Te Tāhū Hauora
Health Quality & Safety Commission

Understanding bloodstream infections associated with peripheral intravenous catheter use

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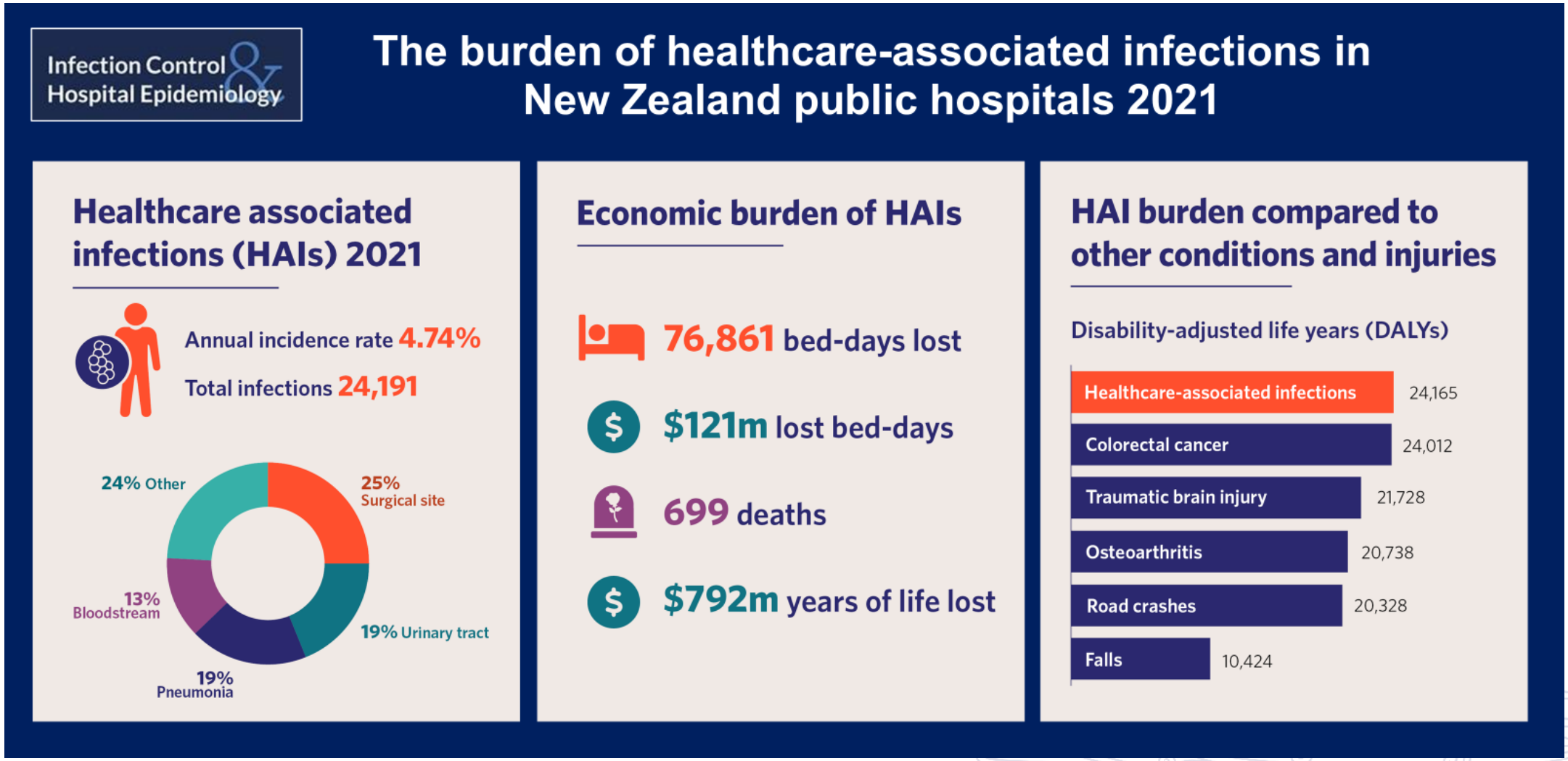
November 2024

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

Introduction

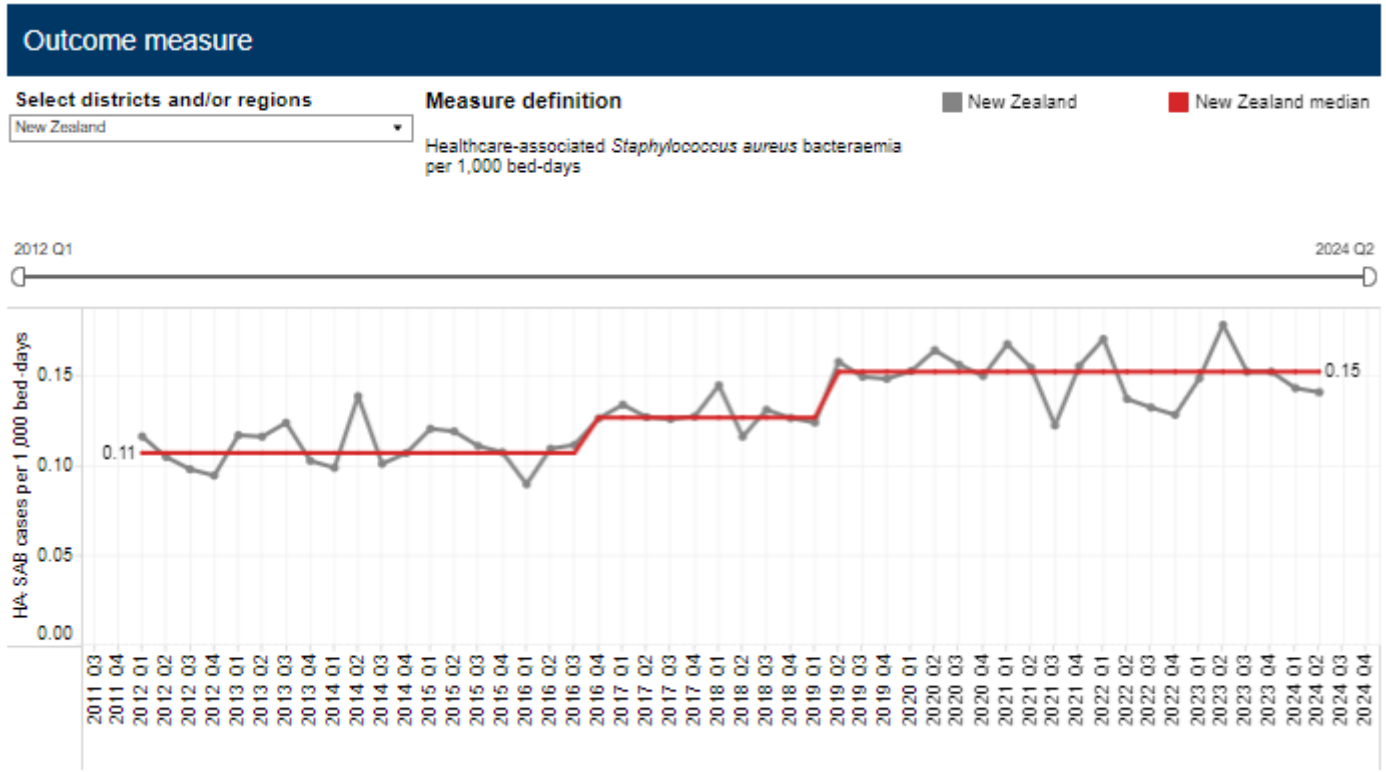


Morris AJ, Hensen M, Graves N, et al. The burden of healthcare-associated infections in New Zealand public hospitals 2021. *Infection Control & Hospital Epidemiology*. Published online 2024:1-7. doi:10.1017/ice.2024.95

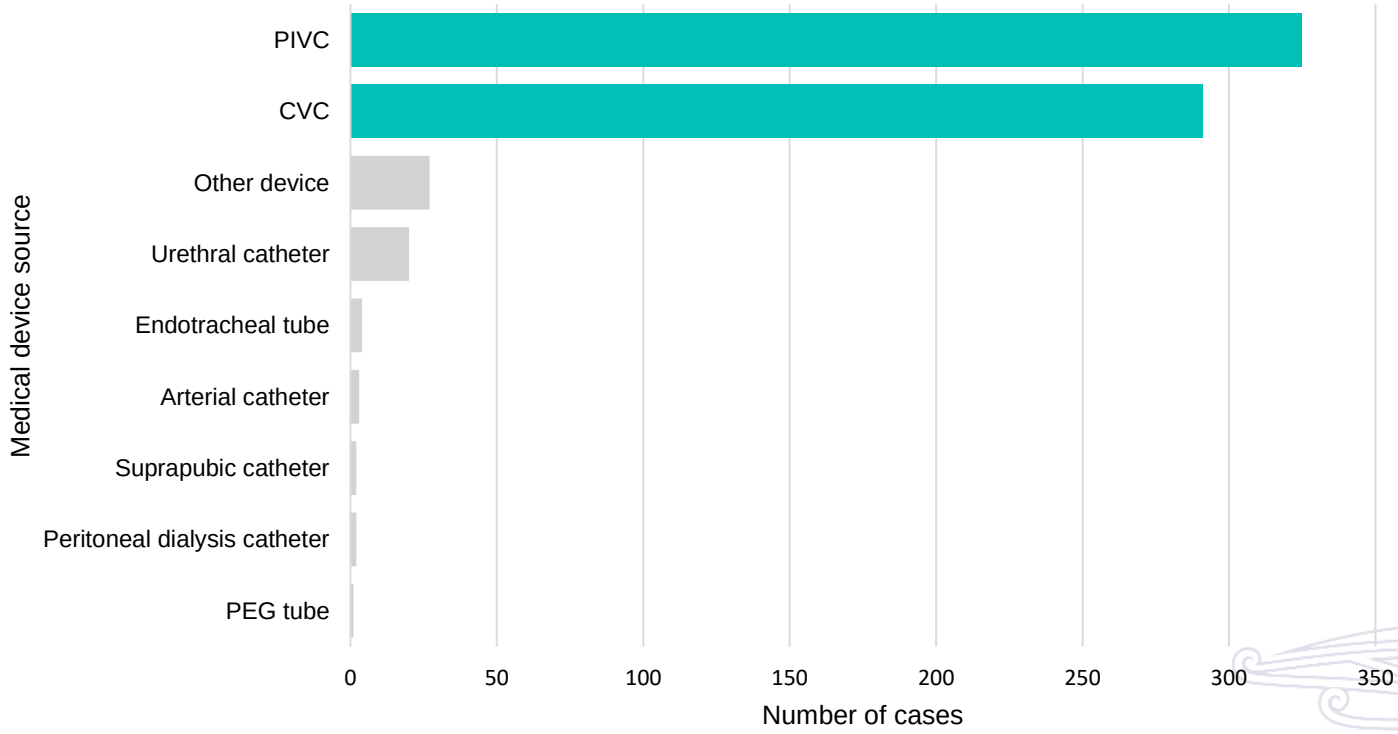
Introduction

Healthcare-associated *Staphylococcus aureus* bacteraemia (HA-SAB) rate in Aotearoa New Zealand (NZ) public hospitals has increased from 0.11 in 2012 to 0.15 events per 1000 bed days in 2024.

PIVCs are a major and increasing source of these infections.



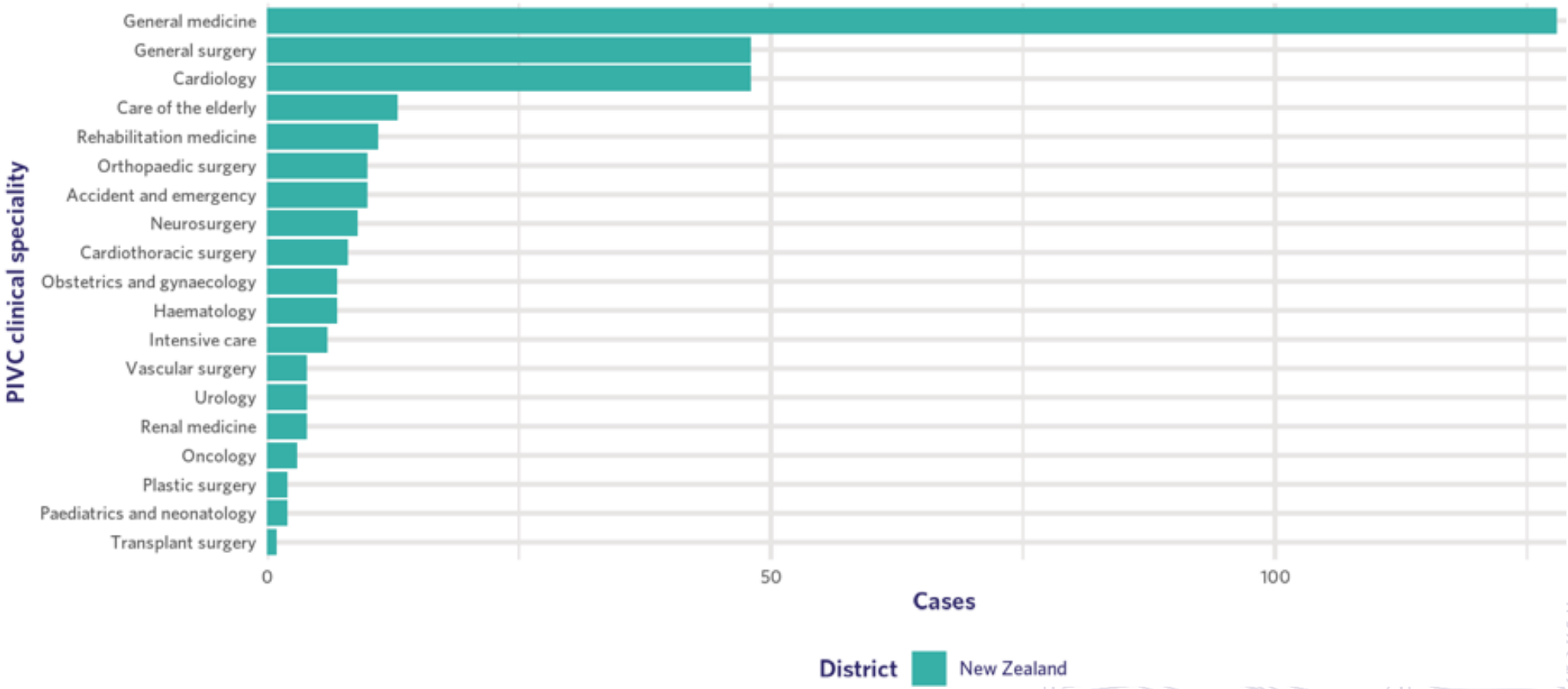
HA-SAB events with a PIVC source, July 2022 – June 2024



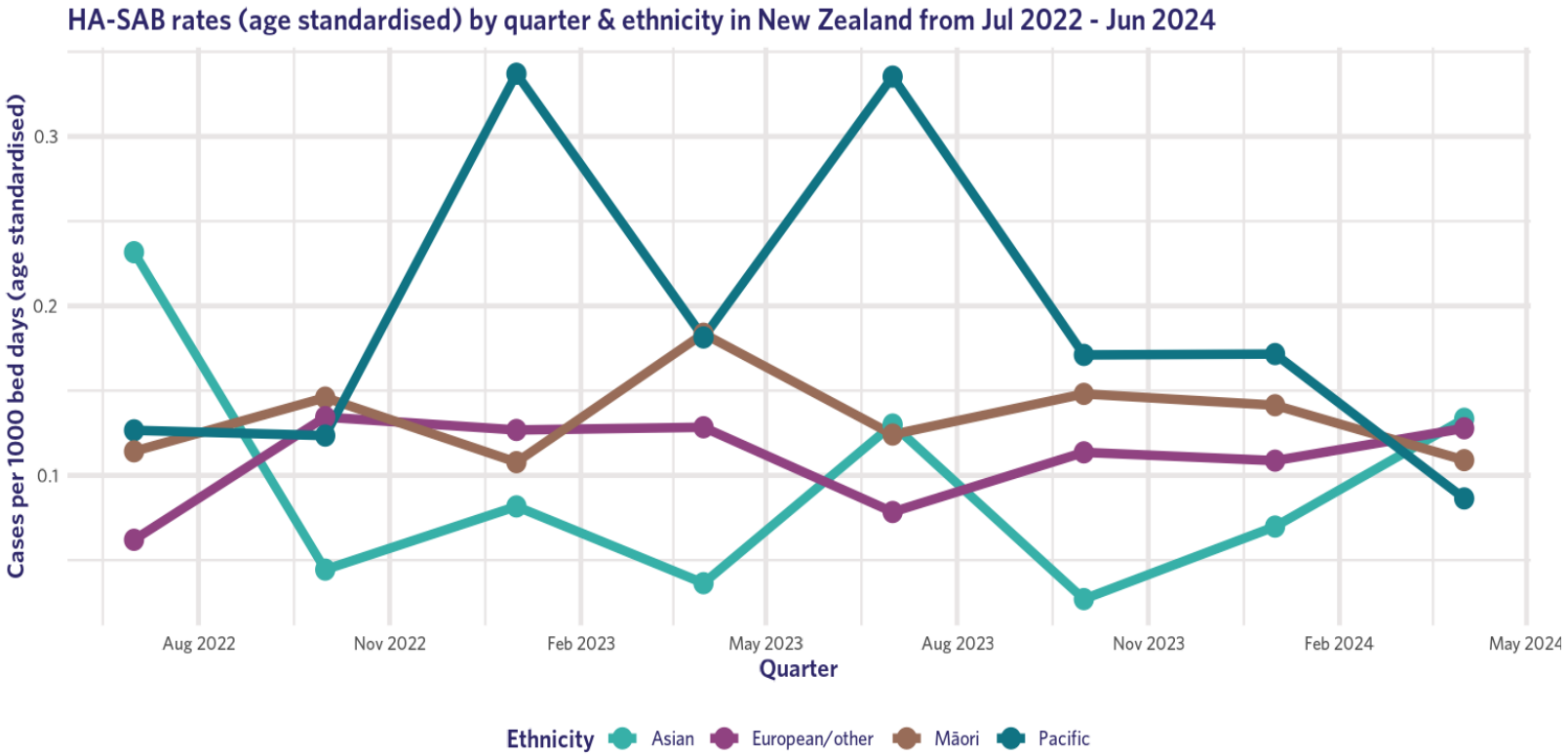
Source	Cases
Device	676
Organ source (not SSI)	116
Surgical site infection	79
Unknown	59
Other	21
Neutropaenic sepsis	14
Unspecified	3

CVC = central venous catheter.

HA-SAB cases by PIVC clinical specialty in New Zealand July 2022 – June 2024



Ethnicity - Age standardised rate HA-SAB per 1000 bed days July 2022 – June 2024

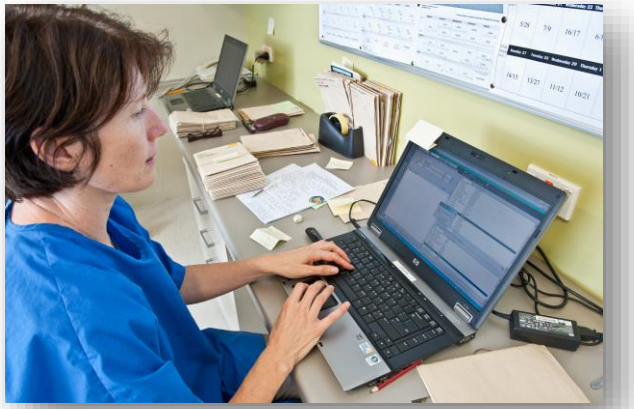


Cases per 1000 bed days (age standardised)			
	Cases	Lower CI (95%)	Upper CI (95%)
Pacific	0.1941	0.1486	0.2464
Māori	0.1347	0.1121	0.1599
European/ other	0.1099	0.0938	0.1271
Asian	0.0939	0.0578	0.1378

What we know from national data

- HA-SAB events continue to increase in Aotearoa New Zealand, with PIVC as a major contributor.
- The highest number of PIVC infections occur in general medicine.
- Pacific and Māori peoples have highest HA-SAB rates.
- After analysing the data and reviewing available evidence, we then wanted to understand why.

Identifying the problem

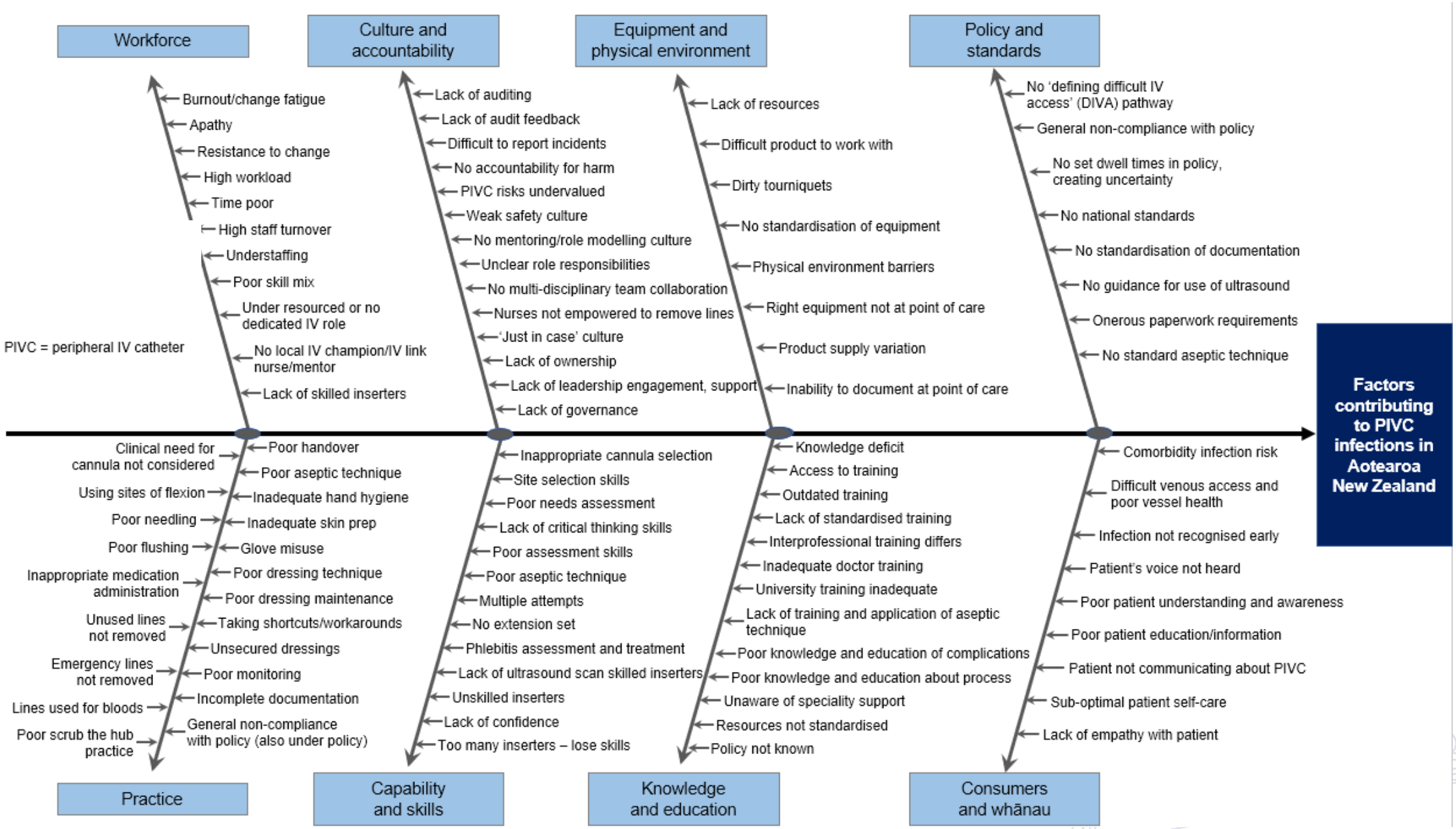


- Analysed data:
  - national HA-SAB surveillance data
  - ACC claims data
  - adverse events
- Reviewed available evidence
- Engagement with:
  - clinicians through a stocktake survey, workshops and a ThoughtExchange.
  - consumers through a survey and subsequent interviews where consumers shared their experience and impact of having an infection on their whānau and their recovery.

ACC = Accident Compensation Corporation.

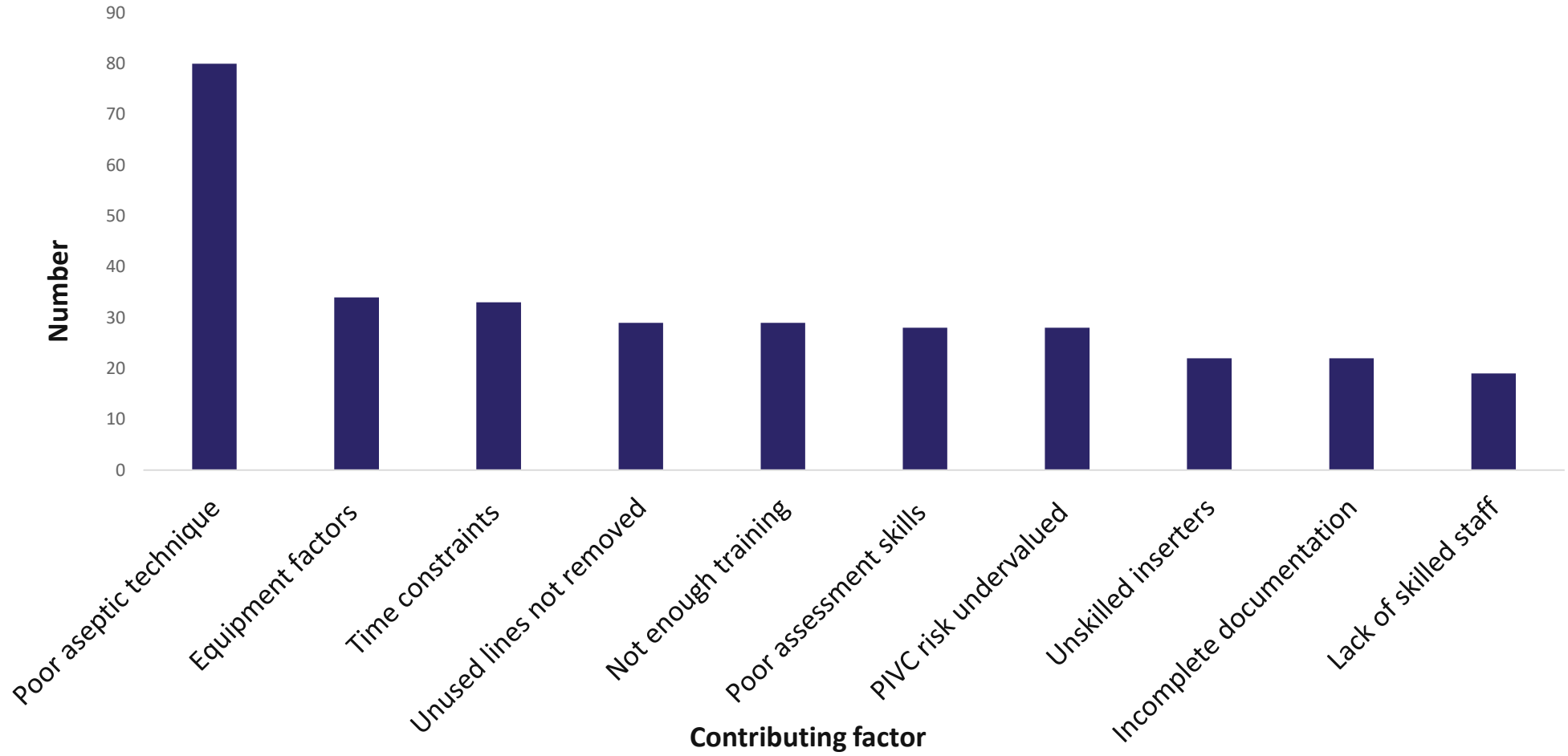
Workshops

- We held four regional workshops with 55 participants
  - Auckland, Hamilton, Wellington, Christchurch
  - Range disciplines: Drs, nurses, IV access specialists, anaesthetic technicians, ID and IPC specialists.
- We asked two questions:
  1. What factors contribute to PIVC-related infections?
  2. How can PIVC management be improved in your workplace?
- Participants identified 502 factors contributing to PIVC infections and provided 398 ideas for improvement.



IV = intravenous.

Regional Workshops: the top 10 factors contributing to PIVC infections



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.

ThoughtExchange participation

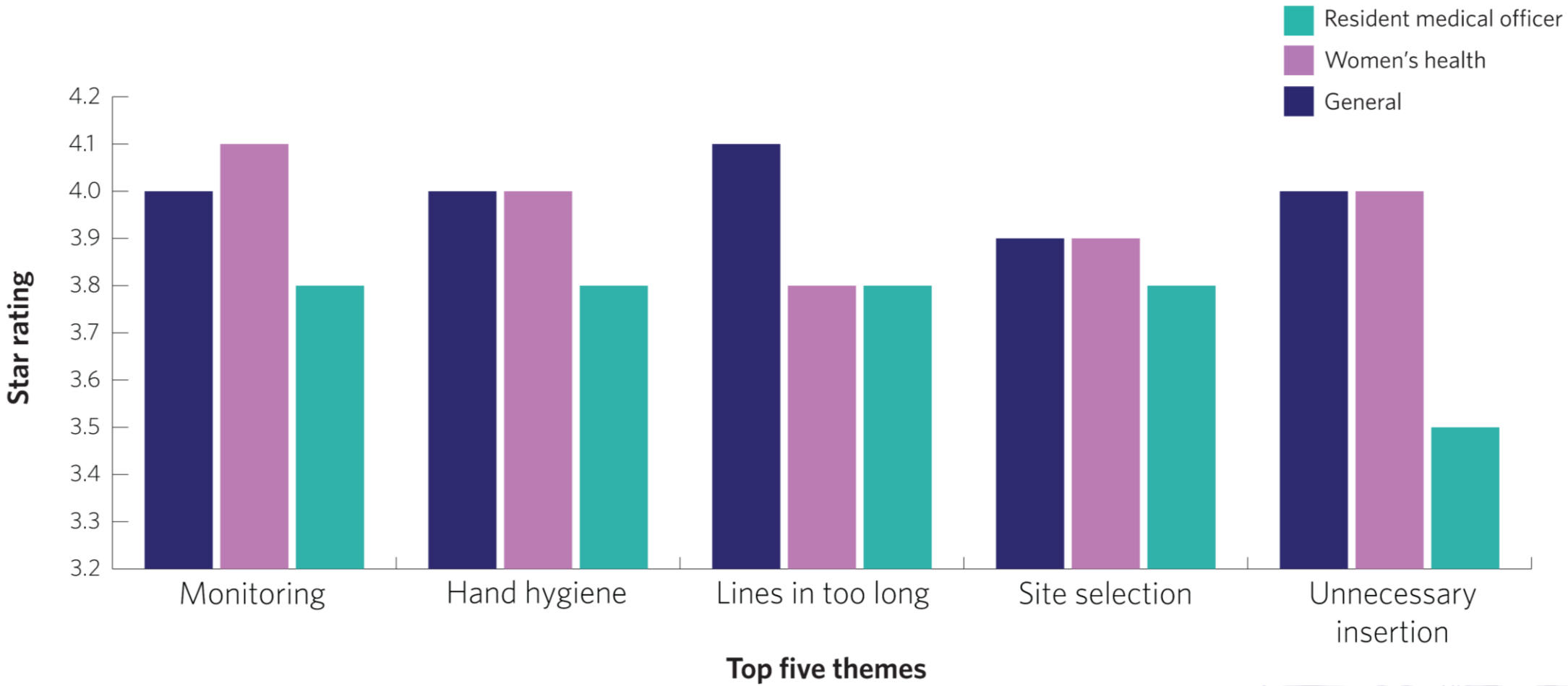
Specialty	Participants	Thoughts	Ratings
General[a]	149	214	3,393
RMO	49	36	500
Women's health	18	19	141
Total	**216**	**269**	**4,034**

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

ThoughtExchange

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

ThoughtExchange: the top five themes



Beth's story

Beth presented with an acute heart condition.
A PIVC was inserted in the ACF.
Beth developed a HA-SAB arising from the infected PIVC.
Beth spent 14 days in hospital and was discharged home with a PICC and then oral antibiotics.

While Beth was in hospital, Mark (husband) was stressed, not getting much sleep, not eating properly and trying to move to a new house at the same time.

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

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

What are we doing

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, maintenance and removal.

A national advisory group has been formed. This group has developed a PIVC infection prevention bundle taking into considering current evidence and the clinician and consumer engagement results.

Questions?

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