Government of **Western Australia**
Department of **Health**
**Public and Aboriginal Health Division**

Communicable Disease Control Directorate
Guideline

# Guidelines for investigating and reporting healthcare associated *Staphylococcus aureus* bloodstream infections.

Guideline 18 / July 2024

*These guidelines have been released by the Communicable Disease Control Directorate, Public and Aboriginal Health Division, Western Australian Department of Health, to provide consistent and evidence informed advice to agencies involved in the prevention of infections and management of communicable diseases in Western Australia.*

## ACKNOWLEDGEMENT OF COUNTRY AND PEOPLE

The Communicable Disease Control Directorate at the Department of Health acknowledge the Aboriginal people of the many traditional lands and language groups of Western Australia. We acknowledge the wisdom of Aboriginal Elders both past and present and pay respect to Aboriginal communities of today.

# Contents

## 1. Definitions

| Term | Definition |
|---|---|
| **Clinical Incident Management System (CIMS)** | Refers to the current electronic online clinical incident management system (implemented February 2014), used to capture and manage clinical incidents that occur within the WA health system. |
| **Healthcare-associated infection (HAI)** | Healthcare-associated infections (HAIs) are infections acquired as a direct or indirect result of the provision of healthcare. |
| **Healthcare associated *Staphylococcus aureus* blood stream infection (HA-SABSI)** | HA-SABSI is a bloodstream infection that occurs as a direct result of the provision of healthcare and meets criteria described in the HISWA Surveillance Manual. |
| **Health Service Providers (HSPs)** | HSPs established by an order made under section 32(1)(b) of the *Health Services Act 2016* and may include North Metropolitan Health Service, South Metropolitan Health Service, Child and Adolescent Health Service, Western Australia Country Health Service and East Metropolitan Health Service. |
| **MRSA** | Methicillin-resistant *Staphylococcus aureus* |
| **MSSA** | Methicillin-susceptible *Staphylococcus aureus* |
| **Severity Assessment Code (SAC)** | The SAC rating is the way clinical incidents are rated in WA's health system. Clinical Incidents are categorised using the SAC rating to determine the appropriate level of analysis, action and escalation. |
| **SAC 1** | A clinical incident that has or could have (near miss), caused serious harm or death and which is attributed to health care provision (or lack thereof) rather than the patient's underlying condition or illness. SAC 1 incidents require a root cause analysis (RCA) or other analysis of similar rigorous methodology to be undertaken. |

## 2. Purpose

The purpose of this document is to provide advice and guidance on the investigation and reporting of healthcare associated *Staphylococcus aureus* bloodstream infections (HA-SABSIs) in Western Australia (WA) as adverse events. This document supports local clinical incident management processes for Health Service Providers (HSPs) to ensure a degree of consistency across when reporting and classifying HA-SABSI as severity assessment code 1 (SAC 1) events as described by the WA Clinical Incident Management Policy.

The guidance contained in this guideline is applicable can be adopted by private hospitals.

# 3. Introduction / Background

HA-SABSI cause significant illness and serious complications, such as endocarditis, osteomyelitis and septic arthritis, thereby increasing the likelihood of prolonged hospital admission, increased use of antimicrobials, and subsequent increased healthcare costs. Even with advanced medical care, mortality remains high.

These adverse events are potentially preventable through the implementation of infection prevention strategies such as compliance with hand hygiene, aseptic technique, skin antisepsis prior to invasive procedures, improved insertion and management of indwelling medical devices, effective antimicrobial stewardship and surveillance. They are an important measure of the quality of care provided in our hospitals.

Ongoing surveillance enables HSPs to identify aspects of clinical care that may contribute to the occurrence of preventable HA-SABSI. Once these factors are identified, HSPs should target interventions to reduce the incidence of HA-SABSI occurring in the future.

Reporting of HA-SABSI via the Healthcare Infection Surveillance WA (HISWA) program that is overseen by the Infection Prevention Policy Surveillance Unit (IPPSU), is mandatory for all HSPs and contracted health entities as described in the *Healthcare Associated Infection Surveillance Policy* (MP 0108/19). HA-SABSI data is also used as a performance indicator for the WA Health Service Performance Report and hospital identified data is reported by the Australian Institute Health and Welfare (AIHW) and published on the MyHospitals website.

With extensive use of HA-SABSI data as a performance measure and an indicator of the standard of care, it is important that valid, reliable data is collected and reported. To assist with the quality of HA-SABSI data reported, the IPPSU undertakes data validation of all HA-SABSI submitted to HISWA by HSPs.

HISWA data has consistently shown that the majority of HA-SABSI can be attributed to two main sources. These are intravascular devices (IVDs) and procedure related events. Research has shown that HA-SABSI from these sources are largely preventable.

Following a literature review to determine the existence of evidence-based strategies to prevent HA-SABSI and in consultation with infection prevention and control staff, HA-SABSI were classified as either largely preventable, possibly preventable, or non-preventable based on the current evidence available and grouped in accordance with current HISWA ‘focus of infection’ classifications.

Clarification around preventability of HA-SABSI is required to ensure that energies are directed where they are of most benefit in reducing harm to patients. The HA-SABSI identified in patients that are considered largely preventable generally have modifiable risk factors which are reliant on the clinical practice of health professionals providing care.

A summary of the literature review is detailed in Appendix 1.

# 4. Requirements

## 4.1 Investigation

Each episode of a laboratory confirmed *S.aureus* positive blood culture requires investigation at the time of notification to ensure opportune and appropriate review of the case occurs. The initial investigation needs to determine if the SABSI is a community or

healthcare associated event. The review should include determinants as described in **Table 1** to assist with the investigation and assessment.

The definitions described in the HISWA Surveillance Manual shall be used to classify SABSI events as healthcare associated. If the investigation determines the SABSI could be related to care provided at another facility the investigator is to refer this information to the IPPSU team at ippsu@health.wa.gov.au for referral to the responsible hospital.

**Table 1- Investigation guidance for all laboratory confirmed *Staphylococcus aureus* positive blood culture.**

Determine the source of infection by reviewing the patient's:

- Healthcare history that includes:
  - date of hospital admission and discharge
  - other recent hospital admissions including emergency department presentations, day of surgery and day procedure events
  - history of hospitalisation at other facilities
  - healthcare provision in the community e.g. HITH, Silverchain
- Medical records and consults
- Underlying medical conditions
- At risk behaviours e.g. intravenous drug use
- Recent surgical/invasive procedures
- Presence of indwelling medical devices/prosthesis
- Documented observations/assessments
- Skin integrity
- Pathology/imaging results.

## 4.2 Identification of focus of infection and preventability

To assist in correct classification of a HA-SABSI and reporting as a SAC 1, the most likely focus of infection or attributable cause, relating to the provision of healthcare needs to be identified. This then determines the degree of preventability. Those HA-SABSI considered largely preventable shall always be reported as SAC 1 events, while those HA-SABSI considered possibly preventable will require individual case assessment by clinicians. The classification and reporting requirements based on preventability are described in **Table 2.**

## 4.3 Reporting

All HA-SABSI considered largely preventable are entered on the approved clinical incident management system (CIMS) as clinical incidents and classified as SAC1 events in accordance with the WA Health Clinical Incident Management Policy. Refer Appendix 2.

It is important to note that patient outcome may not always be the best determinant in reporting a HA-SABSI as a SAC 1 clinical incident. That is, the incident may have, but did not cause serious harm, either by chance or through timely intervention. Therefore, all preventable HA-SABSI resulting in minor harm to the patient should be regarded as a SAC 1 incident.

Where HA-SABSI are reported and investigated as a SAC 1 and following a clinical incident investigation, if it is determined that there are no healthcare contributing factors

and the event was not preventable, then declassification/inactivation processes can be initiated in accordance with the WA Health Clinical Incident Management Policy.

**Note:** Although the Patient Safety Surveillance Unit (PSSU) may determine that a HA-SABSI can be declassified as a SAC 1 event, the infection is still classed as healthcare associated and will remain in the HISWA dataset.

### Table 2 - Classification and reporting requirements

| Focus of HA-SABSI | Preventability | Report as SAC 1 |
|---|---|---|
| Intravascular Device (IVD) | Largely Preventable | Yes |
| Indwelling Medical Device (Non IVD) | Largely Preventable | Yes |
| Surgical Procedure | Largely Preventable | Yes |
| Procedure – Instrumentation or Incision | Largely Preventable | Yes |
| Organ Site | Possibly Preventable | Individual case assessment.<br>**Report** as SAC 1 where healthcare factors are identified e.g. patient may develop decubitis ulcer and subsequent SABSI during inpatient stay. |
| Neutropenia contributed to by cytotoxic therapy | Possibly Preventable | Individual case assessment.<br>**Do not** report as SAC 1 if no other single source of infection identified e.g. presence of IVD, infected procedural site. |
| Unknown | Non-Preventable | **Do not** report as SAC 1 |

## 5. Relevant Legislation

Nil relevant

## 6. Additional Resources

6.1 *Insertion and Management of Peripheral Intravenous Cannula in Healthcare Facilities Policy (MP 0038/16)*

6.2 *Clinical Incident Management Policy 2019 (MP 0122/19)*

## 7. Guideline Contact

Enquiries relating to this Guideline may be directed to:

Infection Prevention Policy Surveillance Unit

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## 8. Document Control

| Guideline number | Version | Published | Review Date | Amendments |
|---|---|---|---|---|
| NA | V.1 | 12/09/2018 | 2023 | Original version |
| 0018 | V2 | 02/07/2024 | 2027 | Review evidence-based literature |

## 9. Approval

| | |
|---|---|
| **Approved by** | Dr Paul Effler, Acting Director,<br>Communicable Disease Control Directorate, Department of Health |
| **Approval date** | 01/07/2024 |

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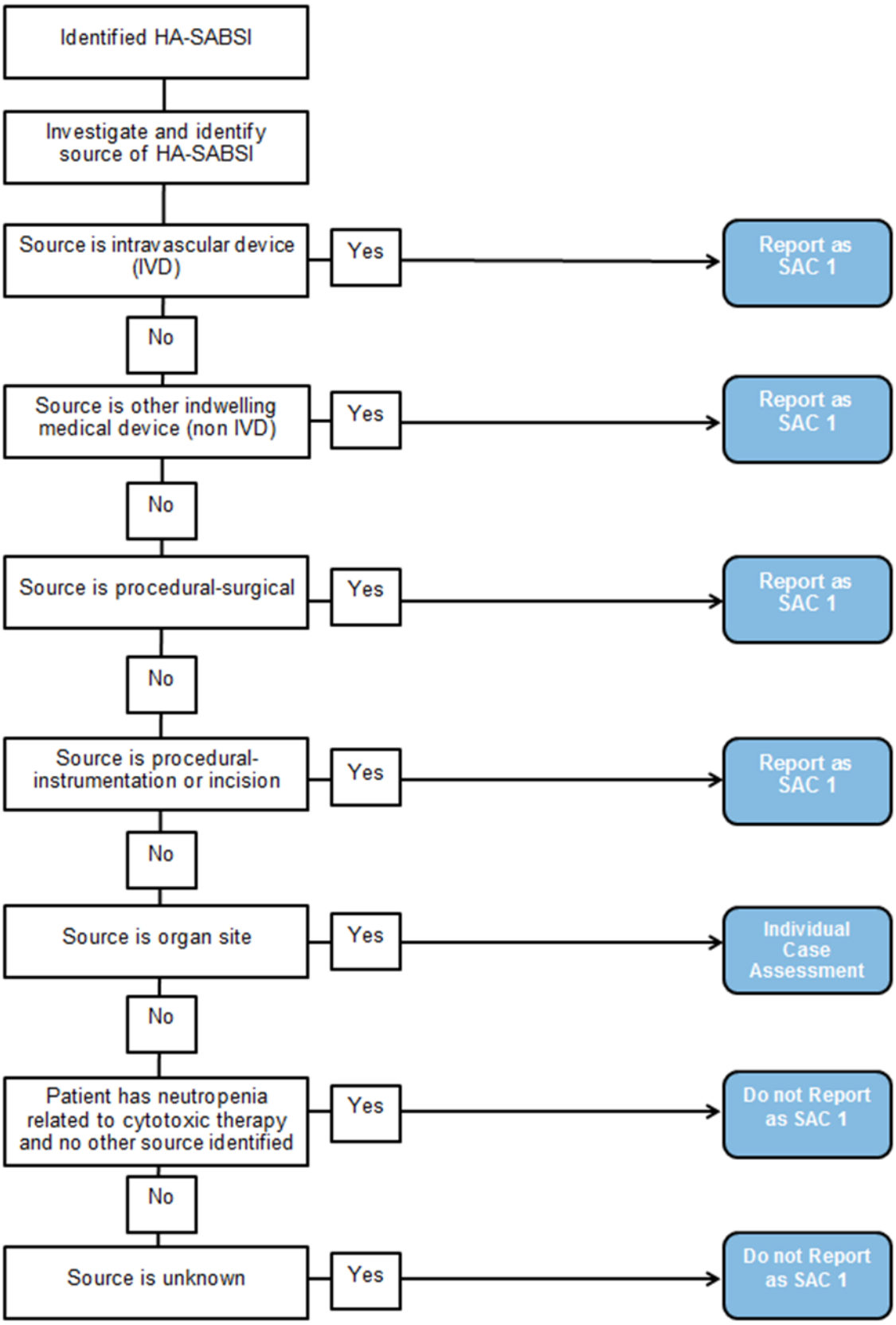
## Appendix 1: Evidence Review

| Focus of HA-SABSI | Evidence-based infection prevention strategies available | Evidence supporting preventable versus non-preventable |
|---|---|---|
| **Intravascular device (IVD) related** | **Central line associated blood stream infection (CLABSI)**<br>• ANZICS Guidelines [9]<br>• SHEA CLABSI Strategies [10].<br><br>**Haemodialysis Access Devices**<br>• CDC Dialysis Interventions [11].<br><br>**Peripheral IVDs (PIVC)**<br>• MP 0038/16 PIVC insertion and management.<br>• Australian Infection Control Guidelines [12]<br>• Implementation Guide for the Surveillance of *Staphylococcus aureus* bloodstream infection [25]. | • A systematic review estimated 65-70% of CLABSI are preventable with implementation of evidence-based strategies [7].<br>• CLABSI ICU studies showed 70% reduction following adherence to best-practices [13].<br>• Princess Alexandra Hospital (Brisbane) Study -81% of PIVC related SABSI had preventable contributing factors identified [14].<br>• Study showed SABSI was the most common IV sepsis and showed the largest percentage fall following a whole of hospital intervention program [3].<br>• Studies demonstrated multi-faceted interventions are successful in reducing PIVC-associated SAB [12].<br>**Conclusion**<br>• Evidence-based prevention strategies published.<br>• Studies demonstrate reduced rates with implementation of and compliance with the strategies.<br>• Largely preventable. |
| **Non-IVD indwelling device related e.g.**<br><br>• urinary catheter<br>• suprapubic catheter<br>• chest tubes<br>• feeding tubes<br>• endotracheal tubes<br>• tracheostomy<br>• peritoneal dialysis | **Catheter associated urinary tract infections (CAUTI)**<br>• Australian Infection Control Guidelines [12].<br>• SHEA- Strategies to prevent CAUTI [15].<br><br>**Ventilator Associated Pneumonia (VAP)**<br>• SHEA- Strategies to prevent VAP [16].<br><br>**Other indwelling devices**<br>• Australian Infection Control Guidelines: protocols for aseptic technique, hand hygiene, skin antisepsis [12]. | Estimated 65-70% of CAUTI and 55% of VAP are reasonably preventable with implementation of evidence-based strategies [7].<br><br>**Conclusion**<br>• All CAUTI largely preventable with adherence to IPC best practice guidelines.<br>• Around half of VAP are preventable by application of evidence informed strategies.<br>• Evidence-based prevention strategies for specific devices published.<br>• Largely preventable |

| Focus of HA-SABSI | Evidence-based infection prevention strategies available | Evidence supporting preventable versus non-preventable |
|---|---|---|
| **Procedure related surgical site infections (SSI)** | • CDC – Guidelines for the prevention of SSIs [17].<br>• WHO – Global guidelines for the prevention of surgical site infection [20].<br>• SHEA - Strategies to Prevent SSI [18].<br>• Therapeutic Guidelines Surgical Antibiotic Prophylaxis Guidelines. [19].<br>• **Strategies to assist in reducing the incidence of SSI:**<br>- appropriate use of prophylactic antibiotics<br>- appropriate hair removal<br>- pre-operative showering<br>- appropriate skin antisepsis<br>- controlled postoperative serum glucose for cardiac surgery patients<br>- maintain normothermia during the perioperative period [18, 21].<br>• **For high-risk surgery:**<br>- screening for *S. aureus* and decolonisation if found to be *S. aureus* carriers e.g., cardiac, arthroplasty, vascular [17]. | • Systematic review estimated 55% of SSI are preventable with implementation of evidence-based strategies [7].<br>• Princess Alexander Hospital (PAH) Study: 50% of SABSI related to SSI had no preventable potential contributors [14].<br>• CDC estimated 50% preventable by application of evidence-based strategies [17].<br><br>A systematic review of risk factors associated with *S. aureus* SSIs among a broad range of surgical patients provides strength in evidence for host factors such as co-morbidity burden, patient advanced age, dependence and frailty and duration and complexity of surgery were consistently found to be associated with SSIs across a variety of study designs [21].<br><br>Although SSIs are not always preventable, progression to bacteraemia may be avoided if managed promptly e.g., excision of infected tissue and targeted antimicrobial therapy [6].<br><br>**Conclusion:**<br>• Patient factors and complexity of surgical procedures do contribute to SSI.<br>• Around half are preventable by application of evidence informed strategies.<br>• If no preventable factors are identified by the SAC 1 investigation, consider de-classifying. |

| Focus of HA-SABSI | Evidence-based infection prevention strategies available | Evidence supporting preventable versus non-preventable |
|---|---|---|
| **Procedure related due to Invasive instrumentation or incision**<br>e.g. ERCP, cardiac catheterisation, joint injection | • Australian Infection Control Guidelines - Protocols for aseptic technique, hand hygiene, skin antisepsis [12].<br>• Therapeutic Guidelines Surgical Antibiotic Prophylaxis Guidelines (where indicated) [19].<br>• Implementation Guide for the Surveillance of *Staphylococcus aureus* bloodstream infection [25]. | **Conclusion**<br>Largely preventable with adherence to IPC best practice guidelines. |
| **Organ site infections**<br>Not related to a surgical procedure, IVD or other indwelling medical device. | | Organ site infections may be directly related or secondary to the patient's underlying medical condition or those that occur less than 48 hours after a hospital admission [25].<br>**Conclusion**<br>Largely non-preventable, assessment needs to be made on an individual basis. |
| **Neutropenia** | HA-SABSI associated with neutropenia caused by cytotoxic therapy and is not related to the presence of an indwelling medical device. | **Conclusion**<br>Generally, no known preventable IPC factors. |
| **Unknown / disseminated** | The source of the HA-SABSI cannot be determined following an investigation. | **Conclusion**<br>Not preventable as unable to identify source of infection. |

## Appendix 2: Reporting of HA-SABSI as SAC 1



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