

Line Associated Staphylococcus aureus Bloodstream Infections- have we lost the battle?



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Acknowledgement

- CALHN Infection Prevention and Control Unit
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- The Australian Group on Antimicrobial Resistance (AGAR)

Disclosures:

None

How is a SAB defined?

A patient-episode of SAB is defined as a positive blood culture for *Staphylococcus aureus*. For surveillance purposes, only the first isolate per patient is counted, unless at least 14 days has passed without a positive blood culture, after which an additional episode is recorded.

The national benchmark for HCA SAB is 1.0 per 10 000 bed days (set by The Australian Health Minister's Advisory Council).

Implementation Guide for the Surveillance of *Staphylococcus Aureus* Bloodstream Infection. Australian Commission for Safety and Quality in Health Care. June 2021

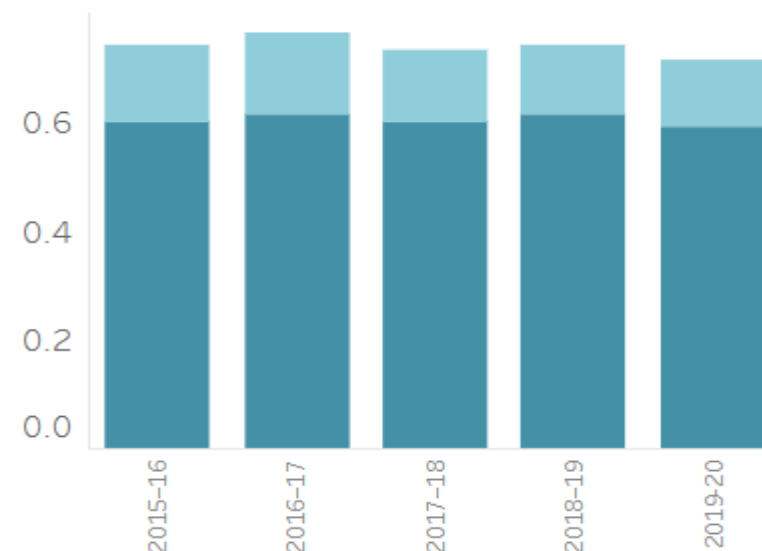
Safety and Quality

Staphylococcus aureus bloodstream infections

in public hospitals have remained

< 0.8

cases per 10,000 patient days
between 2015–16 and 2019–20



Source: AIHW

Line Associated Blood Stream Infections

BSIs cause significant illness and can lead to death

- *Staphylococcus aureus* bacteraemia: high rate of secondary infections i.e. endocarditis, septic arthritis
- an associated mortality rate of about 20%¹

More than half of BSIs are associated with HCA procedures

- Common cause of HCA BSI: Intravascular catheters, urinary catheters, surgical procedures

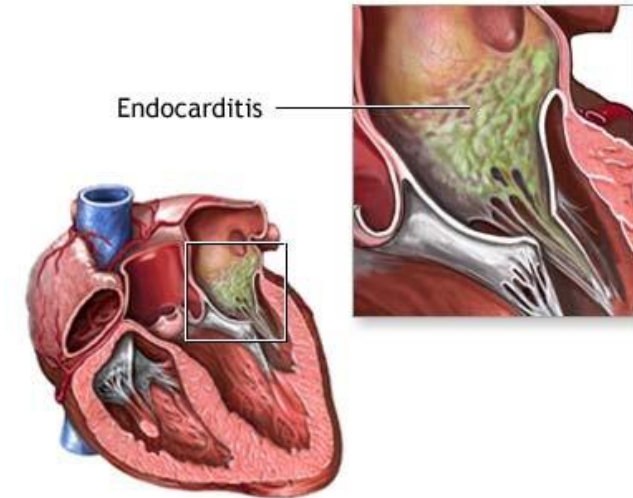
Majority of IV line related BSIs can be prevented

[ACSQHC 2010 Cutting the Risk of Health Care Infections - Australian Commission on Safety and Quality in Health Care](#)



HCA Blood Stream Infections: Patient Outcomes

- **Patients who develop BSIs:**
 - Increased length-of-stay
 - MSSA bacteraemia usually require a minimum 2 week course of IV antibiotics
 - Are more likely to suffer other complications during their time in hospital
 - Average estimated additional cost per CLABSI is \$35,000²
 - **Personal loss: sick leave, income, risk of other HCA complications such as MRO**



[Australian Commission on Safety and Quality in Health Care, 2018, Healthcare-associated Infections](#)



Cost to the organisation:

- Loss of bed, revenue, increased AB use, risk of litigation
- HAC penalty

HAC count

Number of separations with HAC:

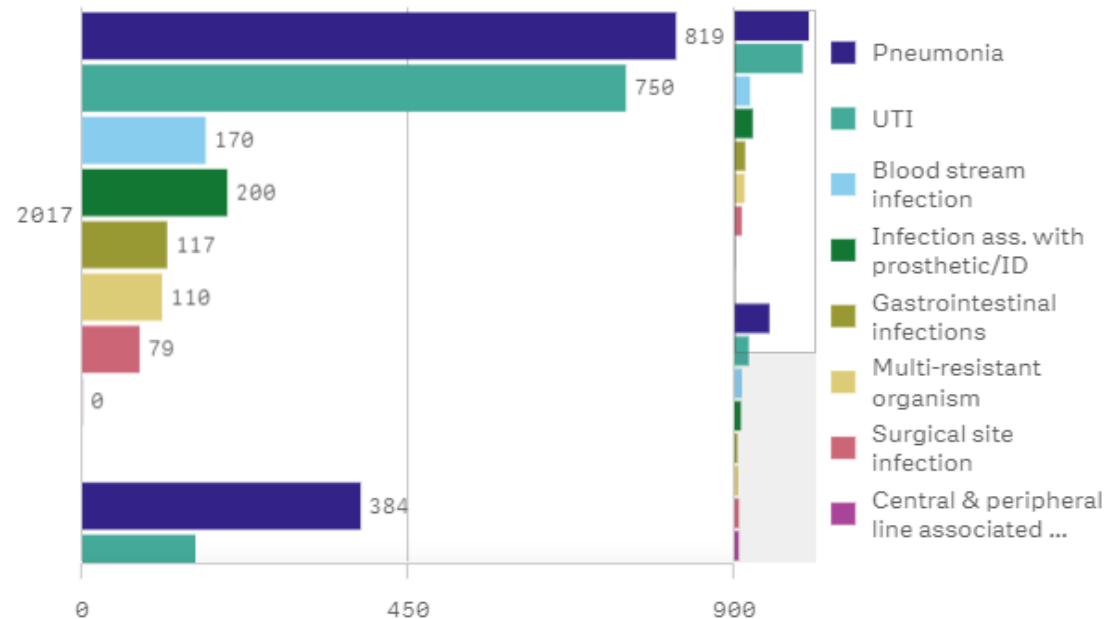
2,630

HAC funding impact

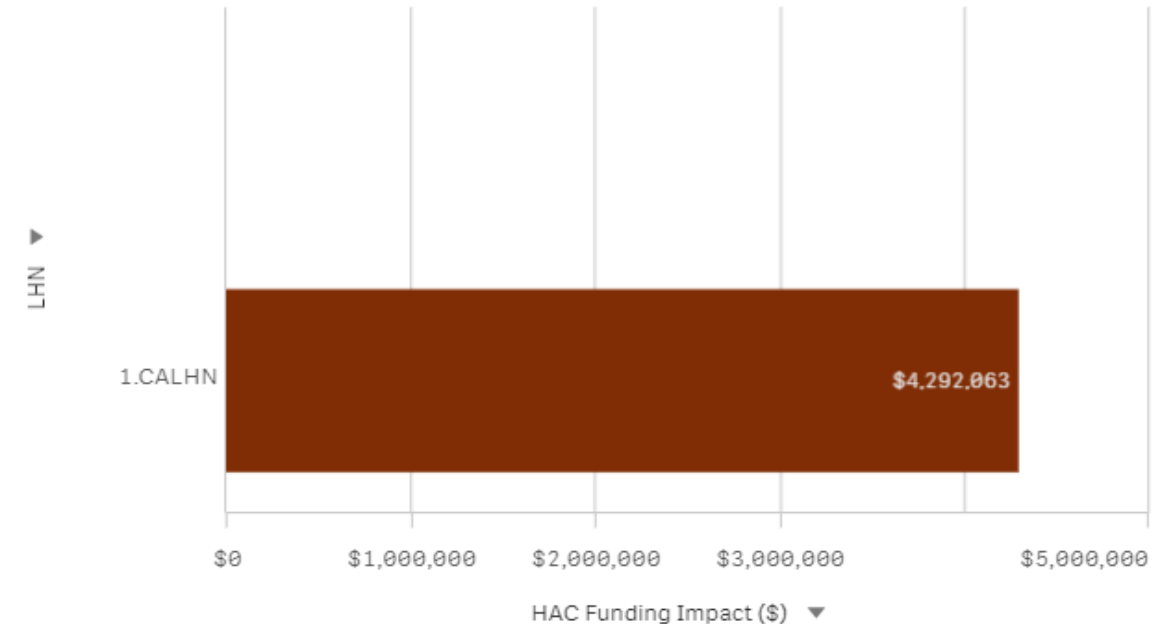
Funding reduced by:

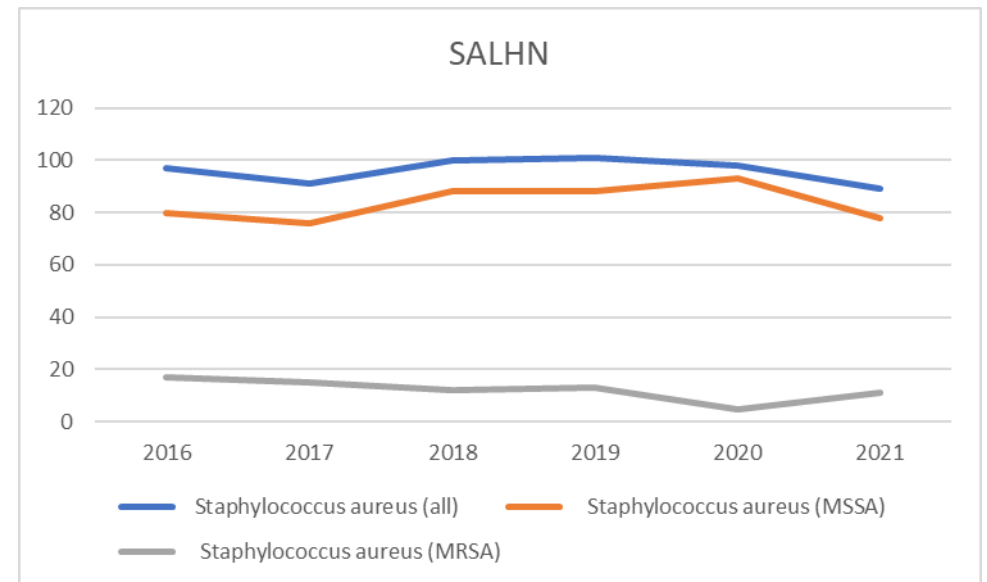
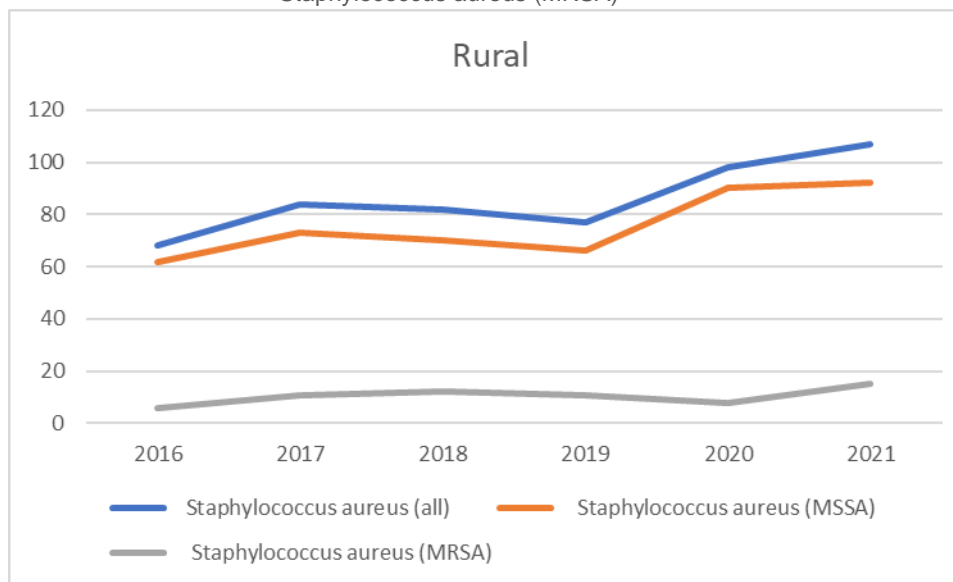
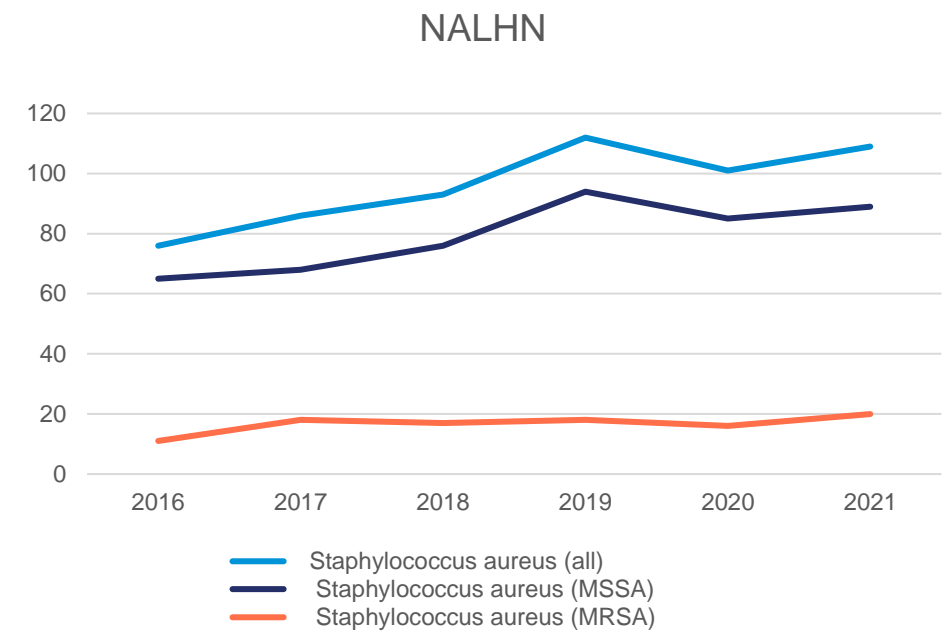
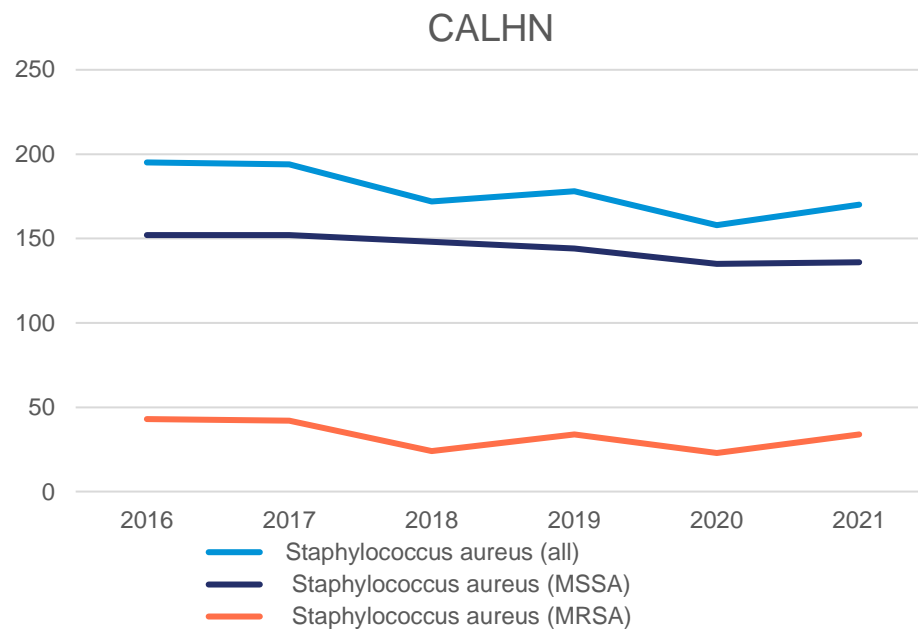
\$4,292,063

3. HAI - Sub-Categories



HAC - No. of seps and \$\$ impact by LHN/Hospital/Clinic

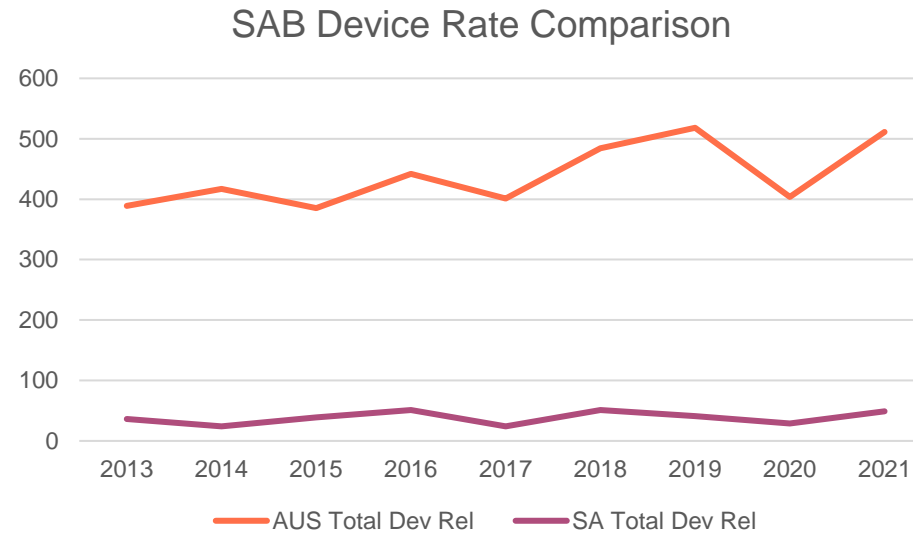




Data obtained from [The Australian Group on Antimicrobial Resistance \(AGAR\)](#)- 18/05/2022

	2016	2017	2018	2019	2020	2021
	Count	Count	Count	Count	Count	Count
Staphylococcus aureus (all)	465	500	489	499	499	513

Comparative SA and Australia Device SAB rate

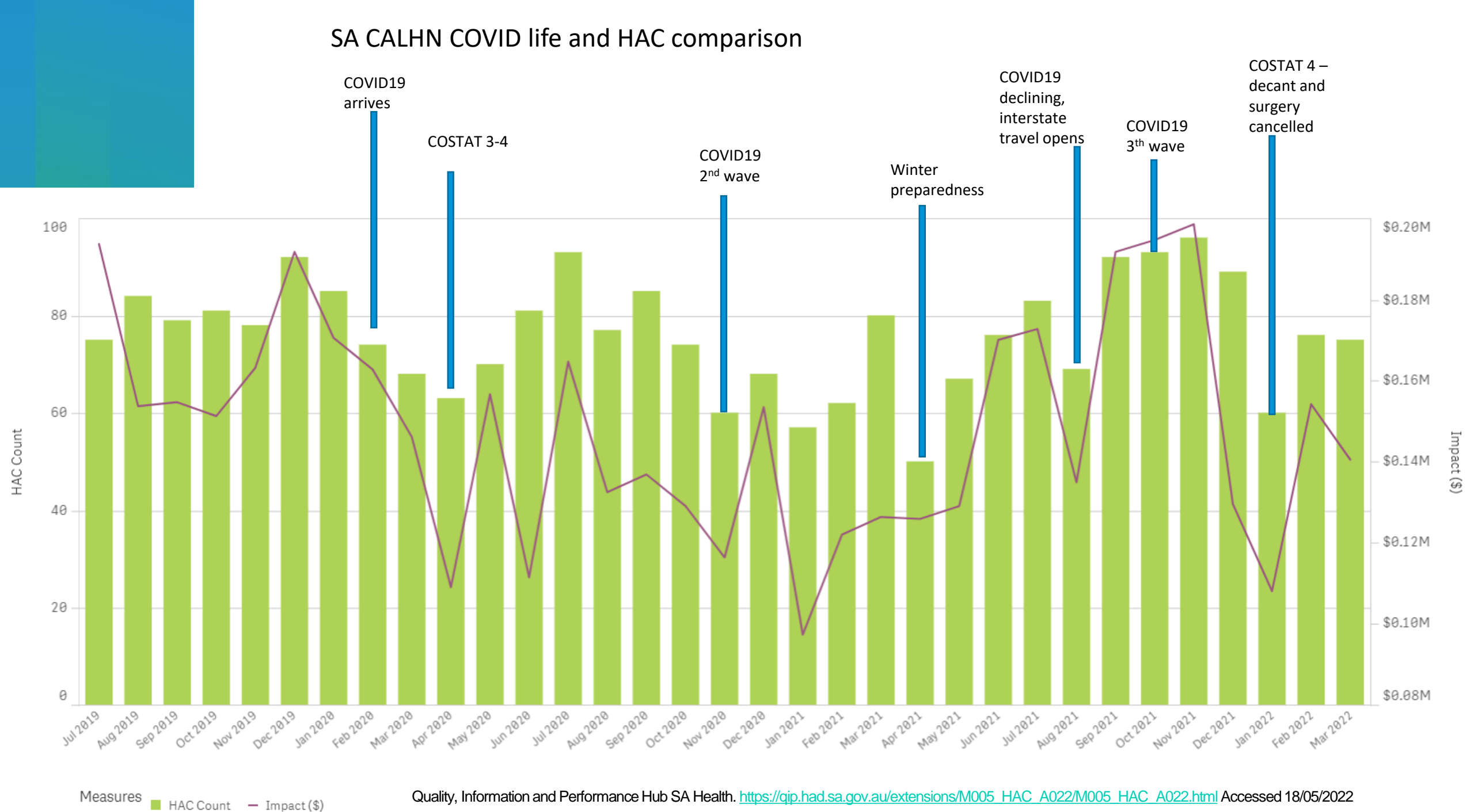


State	Year	SA MRSA	SA Total Dev Rel	%MRSA	%MSSA
SA	2013	5	36	13.9%	86.1%
	2014	3	24	12.5%	87.5%
	2015	5	39	12.8%	87.2%
	2016	12	51	23.5%	76.5%
	2017	3	24	12.5%	87.5%
	2018	3	51	5.9%	94.1%
	2019	7	41	17.1%	82.9%
	2020	2	29	6.9%	93.1%
	2021	6	49	12.2%	87.8%

	Year	AUS MRSA	AUS Total Dev Rel	%MRSA	%MSSA
Aus	2013	77	389	19.8%	80.2%
	2014	67	417	16.1%	83.9%
	2015	76	385	19.7%	80.3%
	2016	75	442	17.0%	83.0%
	2017	75	401	18.7%	81.3%
	2018	55	484	11.4%	88.6%
	2019	80	518	15.4%	84.6%
	2020	66	404	16.3%	83.7%
	2021	68	511	13.3%	86.7%

Data obtained from The Australian Group on Antimicrobial Resistance (AGAR)- 18/05/2022

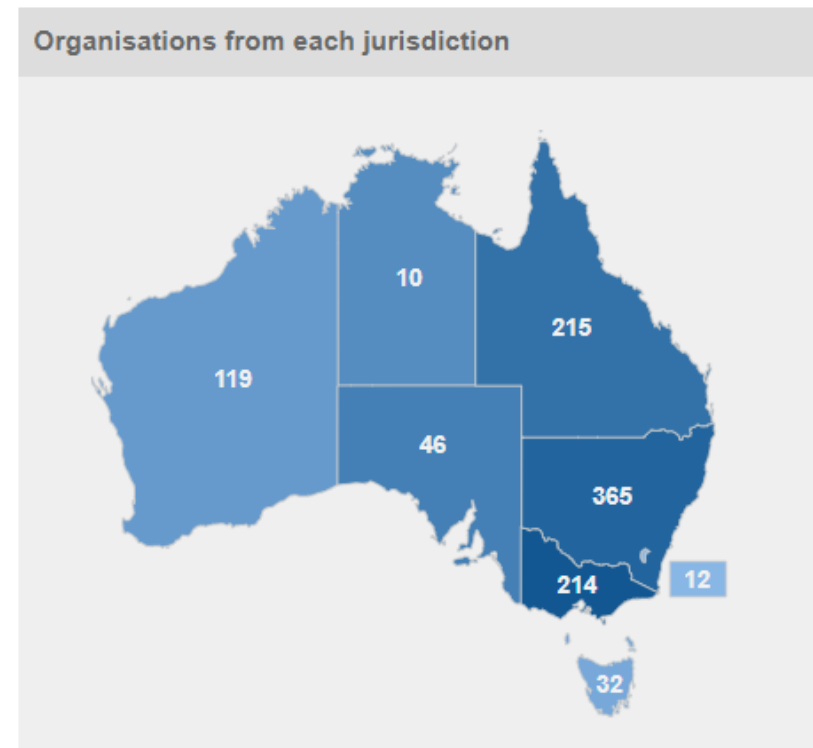
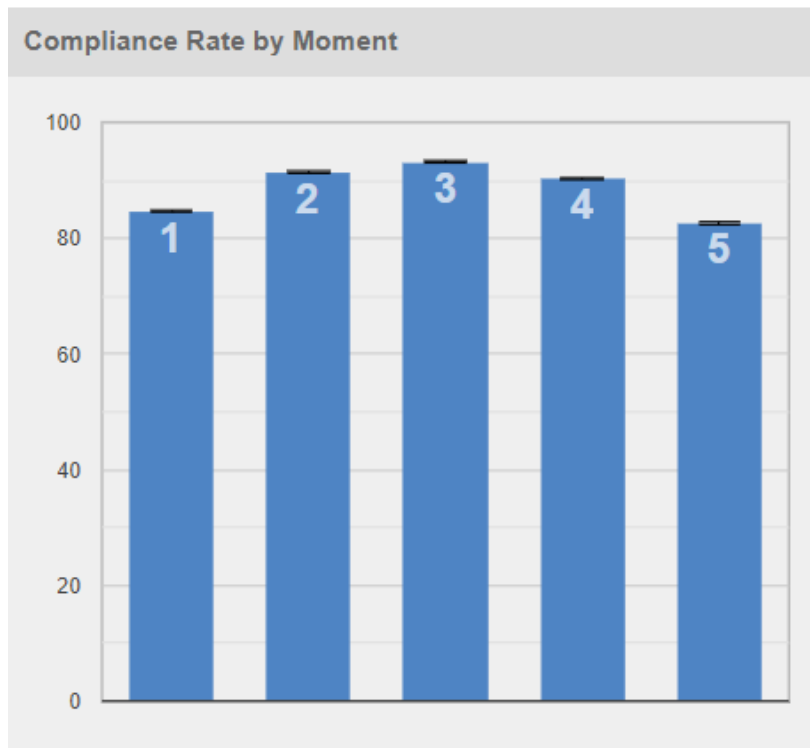
SA CALHN COVID life and HAC comparison



What ammunition have we used so far?

- **The bundle approach**
- **HH Aseptic Technique**
- **Scrub the hub**
- **DIVA**

Hand hygiene



[National hand hygiene audit data - latest data now available](#) | [Australian Commission on Safety and Quality in Health Care](#) Audit period 3 1st July -

Aseptic Technique

- PIVC Trolley for line insertion
- PIVC Packs
- Use of dedicated AT trays to maintain key parts
- National standards for PIVC and Central line insertion



Aseptic Technique

Asepsis is the absence of infectious microorganisms. Aseptic technique protects patients during clinical procedures by using appropriate infection prevention measures that maximise and maintain asepsis.

Risk assessment

Prior to commencing a clinical procedure requiring aseptic technique, perform a risk assessment. Consider the risk to both the patient and yourself of acquiring an infection. This will guide the appropriate infection prevention measures to apply.

- Determine if the procedure is simple, complex or invasive.
- What are the key parts and key sites?
- Do key parts and key sites need to be touched?
- What are the appropriate infection prevention measures to protect key parts and key sites?

Infection prevention measures



Environmental controls are used to reduce the risk of contamination by movement, touch or proximity. Environmental risks may include bed making and cleaning (in close proximity), use of fans, movement and proximity of curtain screens and a confined working area.



Aseptic field management ensures that key parts and key sites are protected and should be prepared as close as possible to the time of actual use.

Ensure the size of the aseptic field is appropriate and is cleaned following organisational guidelines. Inspect packaging of sterile items and open correctly to prevent contamination.



Hand hygiene is performed before, during and after a procedure requiring aseptic technique.

Barriers to effective hand hygiene (artificial nails, jewellery, damaged skin and inappropriate glove use) must be addressed.



Non-touch technique, where key parts and key sites are not directly touched by the clinician's hands, is critical to asepsis.

To protect key parts and key sites, simply do not touch or if necessary, touch indirectly with a swab, sterile forceps or sterile gloves.



Personal protective equipment (PPE) is used to protect both the patient and clinician from infection.

PPE may include non-sterile or sterile gloves, gowns, face and eye protection and head coverings.

Scrub the hub

Germ free- scrub these 3

Scrub for 15 seconds

Scrub with 70% alcohol and leave to dry



SCRUB the hub

- IV hub will have pathogens on it; poor disinfection technique may push pathogens into the valve and enter the



SCRUB medication septum

- Protective lids and septums are not sterile
- Contaminated septums have

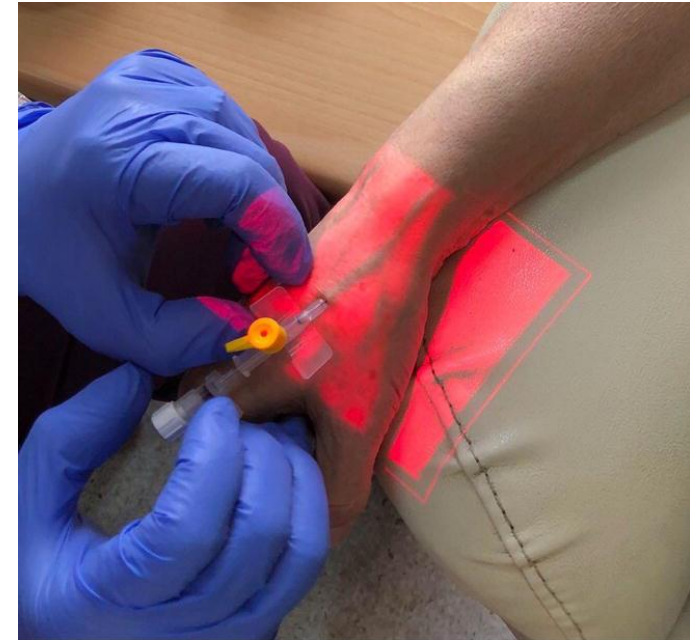


SCRUB blood culture bottle top

- Prevents contamination of the blood and false positive results

DIVA- Difficult IV Access

Point of use Ultrasound (POCUS) or transillumination



Reference:

Dorotić A, Kuktić I, Vuljanić D, Šimundić AM. Verification of technical characteristics and performance of VeinViewer Flex, ICEN IN-G090-2 and AccuVein AV400 transillumination devices. Clin Chim Acta. 2021 Apr 8;519:40-47. doi: 10.1016/j.cca.2021.04.001. Epub ahead of print. PMID: 33839091.

What new ammunition could we use?



IV Watch SmartTouch

**Monitors peripheral IV
infiltration or extravasation**



Timer Tag CATH TAG



Low cost single use disposable timer that reminds HCW that the device needs to be reviewed or replaced. The blinking red light alerts the staff member that it needs replacing.

<https://www.design-industry.com.au/timertag-cath-tag-> Accessed 18/05/2022

Alternate Timer Tags

Low cost single use disposable timer
Blinking red light alerts the staff member that the device needs to be changed.



<https://www.lateralmedical.com/infection-control-ohs/timertag/peripheral-iv-alert-labels/>

Accessed on line 18/05/2022

Smart Dressings – watch this space....

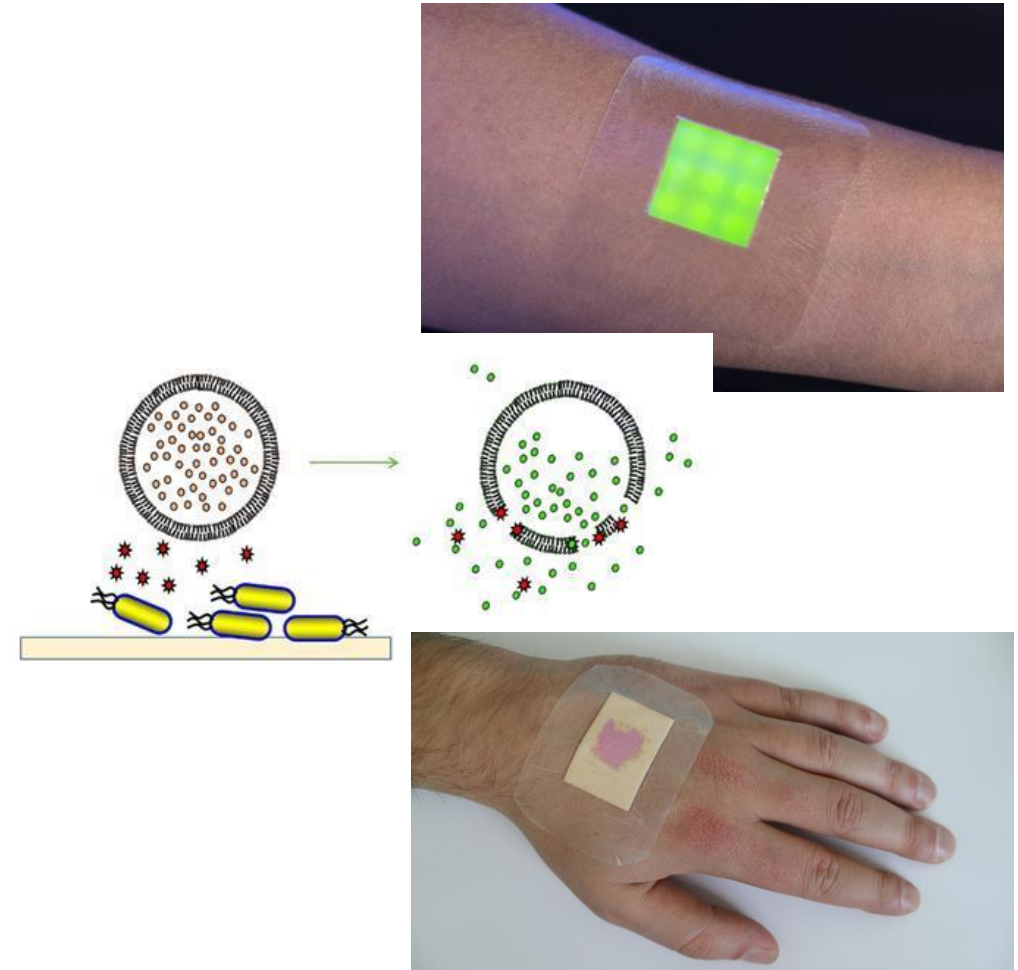
Smartwound

A dressing containing vesicles dispersed in a hydrogel, that as the infecting bacteria release their toxins, they rupture the encapsulated fluorescent dye which is released.

These toxins are the same ones that cause clinical signs of infections such as pain, heat etc.

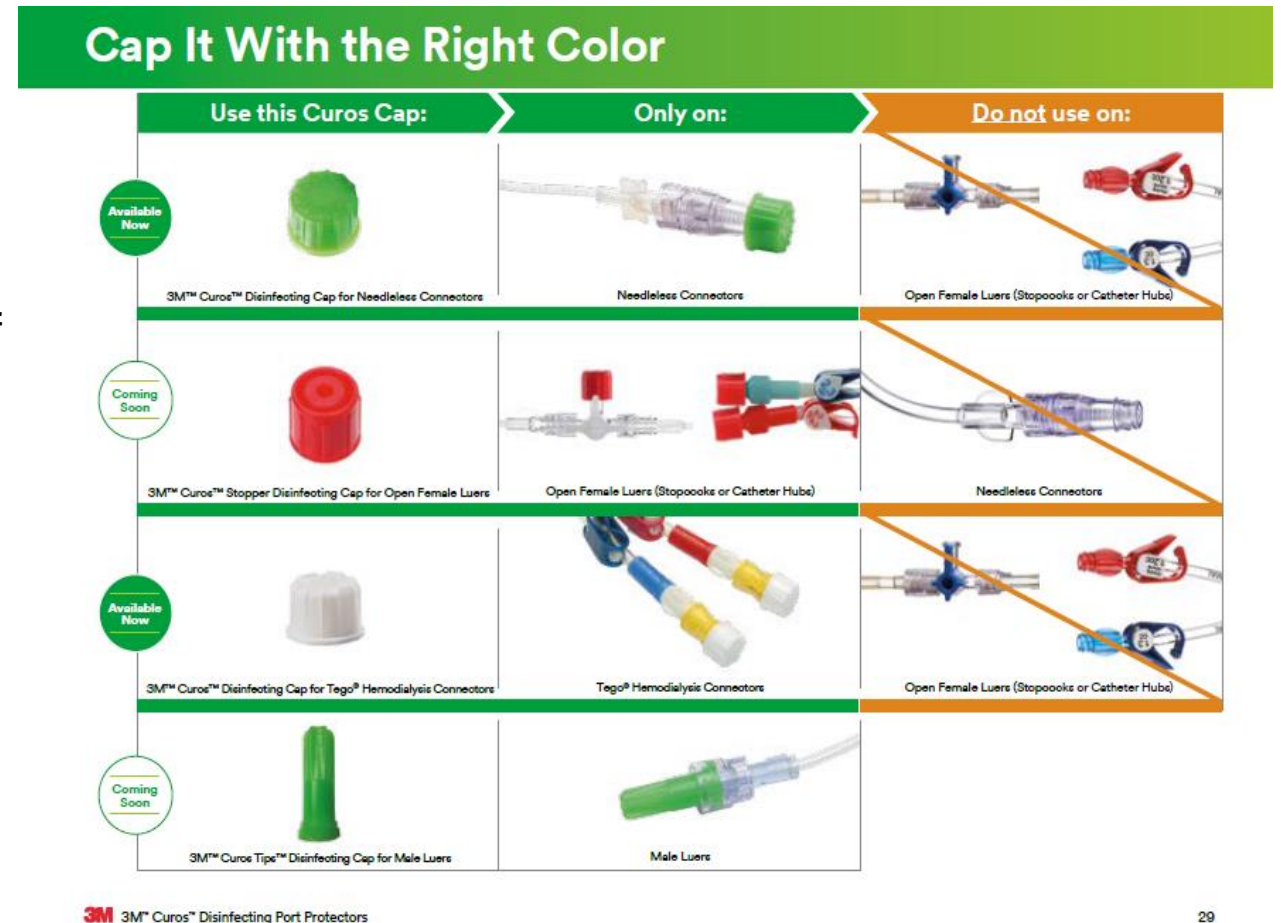
Colour Changing Dressing

An indicator dye present in the dressing that reacts to changes in pH values (healthy is 5 or below), above is alkaline and indicates possible wound infection.



Needleless Connector Caps

- Infection from hub contamination increases after 7 days. Colonisation of NC is considered the cause of 50% of post insertion infections.
- Maximises contact time and friction
- Reduces patient cross contamination
- Cost saving comparison?



29

Impact of alcohol-impregnated protectors on incidence of catheter-associated blood stream infections.

Alasmari F, Kittur ND, Russo AJ, et al. Presented at: IDWeek annual meeting; October 18, 2012; San Diego, CA.

Alcohol-impregnated disinfectant caps reduce the rate of central-line associated bloodstream infections and nosocomial bacteremia.

Shelly M, Greene L, Brown L, Romig S, Pettis AM. Presented at: IDWeek annual meeting; October 10, 2014; Philadelphia, PA.

Your  Thoughts