Te Tāhū Hauora
Health Quality & Safety Commission

Reducing bloodstream infections associated with peripheral intravenous catheter use

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Acknowledgements	Conflicts of interest
Jeanette Bell Lynette Lennox Sally Roberts Nikki Grae Ruth Barratt Amanda Wood Participating districts Consumers	No known conflicts of interest

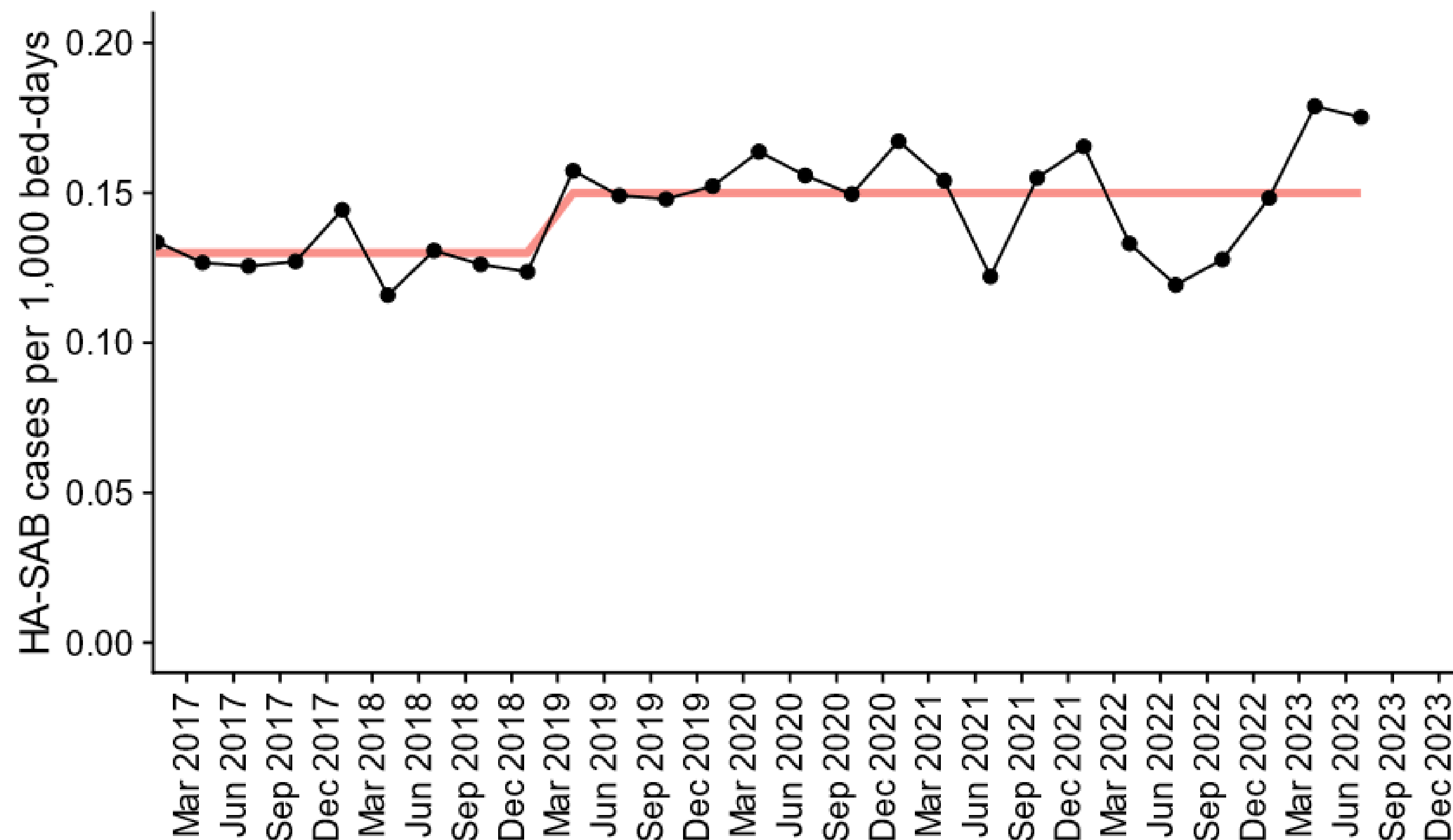
Today I am sharing with you

- HA-SAB surveillance outcomes related to PIVCs.
- How we identified potential problems with PIVC insertion, maintenance and removal through engagement with clinicians and consumers.
- Summary of this engagement.
- Next steps.

HA-SAB = healthcare-associated *Staphylococcus aureus* bacteraemia; PIVC = peripheral intravenous catheter.

Introduction

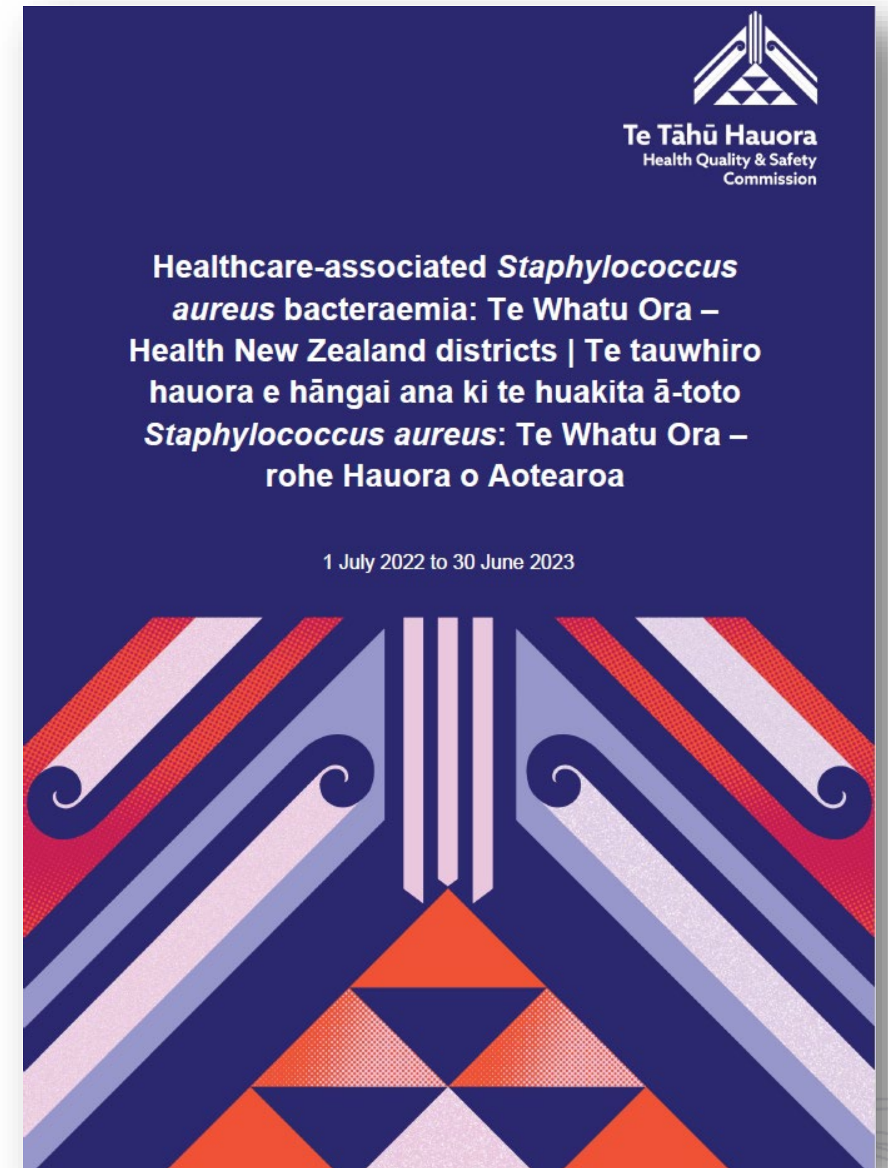
The median rate of HA-SAB per 1,000 inpatient beds in district hospitals in Aotearoa New Zealand has increased steadily since 2017.



Te Tāhū Hauora Health Quality & Safety Commission. 2023. Healthcare-associated *Staphylococcus aureus* bacteraemia: Te Whatu Ora – Health New Zealand districts. 1 July 2022 to 30 June 2023. Wellington: Te Tāhū Hauora. URL: www.hqsc.govt.nz/resources/resource-library/healthcare-associated-staphylococcus-aureus-bacteraemia-te-whatu-ora-health-new-zealand-districts

Introduction

PIVCs are a major and increasing source of these infections.



PIVC = peripheral intravenous catheter.
www.hqsc.govt.nz/resources/resource-library/healthcare-associated-staphylococcus-aureus-bacteraemia-te-whatu-ora-health-new-zealand-districts

HA-SAB events with a PIVC source, July 2022–June 2023

Rate of HA-SAB per 1,000 bed-days

0.20
0.15
0.10
0.05
0.00

Jul 2022
Aug 2022
Sep 2022
Oct 2022
Nov 2022
Dec 2022
Jan 2023
Feb 2023
Mar 2023
Apr 2023
May 2023
Jun 2023

HA-SAB source
CVC
PIVC
Total

CVC = central venous catheter.

HA-SAB events with a PIVC source, July 2022–December 2023

Since the publication of the 12-month review, we now have 18 months of data. There has been no improvement in HA-SAB events with a PIVC source.

Primary source	N (%)	Secondary source	N (%)
Invasive medical devices	503 (69)	PIVC	241 (48)
		Central venous catheter	222 (44)
		Other medical device	18 (4)
		Urinary catheter	16 (3)
		Endotracheal tube	3 (1)
		Not recorded	3 (1)

Identifying the problem

- To understand the problem of increasing HA-SAB with a PIVC source, we analysed national HA-SAB surveillance data, ACC data and adverse events and reviewed available evidence.
- We engaged with clinicians through a stocktake survey, workshops and a ThoughtExchange.
- We engaged with consumers through a survey, interviews and advisory groups.

ACC = Accident Compensation Corporation.

Workshops

- We held four regional workshops, with 55 participants.
- We asked two questions:
  - What factors contribute to PIVC-related infections?
  - How can PIVC management be improved in your workplace?
- Participants identified 502 factors contributing to PIVC infections and provided 398 ideas for improvement.

Factors contributing to PIVC infections in Aotearoa New Zealand

Workforce
- Burnout/change fatigue
- Apathy
- Resistance to change
- High workload
- Time poor
- High staff turnover
- Understaffing
- Poor skill mix
- Under resource or no dedicated IV role
- No local IV champion/IV link nurse/mentor
- Lack of skilled inserters

Culture and accountability
- Lack of auditing
- Lack of audit feedback
- Difficult to report incidents
- No accountability for harm
- PIVC risks undervalued
- Weak safety culture
- No mentoring/role modelling culture
- Unclear role responsibilities
- No multi-disciplinary team collaboration
- Nurses not empowered to remove lines
- 'Just in case' culture
- Lack of ownership
- Lack of leadership engagement, support
- Lack of governance

Equipment and physical environment
- Lack of resources
- Difficult product to work with
- Dirty tourniquets
- No standardisation of equipment
- Physical environment barriers
- Right equipment not at point of care
- Product supply variation
- Inability to document at point of care

Policy and standards
- No 'defining difficult IV access' (DIVA) pathway
- General non-compliance with policy
- No set dwell times in policy, creating uncertainty
- No national standards
- No standardisation of documentation
- No guidance for use of ultrasound
- Onerous paperwork requirements
- No standard aseptic technique

Practice
- Clinical need for cannula not considered
- Using sites of flexion
- Poor needling
- Poor flushing
- Inappropriate medication administration
- Unused lines not removed
- Emergency lines not removed
- Lines used for bloods
- Poor scrub the hub practice
- Poor handover
- Poor aseptic technique
- Inadequate hand hygiene
- Inadequate skin prep
- Glove misuse
- Poor dressing technique
- Poor dressing maintenance
- Taking shortcuts/workarounds
- Unsecured dressings
- Poor monitoring
- Incomplete documentation
- General non-compliance with policy (also under policy)

Capability and skills
- Inappropriate cannula selection
- Site selection skills
- Poor needs assessment
- Lack of critical thinking skills
- Poor assessment skills
- Poor aseptic technique
- Multiple attempts
- No extension set
- Phlebitis assessment and treatment
- Lack of ultrasound scan skilled inserters
- Unskilled inserters
- Lack of confidence
- Too many inserters – lose skills

Knowledge and education
- Knowledge deficit
- Access to training
- Outdated training
- Lack of standardised training
- Interprofessional training differs
- Inadequate doctor training
- University training inadequate
- Lack of training and application of aseptic technique
- Poor knowledge and education of complications
- Poor knowledge and education about process
- Unaware of speciality support
- Resources not standardised
- Policy not known

Consumers and whānau
- Comorbidity infection risk
- Difficult venous access and poor vessel health
- Infection not recognised early
- Patient's voice not heard
- Poor patient understanding and awareness
- Poor patient education/information
- Patient not communicating about PIVC
- Sub-optimal patient self-care
- Lack of empathy with patient

IV = intravenous.

Regional Workshops: the top 10 factors contributing to PIVC infections

90
80
70
60
50
40
30
20
10
0

Number

Poor aseptic technique
Equipment factors
Time constraints
Unused lines not removed
Not enough training
Poor assessment skills
PIVC risk undervalued
Unskilled inserters
Incomplete documentation
Lack of skilled staff

Contributing factor

ThoughtExchange

We reached out to clinicians using an interactive survey platform called ThoughtExchange.

This novel platform enabled us to reach a broader range of clinicians and those who could not attend the workshops.

www.thoughtexchange.com

ThoughtExchange participation

Specialty	Participants	Thoughts	Ratings
General[a]	149	214	3,393
RMO	49	36	500
Women's health	18	19	141
Total	**216**	**269**	**4,034**

[a]General: emergency departments, anaesthesia, Infection Prevention & Control Nurses College, Intravenous Nursing New Zealand, New Zealand Microbiology Network, ambulance.
RMO = resident medical officer.

ThoughtExchange: the top five themes

Resident medical officer
Women's health
General

Star rating

4.2
4.1
4.0
3.9
3.8
3.7
3.6
3.5
3.4
3.3
3.2

Monitoring
Hand hygiene
Lines in too long
Site selection
Unnecessary insertion

Top five themes

The highest-ranked thoughts

Participant thought	Star rating	
PIVC that are not removed as soon as no longer indicated and left idle are a factor. I believe staff are hesitant to remove PIVC due to resource constraint. Time/expertise is needed to replace PIVC esp patients with difficult IV access.	4.3	(22) Ranked #1 of 214
Lack of appreciation of the invasive nature of an IV and complacency around asepsis when inserting or accessing the device. Breaks in technique may have serious consequences.	4.3	(20) Ranked #2 of 214
Staff knowledge of the ongoing infection risk PIVC pose for a patient is insufficient. PIVC are not seen as a serious infection risk. Staff understanding this risk in more depth may be more motivated to remove PIVC as soon as no longer indicated and take signs of phlebitis seriously.	4.2	(23) Ranked #3 of 214
PIVCs placed in ED "just in case" but not used and yet still left in place when transferred to the ward. Creates an unnecessary risk that PIVCs will not be removed and will be unmonitored on the wards.	4.2	(22) Ranked #4 of 214
Poor observation by clinical staff. Regular observation for signs of infection to ensure early removal of device.	4.2	(22) Ranked #5 of 214

Beth’s story

I didn’t get a shower for 2 days because I was hooked up to a drip.

There were all sorts of lines put in when we arrived … I had a line in each arm and then later on only one was used.’

I felt so useless, and that he was having to cope with so much.

Te Tāhū Hauora Health Quality & Safety Commission. 2023. Beth’s story – the dangers with invasive medical devices. URL: www.hqsc.govt.nz/resources/resource-library/beths-story-the-dangers-with-invasive-medical-devices

Key contributing factors from all stakeholder engagement

- **Poor asepsis:** aseptic technique, hand hygiene, scrub the hub, skin prep
- **Suboptimal use of lines:** left in too long, unused lines, unnecessary insertion, poor site selection (using sites of flexion)
- **Inadequate monitoring:** catheters not reviewed, inadequate documentation
- **Under-skilled staff:** unskilled inserters, poor assessment skills, lack of skilled staff, not enough education, role responsibilities
- **Lack of patient engagement:** lack of education and involvement
- **Environmental barriers:** physical environment, equipment, time constraints

Next steps

To reduce PIVC-related HA-SAB infections, we have commenced a quality improvement initiative to improve processes associated with PIVC use, such as indication, insertion, access and maintenance and removal.

Next steps

An advisory group has been formed. This group has started determining what a bundle of care for PIVC may look like, considering current evidence and the clinician and consumer engagement results.