support local quality improvement activities."
(ACSQHC, 2021)

1

Indicator 1: Proportion of patients with a PIVC in situ that has not been used for a therapeutic purpose since it was inserted.

2 **Inform and partner with patients**

Indicator 2: Proportion of patients with a PIVC in situ that can identify the reason for the device.

3 **Ensure competency**

Indicator 3: Evidence of a locally approved policy that ensures healthcare professionals are competent in PIVC insertion, monitoring, and removal. The policy should specify the:

- Competency a clinician must demonstrate to insert a PIVC, including for more complex and technology-assisted insertions
- Competency a clinician must demonstrate to monitor and remove PIVCs
- Organisation's process to assess and monitor the ongoing competency of clinicians, including for more complex insertions
- Organisation's process to assess adherence to the policy.

4 **Choose the right insertion site and PIVC**

Indicator 4a: Evidence of local arrangements that provide systematic support for decisions related to the selection of an appropriate PIVC device.

Indicator 4b: Proportion of patients with a PIVC in situ over an area of flexion.
Note: This indicator is specified to include patients with a PIVC in situ for 24 hours or longer.

5 **Maximise first insertion success**

Indicator 5a: Evidence of a locally approved policy that defines the local protocol to support PIVC insertion on first attempt. The protocol should specify the:

- Risk assessment process that should be used to identify patients where insertion of a PIVC may be more complex
- Situations when staff should escalate PIVC insertion to more experienced staff and the process to follow
- Clinical situations when more than one attempt is appropriate
- Organisation's process to assess adherence and outcomes of the policy.

Indicator 5b: Proportion of patients who report their PIVC was inserted on the first attempt.

7 **Document decisions and care**

Indicator 7a: Evidence of a locally approved policy that defines the documentation insertion, maintenance, removal, and regular review. The policy should specify:

- The information that must be documented in the medical record for every PIVC including, indication for insertion, maintenance and removal
- How often documentation should occur
- The organisation's process to assess adherence to the policy.

Indicator 7b: Proportion of patients with a PIVC in situ with the indication for inser documented in their medical record.

8 **Routine use: inspect, access and flush**

Indicator 8a: Proportion of patients with a PIVC in situ who have their PIVC insertic inspected for complications at least every 8 hours.

Indicator 8b: Proportion of patients with a PIVC in situ with a clean, dry and secure P

9 **Review ongoing need**

Indicator 9: Proportion of patients with a PIVC in situ who have been assessed in t 24 hours to determine the ongoing need for their PIVC.

10 **Remove safely and replace if needed**

Indicator 10: Proportion of patients with a PIVC in situ that has not been used for a purpose in 24 hours.

The definitions required to collect and calculate indicator data are specified online in Metadata Registry (METeOR). More information about indicators and other quality improvement measure in Appendix B.

https://www.safetyandquality.gov.au/sites/default/files/2021-05/pivc_ccs_launch_slides_0.pdf

So, what should be in the PIVC bundle?

Contact

Gillian Ray-Barruel
Senior Research Fellow
g.raybarruel@uq.edu.au