

A seven-year review of *Staphylococcus aureus* bloodstream infection surveillance data in Western Australian health services (2011 to 2017)

Ms Simone Tempone, and Ms Rebecca McCann
Healthcare Associated Infection Unit, Department of Health Western Australia, Perth, Australia

Introduction

Since 2010, Healthcare Infection Surveillance Western Australia (HISWA) have reviewed all *Staphylococcus aureus* positive blood cultures processed by PathWest Laboratory Medicine (PathWest), as part of the data validation process for mandatory state and national reporting requirements of healthcare-associated *S. aureus* bloodstream infections (HA-SABSI). Utilising a standardized case definition (1), SABSI are classified as either a HA or a community-associated (CA) event, with only HA events monitored and reported locally and nationally. The objective of this study was to further interrogate Western Australia's rising rates of CA-SABSI, previously identified in a collaborative study with the Victorian Healthcare Associated Infection Surveillance (VICNISS).

Methods

Study design

Retrospective review of routinely collected health data for the HISWA SABSI surveillance program, from 2011-2017.

Setting

The study was conducted in WA, which has a population of approximately 2.6 million. Health services are delivered by a mix of public and private healthcare providers. The majority (86%) of all acute care hospitals are operated by the public sector, and their clinical pathology services are delivered by PathWest, the single public-sector pathology service provider.

Study population

Cases for the study were included if they had *S. aureus* isolated from a blood culture specimen tested by PathWest. A review of each case was undertaken by the HAIU via access to the on-line patient clinical information system to stratify the infection acquisition based on national definitions (1).

Results

Overall

- 3,542 SABSI were investigated.
- 71% were classified as CA-SABSI.
- Incidence was 5.92 and 14.37 SABSI per 100,000 person-years, for HA-SABSI and CA-SABSI respectively.
- MSSA was predominately isolated (85%).

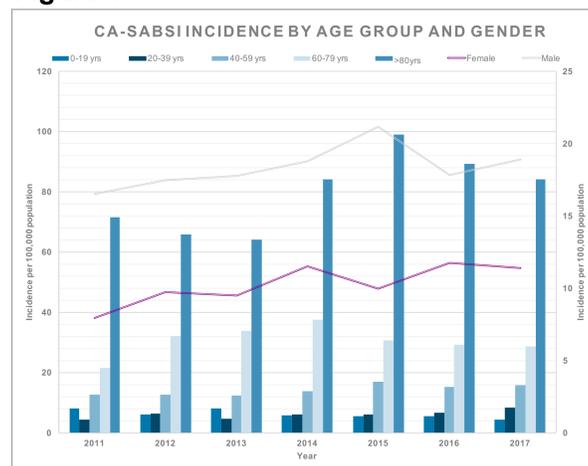
Table 1. Case demographic data

	CA-SABSI (%)	HA-SABSI (%)
Cases	2508 (71)	1034 (30)
Median age yrs (IQR)	59 (40 - 75)	64 (48 - 78)
Gender		
Male	1614 (46)	669 (19)
Female	894 (25)	365 (10)
MRSA/MSSA		
MRSA	439 (12)	182 (5)
MSSA	2069 (58)	852 (24)
Previously colonised (MRSA cases only)		
No	216 (35)	82 (13)
Yes	223 (36)	100 (16)
30 day all-cause mortality	354 (10)	136 (4)

Longitudinal incidence*

- SABSI increased from 18.70 to 20.86 per 100,000 person-years.
- HA-SABSI decreased from 6.42 to 5.67 per 100,000 person years.
- CA-SABSI increased from 12.28 to 15.19 per 100,000 person-years.**
- CA-SABSI in males increased from 16.54 to 18.92 and females increased from 7.96 to 11.44 per 100,000 person-years.
- MSSA CA-SABSI increased from 10.24 to 11.69 and **MRSA CA-SABSI increased from 2.04 to 3.50 per 100,000 person-years.**

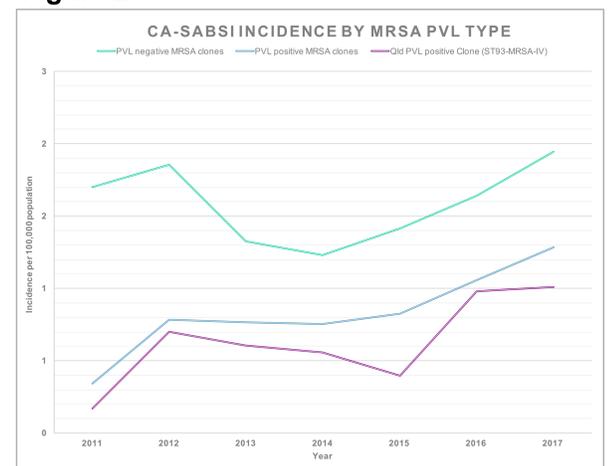
Figure 1



MRSA SABSI*

- Of the 621 MRSA SABSI, 323 (52%) were known to have been colonised with MRSA prior to the onset of infection.
- Incidence of those with known prior MRSA colonisation has remained relatively stable for HA-SABSI, while for **CA-SABSI it has increased from 1.10 to 2.10 per 100,000 person-years.**
- Genotyping data shows increasing incidence in MRSA CA-SABSI is caused predominantly by methicillin-resistant PVL negative strains. However there has been a significant increase in **PVL positive Qld Clone (ST93-MRSA-IV) incidence.**

Figure 2



*Incidence calculated with ABS WA population estimates; The significance of differences between groups was assessed by χ^2 . P values ≤ 0.01 were considered significant and are indicated in bold.

Conclusion

- SABSIs continue to represent a significant burden to the WA healthcare system.
- In WA, the incidence of HA-SABSI has been in decline, a trend that has also been seen in other jurisdictions in Australia since standardised national surveillance practices were adopted (2). WA also reports low rates of MRSA HA-SABSI, which is likely due to stringent policies in place since the early 1980's. These improved patient outcomes most likely reflect a variety of system wide improvements, and demonstrate how a robust national surveillance program, with the implementation of evidence driven preventative measures and policies, can aid safer provision of healthcare (3,4).
- The incidence of CA-SABSI has significantly increased during this time and further work is needed to better understand risk factors in this population so appropriate public health interventions can be effectively targeted.
- With other jurisdictions in Australia reporting similar increases in CA-SABSI (5), perhaps a coordinated national approach, similar to what has been implemented for HA-SABSI, should be considered.

For further information, please contact:

Simone Tempone, Healthcare Associated Infection Unit
Simone.tempone@health.wa.gov.au



Government of Western Australia
Department of Health

References

- Australian Commission on Safety and Quality in Health Care. *Implementation Guide for Surveillance of Staphylococcus aureus Bacteraemia*. 2013
- Australian Institute of Health and Welfare. *Staphylococcus aureus bacteraemia in Australian hospitals 2016-17*.
- Grayson, L.M., et al., *Effects of the Australian National Hand hygiene Initiative after 8 years on infection control practices, health-care worker education, and clinical outcomes: a longitudinal study*. The Lancet, 2018. 18 (11): p1269-1277.
- Western Australia Department of Health. *Insertion and Management of Peripheral Intravenous Cannulae in Western Australian Healthcare Facilities Policy*. Mandatory Policy. 2016
- Agostino, J.W., et al., *The increasing importance of community-acquired methicillin-resistant Staphylococcus aureus infections*. Med J Aust, 2017. 207(9): p. 388-393.