



HISWA

Healthcare Infection Surveillance Western Australia

Surveillance Manual

Version 5, January 2012

This publication has been produced by the Healthcare Associated Infection Unit,
Communicable Disease Control Directorate.

© Department of Health, Western Australia

January 2012

Contributors / Editors

Peterson A, McCann R, Tracey L, D'Abrera V, Armstrong P

Contact Details

Healthcare Associated Infection Unit

Communicable Disease Control Directorate

Department of Health Western Australia

PO Box 8172

Perth Business Centre

Western Australia 6849

Telephone: 08 9388 4999

Email: hiswa@health.wa.gov.au

Web:

http://www.public.health.wa.gov.au/2/37/3/healthcare_associated_infection_unit.pm

Table of Contents

Module 1	Introduction to Surveillance.....	4
Module 2	Surgical Site Infection (SSI)..... <ul style="list-style-type: none">■ Hip and Knee Arthroplasty■ Caesarean Section	16
Module 3	Significant Organism..... <ul style="list-style-type: none">■ Methicillin-resistant <i>Staphylococcus aureus</i> (MRSA) infection	36
Module 4	Significant Organism..... <ul style="list-style-type: none">■ <i>Clostridium difficile</i> infection (CDI)	48
Module 5	Significant Organism..... Vancomycin-Resistant Enterococci Sterile Site Infection	58
Module 6	Specific Organism Bloodstream Infection..... <ul style="list-style-type: none">■ <i>Staphylococcus aureus</i> bloodstream infection (SABSI)	66
Module 7	Central Line-associated Bloodstream Infection (CLABSI)..... <ul style="list-style-type: none">■ Adult intensive care unit■ Haematology■ Oncology■ Outpatient intravenous therapy	78
Module 8	Haemodialysis Access-associated Bloodstream Infection.....	92
Module 9	Occupational Exposure.....	104
Module 10	HISWA Bed-days and Separations.....	110
Terms	Abbreviations and Acronyms.....	115

List of Tables, Figures and Appendices

List of Tables

Table 1	HISWA indicators	2
Table 2	Criteria for superficial incisional SSI.....	20
Table 3	Criteria for deep incisional or organ/space SSI.....	21
Table 4	SSI numerator data fields and descriptors for HISWA database.....	25
Table 5	SSI denominator data fields for HISWA database.....	26
Table 6	MRSA HAI numerator data fields and descriptors for HISWA database.....	44
Table 7	CDI numerator data fields and descriptors for HISWA database...	52
Table 8	VRE sterile site infection numerator data fields and descriptors....	63
Table 9	HA-SABSI numerator data fields and descriptors for HISWA database.....	75
Table 10	CLABSI numerator data fields and descriptors for HISWA database.....	84
Table 11	Haemodialysis access-associated BSI numerator data fields and descriptors for HISWA database.....	97
Table 12	Haemodialysis access-associated BSI denominator data fields for HISWA database.....	98
Table 13	Classification of HCW occupations and descriptors.....	107
Table 14	Occupational exposure numerator data fields and descriptors for HISWA database.....	108
Table 15	Monthly bed-day data required for HISWA.....	112
Table 16	HISWA bed-day data fields.....	113

List of Figures

Figure 1	Essential components of the surveillance cycle.....	5
Figure 2	Schematic of SSI anatomy and classification.....	19
Figure 3	Flowchart for surveillance of MRSA HAI.....	38
Figure 4	Flowchart for determining a hospital identified CDI case.....	50
Figure 5	Timeline for healthcare or community associated CDI definition....	56
Figure 6	Flowchart for surveillance of HA-SABSI.....	68
Figure 7	Flowchart for surveillance of CLABSI.....	80
Figure 8	Flowchart for surveillance of haemodialysis access associated BSI.	94

List of Appendices

Appendix 1	HISWA Operative Procedures.....	30
Appendix 2	Specific Classification of an Organ/Space SSI.....	31
Appendix 3	Risk Score Index Classification for SSI.....	33
Appendix 4	Clarification of MRSA-Specific Antibiotic Therapy.....	47
Appendix 5	CLABSI – Definition of a Bloodstream Infection.....	88
Appendix 6	CLABSI – Sampling of ICU Central Line Days (worked example)	90
Appendix 7	Haemodialysis Access-associated BSI – Definition of a Bloodstream Infection.....	100
Appendix 8	HISWA Sample Denominator Data Collection Tool for Satellite Haemodialysis Units.....	102

Introduction

Healthcare associated infections (HAIs) are one of the most common causes of unintended harm suffered by health consumers. These infections cause the patient unnecessary pain and suffering and they utilise significant human and financial resources within healthcare systems. It is increasingly recognised that HAIs are preventable adverse events rather than an inevitable complication of medical care.

The establishment of baseline HAI rates and ensuring ongoing monitoring is essential to reduce HAIs. Both private and public healthcare facilities (HCFs) in Western Australia (WA) voluntarily commenced contributing data to the Healthcare Infection Surveillance WA (HISWA) program in 2005. The introduction of mandatory indicators for all public HCFs and private HCFs contracted to provide care for public patients commenced in 2007. Private HCFs continue to contribute data voluntarily. The indicators collected for HISWA are described in Table 1.

The goals of the HISWA program are to:

- Ensure all WA hospitals utilise standardised definitions and methodology.
- Ensure the validity of data through formal and informal validation exercises.
- Identify trends and engage clinicians to review clinical care and processes to minimise infection risks.
- Ensure activities are aligned, where possible, with Australian and international surveillance programs to allow for relevant external benchmarking.
- Provide support to surveillance personnel contributing data to HISWA.

HISWA data is analysed by staff at the Healthcare Associated Infection Unit (HAIU). Aggregated data and detailed hospital specific reports are produced and distributed. All contributors are encouraged to internally review their own data to identify issues and trends in a timely manner.

This surveillance manual contains technical information to allow standardised definitions and methodology to be used by surveillance personnel to report data to HISWA. If any hospital requires assistance with their surveillance program, the HAIU team are available to provide support.

Table 1 HISWA indicators

HISWA Indicators	Data Collection Commenced	Status	Comments
Rate of surgical site infection following elective hip and knee arthroplasty	July 2005	Mandatory (October 2007)	Mandatory for all public metropolitan, regional resource centres and integrated district hospitals and private hospitals funded to provide care to public patients where arthroplasty procedures are performed.
Rate of surgical site infection following elective or emergency caesarean section	April 2011	Voluntary	Any public or private HCF where the indicator is relevant to the provision of care.
Rate of methicillin-resistant <i>Staphylococcus aureus</i> (MRSA) healthcare associated infection	July 2005	Mandatory (October 2007)	Mandatory for all public metropolitan, regional resource centres and integrated district hospitals and private hospitals funded to provide care to public patients.
Rate of hospital identified <i>Clostridium difficile</i> infection	January 2010	Mandatory* (January 2010)	Mandatory for all public metropolitan, regional resource centres and integrated district hospitals and private hospitals funded to provide care to public patients.
Rate of healthcare associated <i>Staphylococcus aureus</i> bloodstream infection	October 2007	Mandatory* (October 2007)	Mandatory for all public metropolitan, regional resource centres and integrated district hospitals and private hospitals funded to provide care to public patients.
Rate of central line-associated bloodstream infections in adult ICU	July 2005	Mandatory (October 2009)	Mandatory for all public hospitals and private hospitals funded to provide care to public patients with intensive care units.
Rate of central line-associated bloodstream infection in: - haematology - oncology - outpatient IV therapy	July 2005	Voluntary	Any public or private HCF where the indicator is relevant to the provision of care.
Rate of haemodialysis access-associated bloodstream infection	July 2005	Mandatory (July 2009)	Mandatory for all public metropolitan, regional and integrated district hospitals and private hospitals funded to provide care to public patients for renal dialysis. It includes all licensed private satellite day dialysis facilities.
Rate of occupational exposure to blood and/or body fluids	January 2008	Mandatory (January 2008)	Mandatory for all public metropolitan, regional resource and integrated district hospitals, Psychiatric hospitals and private hospitals funded to provide care to public patients.
Hand hygiene compliance (National Hand Hygiene Initiative)	February 2009	As per NHHI	Mandatory for all public metropolitan, regional resource centres and integrated district hospitals and private hospitals funded to provide care to public patients. (WACHS Small Health Services in consultation with regional directors)

* Requirement under National Healthcare Agreements 2009

Module 1

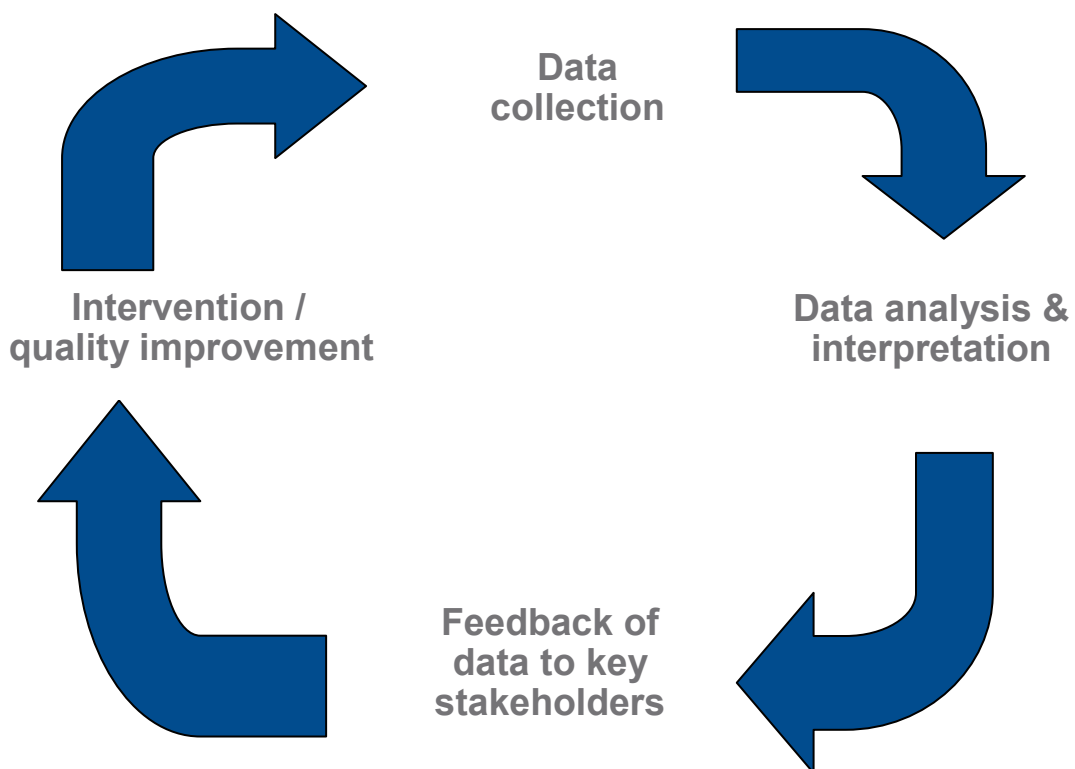
Introduction to Surveillance

Surveillance of Healthcare Associated Infections

1. Surveillance Overview

Surveillance is the systematic collection, management, analysis, interpretation and reporting of data for use in the planning, implementation and evaluation of the provision of healthcare. The purpose of collecting and analysing surveillance data is to improve the quality and safety of patient care within a healthcare facility (HCF). Data should not be collected just for the purpose of collecting data – the data needs to be used to make change. Effective surveillance systems are the drivers for change and make it possible to evaluate the effectiveness of interventions. An effective surveillance system is one that provides timely feedback to HCF clinicians and managers to enable change to happen.¹

Figure 1 Essential components of the surveillance cycle



2. Rationale for Surveillance

Surveillance of HAIs provides reliable objective data on which to base decisions. Surveillance data allows determination of whether a problem exists, identify the size of the problem and observe trends over time. A sound surveillance system should help to:

- Determine baseline rates of HAI.
- Detect changes in rates or distribution of HAI.
- Facilitate investigation of significant increases in HAI rates.
- Assist in determining the effectiveness of infection prevention measures.
- Monitor compliance with established infection prevention practices.
- Evaluate interventions and change in practice.
- Identify areas where research would be beneficial.²

3. Types of HAI Surveillance

3.1 Outcome surveillance

'Outcome surveillance' involves measuring adverse healthcare events. Data may be expressed as:

- Rates: time-series of HAI counts or proportions.
- Point prevalence: the proportion of patients with HAIs at the time of the survey.
- Incidence over time: the number of patients who develop a new HAI.³

3.2 Process surveillance

'Process surveillance' involves auditing actual practice against evidence-based infection prevention policies or guidelines that are linked to improved outcomes e.g. auditing of compliance with surgical antibiotic prophylaxis. Improved processes should result in lower infection rates.³

3.3 Signal infection surveillance

'Signal infection surveillance' has been specifically developed to provide small and medium sized HCFs with a framework to investigate HAIs using a root cause analysis approach and to identify potential systemic issues requiring improvement.⁴

4. Selection of Surveillance Indicators

- In a HCF, infection prevention and control teams need to identify surveillance activities that will meet their facility's priorities and objectives. The traditional 'hospital-wide' surveillance, where data were collected on every infection identified, has been largely replaced by targeted surveillance that focuses on specific HAIs, organisms, medical devices or high-risk populations.
- Jurisdictional surveillance allows aggregation of data from many HCFs, leading to a larger dataset with increased statistical value. Statewide trends can be identified to inform priorities for state infection prevention policies.
- Indicators selected for jurisdictional HAI surveillance are generally:
 - procedures that are high volume or high risk for infection and are associated with high morbidity and mortality e.g. hip and knee arthroplasty
 - medical device use in high risk groups e.g. central venous catheters used in intensive care unit (ICU) patients
 - significant organisms associated with antibiotic resistance and high morbidity and mortality.

5. Surveillance Methodology

The value of surveillance is enhanced by providing high quality comparative data. For participating hospitals to make a valid comparison of their infection rates, the methodology used must be similar. HISWA aims for high sensitivity and specificity of reported HAIs. Sensitivity is based on false negative HAIs i.e. true HAI that are not reported and specificity is based on false positive HAIs i.e. reported infections that do not meet the HAI surveillance definitions.

Processes are required to ensure that surveillance personnel automatically receive copies of all microbiology reports, in real-time, for patients presenting to their facility, including outpatient and emergency presentations. HISWA requires surveillance personnel to implement active, prospective, patient-based surveillance.

The use of the flow charts for each indicator is recommended for case review.

5.1 Active, prospective case-finding

- Active case-finding processes are required to identify patients who develop HAIs from the time of their admission until discharge, and on readmission with infection.
- All microbiological results relevant to a surveillance indicator should be investigated and interpreted in conjunction with information from clinical sources.
- Each case-finding method has some merit and limitations, therefore, in addition to the review of all relevant laboratory reports, a combination of case-finding methods that can be applied to eligible patients should be in place that include:
 - total chart review for clinical data i.e. medical records, wound management plan, temperature chart, diagnostic and imaging reports e.g. x-ray, bone scan, ultrasound, biopsy and medication chart (antibiotics)
 - liaison with ward or clinical staff and regular ward rounds
 - use of patient management systems for admission histories
 - formal notification from clinical staff e.g. infection notification forms
 - administration and coding reports e.g. ICD-10-AM
 - pharmacy dispensing reports
 - consultant referrals e.g. for microbiologist or infectious disease physician.

5.2 Patient-based surveillance

- Patient-based surveillance requires identification of all eligible patients for inclusion in the surveillance indicator. For example, in a reporting period:
 - all patients undergoing a specific surgery must be counted for SSI surveillance
 - all patients that have had a central line in situ in ICU must be counted for ICU central line-associated bloodstream infection (CLABSI) surveillance.
- Surveillance personnel are required to determine the optimal method for obtaining denominator data for each surveillance indicator at their HCF. This may include the utilisation of :
 - theatre management systems / theatre booking slips / coding reports
 - medical records systems / business administration systems
 - ward staff on wards relevant to the surveillance indicator.

5.3 Definitions

Standardised surveillance definitions are essential for successful data collection and analysis. The definitions developed by the National Healthcare Surveillance Network (NHSN) within the Center for Disease Control and Prevention (CDC) in the United States of America are the most comprehensive and widely used definitions for HAI surveillance. Adoption of these definitions allows for benchmarking opportunities with large international datasets. Data collection for many of the HISWA indicators is based on the NHSN definitions in addition to those developed for the Australian Council for Healthcare Standards (ACHS).

To improve the inter-rater reliability of HAI classification, contributors should:

- Ensure surveillance personnel are trained in the use of surveillance definitions.
- Ensure surveillance personnel apply consistent methodology for data collection and application of definitions.
- Classify infections strictly according to the definition and only include HAI that fulfil the criteria in the definition.
- Liaise with appropriate medical / surgical teams to assist in determining the source of the infection.
- Investigate the patient's history to identify the attributable HCF
- Refer any queries or ambiguities in relation to the application of the surveillance definitions to the HAIU.
- Complete classification scenarios developed by the HAIU.

6. Data Validation

All HISWA contributors need to have internal validation processes in place to ensure the data they are submitting is reliable and valid. Surveillance personnel should:

- Ensure, before submission of data, that the clinical, laboratory and other diagnostic information collected meets the criteria in the definition and communication has occurred with relevant stakeholders e.g. review of all SSI with a designated member of the surgical team.
- Generate appropriate facility-specific reports to enable cross checking of cases admitted for procedures and with infections e.g. ICD-10-AM reports.
- Use HISWA hospital level raw data report i.e. data entered in the HISWA database, to cross check with internal records prior to submission.

- Use consolidated laboratory reports and cross check to ensure all relevant cases have been investigated.
- Ensure administrators providing bed-day data are informed of the data requirements outlined in Module 8.
- Cross check denominator data received from administrators and other external departments with data from previous months to identify potential outliers.

7. Data Entry to HISWA

Prior to utilising the HISWA database, contributors should ideally meet with a member of the HAIU team for an introductory training session. A username and password is assigned to each hospital to allow login to the database.

All contributors have access to the *HISWA Database Manual* to assist with the technical details of data entry to the HISWA database. This can be accessed from the menu page of the database following login. All contributors need to ensure they:

- Enter data accurately into the HISWA database.
- 'Save' each record after data entry.
- Use the HISWA hospital level raw data report to check both numerator and denominator data prior to finalising data.
- Enter HAIs are entered in the appropriate modules when they meet the definition for multiple indicators e.g. an MRSA BSI needs to be entered in the specific organism module and the specific organism bloodstream module.
- Use the *Finalisation Page* and finalise data monthly for the previous month e.g. April data must be finalised by the last day of May.

8. Data Analysis

Data analysis is an essential component of the surveillance cycle so that HAIs can be described and communicated in a meaningful way.

8.1 Calculation of rates

- A rate indicates a relationship between two measurements with different units of measure and is used in HAI surveillance to describe HAIs in patient populations of different sizes and in different time periods.

- A rate has three components:
 - numerator: the number of infections
 - denominator: the number of patients at risk
 - constant: a multiple of 10 that results in a number greater than zero.
- Mathematically, the rate is calculated as: $\text{numerator} \div \text{denominator} \times \text{constant}$.
- Rates are generally expressed according to the denominator and the constant used e.g. per 100 surgical procedures or per 1000 central line days.

8.2 The p Value

- The p value determines the probability that the difference between two rates has arisen by chance.
- If the probability is low (<0.05 or 5%) then the difference in rates is considered to be unlikely due to chance alone and therefore represents a significant difference.

8.2 Confidence intervals

- HISWA rates are calculated with 95% confidence intervals (CI) which provides an indication of the true infection rate.
- The CI displays the lowest and highest values that the true infection rate is likely to fall between 95% of the time.
- As a general rule, a larger sample size results in a narrower CI and thus gives a better indication of the true rate.

8.3 Risk stratification

- Risk stratification categorises patients at risk of infection into homogenous groups so that comparisons of infection rates can be made between groups with similar risk factors.
- Examples of risk stratification used by HISWA include:
 - a risk index score for surgical patients based on their estimated risk of infection relative to other patients undergoing the same surgery
 - categorisation of MRSA infections according to ICU and non-ICU settings
 - categorisation of haemodialysis access device associated infections according to the type of access device
 - categorisation of surgical procedures by elective or emergency status.

8.4 Benchmarking

- Benchmarking involves comparing an infection rate with another point of reference which gives an indication of performance.
- Benchmarking should only be used as a guide and interpreted with caution due to potential variability in case mix, size of population and surveillance practice.

9. Interpretation of reports

The following information further assists with the interpretation of specific HISWA reports produced by the HAIU e.g. the hospital quarter report.

9.1 WA Aggregate rate

- This is an infection rate calculated from combined data submitted to HISWA from all contributing hospitals in WA for a specified period.
- It provides a useful benchmark with which individual hospitals can compare their infection rate for the same period.

9.2 Cumulative WA Aggregate rate

- The cumulative aggregate rate is the overall rate for WA since data collection commenced for that indicator.
- The cumulative aggregate rate is the total number of infections (numerator) divided by the total relevant denominator for WA since reporting commenced.

9.3 Cumulative hospital infections and rate

- The cumulative number of infections for a hospital is the total number of infections that have been reported for an indicator since their inclusion in the HISWA program.
- The cumulative hospital rate is the total number of infections divided by the total relevant denominator since reporting commenced.

9.4 Rate previous two quarters

- This measure provides an internal benchmark to determine short term trends in the infection rate over time.
- It is the number of infections over the previous two quarters divided by the relevant denominator over the previous two quarters.

9.5 Trend

- Trend is a term used to describe the general movement in rates over time. HISWA reports describe trends in terms of quarterly rates.
 - rate this quarter greater than previous quarter and indicated by ↑
 - rate this quarter less than previous quarter and indicated by ↓
 - rate this quarter equal to previous quarter and indicated by ⇔

9.6 Comparator rate

- Where possible, a comparator rate from another Australian state or overseas country will be used for external benchmarking.
- Comparators are selected based on the use of the same definitions and methodology to HISWA and the sample size is sufficiently large to calculate a valid infection rate.

9.7 Infection rates from small hospitals

- High infection rates and wide confidence intervals may be reported when there are small denominator numbers reported from small hospitals.
- This also means that a small increase in the number of infections can result in a large increase in the infection rate. Therefore rates should always be interpreted carefully and in conjunction with other information.

10. Reporting and Feedback

Feedback of analysed data in a timely manner to key stakeholders is an important requirement of surveillance programs to drive change and improve outcomes and has been demonstrated to be effective in reducing infections when provided to clinicians.³ Surveillance results need to be communicated to appropriate committees and to the executive management who are accountable for patient safety and quality and have the ability to make change within the facility.

11. References

1. Cruickshank M, Ferguson J, Editors. Executive summary. Reducing harm to patients from healthcare associated infection: the role of surveillance: Australian Commission on Safety and Quality in Healthcare Canberra July 2008. pp 3-15.
2. Victorian Department of Health Nosocomial Infection Surveillance System (VICNISS) Type 1 Surveillance Manual Version 6, 2008. www.vicniss.org
3. Clezy K, Cruickshank M, Ferguson J, Givney R, McLaws M, Peterson A, Russo P, Jorm C Authors. Surveillance and Quality Improvement in: Reducing harm to patients from healthcare associated infection: the role of surveillance: Australian Commission on Safety and Quality in Healthcare Canberra July 2008. pp 27-49.
4. Centre for Healthcare Related Infection Surveillance and Prevention (CHRISP), Signal Infection Surveillance Program. http://www.health.qld.gov.au/chrisp/surveillance/about_signal.asp
5. Haley, R, Culver D, White J, Morgan W, Emori, T, Munn, V. The efficacy of infection surveillance and control programs in preventing nosocomial infection in US hospitals. *Am J Epidemiology* 1985; 121:182-205.

Module 2

Surgical Site Infection

Surgical Site Infection

A surgical site infection (SSI) is an infection that develops as a result of an operative procedure. They are associated with increased morbidity and mortality, prolonged hospital stays and increased healthcare costs. Surveillance of SSI rates, coupled with prompt feedback of data to surgeons and key stakeholders, has been shown to be an important strategy to reduce SSI.¹

1. HISWA Operative Procedures

- An operative procedure is a procedure that takes place during an operation (defined as a single trip to the operating room where a surgeon makes at least one incision through the skin or mucous membranes and closes the incision before the patient leaves the operating room).
- Operative procedures and their ICD-10-AM codes for HISWA SSI surveillance are listed in Appendix 1.
- Specific requirements for HISWA procedures are described in Section 6.0.

1.1 Emergency and elective procedures

- Elective: a planned procedure at a time to suit the patient and surgical team.
- Emergency: an unplanned procedure, performed within 24 hours of the precipitating event. For emergency caesarean section procedures refer to section 6.2.

2. Methodology

For participating hospitals to make a valid comparison of their SSI rates the methodology must be similar and infection definitions consistently applied.

Therefore, active, prospective, patient-based surveillance is required and needs to be performed by trained infection prevention and control personnel. Refer to Module 1 for an introduction to surveillance of HAIs.

2.1 Denominator data

- Patient-based surveillance requires identification of all eligible patients undergoing the selected operative procedure.
- Eligible patients can be determined in liaison with operating theatre management systems / theatre bookings / theatre coding / medical record systems and notifications from theatre staff.

2.2 Numerator data

- Patient-based surveillance requires monitoring of all patients undergoing the selected procedure for identification of SSI.
- Active, prospective case-finding is required to detect SSIs from the time of the surgical procedure and during the post-operative stay until discharge.
- Processes are required to detect patients who are readmitted to hospital for treatment of SSIs.

2.3 Classification of SSI

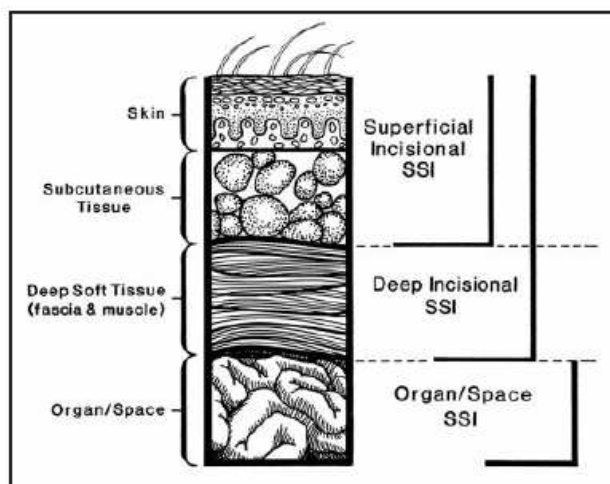
- To improve the classification inter-rater reliability, contributors should:
 - classify SSI strictly according to definitions
 - liaise with the surgical team, other contributors and the HAIU for difficult classifications
 - complete SSI classification scenarios developed by HAIU.

3. Definitions

3.1 Types of SSI

A surgical site infection can be classified as either a superficial incisional, deep incisional or an organ / space infection (Figure 2)². HISWA data combines deep incisional and organ / space infections to allow for more meaningful statistical analysis and align with published reports from other jurisdictions.

Figure 2 Schematic of SSI anatomy and classification



3.1.1 Superficial SSI

A superficial incisional SSI involves only the skin and subcutaneous tissue of the incision.

3.1.2 Deep SSI

A deep incisional SSI involves deep soft tissues e.g. fascia and muscle layers.

3.1.3 Organ / space SSI

An organ / space SSI involves any part of the body, excluding the skin incision, fascia or muscle layers that is opened or manipulated during the operative procedure.

The criteria for each type of SSI are outlined in Tables 2 and 3.

Table 2 Criteria for superficial incisional SSI

<i>To classify as a superficial incisional SSI the following criteria must be met:</i>
<p>Infection occurs within 30 days after the operation and infection involves only skin or subcutaneous tissue of the incision and the patient has at least <u>one</u> of the following:</p> <ul style="list-style-type: none"> a) purulent discharge from the incision b) organisms isolated from an aseptically obtained culture of fluid / tissue from the incision site (Note: A positive wound swab, in contrast to wound aspirate, without other significant evidence of infection is not adequate for diagnosis of infection) c) displays at the incision site at least one of the following signs or symptoms of infection: pain or tenderness, localised swelling, redness or heat and the incision is deliberately opened by the surgeon and is culture-positive or not cultured. A culture-negative finding does not meet this criterion d) diagnosis of superficial incisional SSI is made by the surgeon or attending physician*.
<i>Comments</i>
<ul style="list-style-type: none"> ■ Do not report a stitch abscess as a SSI (minimal inflammation and discharge confined to the points of suture penetration). ■ Do not report a localised stab wound infection as a SSI e.g. drain incision site. ■ Do not report superficial incisions that are shown to be colonised with microorganisms by the collection of a superficial wound swab and are without clinical signs of infection as a SSI. ■ Cellulitis, alone, does not meet the criteria for superficial SSI unless criterion c) is met. ■ Classify SSIs that involve both superficial and deep incision sites as deep or organ / space SSI.

** Surgeon or attending physician diagnosis: these cases need to be carefully evaluated by the surveillance personnel to ensure the definition of a SSI has been met. The prescription of antimicrobials alone is not sufficient evidence of diagnosis of SSI. If the reason for treatment has not been documented the case requires discussion with the surgeon or attending physician.*

Table 3 Criteria for deep incisional or organ / space SSI

To classify as deep or organ / space SSI the following criteria must be met:
<p>Infection occurs within 30 days after the operation if no implant is left in place, or within 365 days if an implant is in place, and the infection appears to be related to the operative procedure and infection involves deep soft tissues e.g. fascia and muscle layer of the incision or organs/spaces opened or manipulated during the operative procedure and the patient has at least <u>one</u> of the following:</p> <p>a) purulent drainage from a drain that is placed through a stab wound into the deep incision or organ space</p> <p>b) a deep incision spontaneously dehisces or is deliberately opened by a surgeon and is culture-positive or not cultured and the patient has at least one of the following: fever > 38⁰C or localised pain or tenderness. A culture negative finding does not meet this criterion</p> <p>c) an abscess or other evidence of infection involving the deep incision or organ space that is found on direct examination, during re-operation, or by histopathologic or radiologic examination</p> <p>d) organisms isolated from an aseptically obtained culture of fluid / tissue from the deep incision or organ / space</p> <p>e) diagnosis of a deep or organ / space SSI by the surgeon or attending physician*.</p>
Comments
<ul style="list-style-type: none"> ■ Classify SSIs that involve both superficial and deep incision sites as deep or organ / space SSI. ■ Do not report surgical sites that are colonised with micro-organisms only and are without clinical signs and symptoms of infection. ■ Specific sites are used to classify organ / space SSI. For example a caesarean section with subsequent endometritis, or osteomyelitis following an arthroplasty procedure. Specific sites of organ / space also have specific criteria which must be met to qualify as SSI events.³ ■ Refer to Appendix 3 for criteria for common sites of organ / space SSI relevant to HISWA operative procedures.

** Surgeon or attending physician diagnosis: these cases need to be carefully evaluated by the surveillance personnel to ensure the definition of a SSI has been met. The prescription of antimicrobials alone is not sufficient evidence of diagnosis of SSI. If the reason for treatment has not been documented the case requires discussion with the surgeon or attending physician.*

3.2 Implants

An implant is defined as a non-human-derived object, material or tissue that is permanently placed in a patient during an operative procedure and is not routinely manipulated for diagnostic or therapeutic purposes. Examples include porcine or synthetic heart valves, mechanical heart, joint prostheses, metal rods, mesh, screws, sternal wires, cements, internal staples (exclude non-absorbable sutures), hemoclips and other devices. Implants do not include transplants.

3.3 Transplants

Transplants are human cells, tissues, organs, cellular-or tissue-based products that are placed into a human recipient via grafting, infusion, or transfer. Examples include heart valves, organs, ligaments, bone, blood vessels, skin, corneas and bone marrow cells. Autologous transplants are products that originate from the patient's own body.

3.4 Specimen classification

Classification of a specimen as either sterile or non-sterile assists in interpreting clinical significance and determining if the criteria for classification as a SSI are met.

3.4.1 Sterile specimen

Wound aspirates and tissue biopsies collected aseptically e.g. when the incision is deliberately opened by the surgeon and collected in theatre, are sterile specimens and are unlikely to be contaminated with skin micro-organisms. Therefore positive results are significant evidence of infection.

3.4.2 Non-sterile specimen

Non-sterile specimens are potentially contaminated with skin micro-organisms and therefore positive results require further clinical assessment to determine if infection is present e.g. swabs of the incision and dehisced or expressed wound fluid.

3.5 Point of detection of SSI

Infections may be detected at three possible points and are reported accordingly.

3.5.1 *Detected during admission*

Detected during the period following the procedure and prior to discharge from hospital or hospital in-the-home (HITH).

3.5.2 *Detected on readmission*

Detected on readmission to hospital or to a HITH service within 30 days of the procedure, or within 365 days if an implant is in situ, for treatment of the SSI e.g. readmission for antibiotic treatment, washout, removal of prosthesis.

3.5.3 *Detected and treated as an outpatient*

Detected and treated as an outpatient, and the patient is not admitted to a hospital or a HITH for treatment. This information may be identified by active post-discharge surveillance (PDS) or by notification from outpatient departments or clinics or general practitioners. Due to the lack of uniformity for PDS between healthcare facilities, this data should be recorded by the facility and reported to HISWA but is not included in calculations of HISWA SSI rates for benchmarking purposes.

Note: Contributors must inform the HAIU when SSIs are detected at a hospital that did not perform the initial procedure. The SSI will be included in data of the hospital where the initial procedure was performed.

3.6 Period of follow-up

- **Non-implant procedure:** follow-up period is 30 days from the procedure date. All eligible patients must be followed up during the initial admission period until discharge and monitored for readmission with an SSI during this period.
- **Implant procedure:** follow-up period is 365 days from the procedure date. All eligible patients must be followed up during the initial admission period until discharge and monitored for readmission with an SSI during this period.

4. SSI Risk Index

The risk index is recommended by the NHSN as a method of stratification of risk for infection associated with surgery.^{2, 4} The higher the patient's risk index the higher the risk the patient has of developing an SSI. Risk-adjusted rates allow statistical adjustment for differences across participating hospitals.

4.1 Calculation of risk index

- The risk index consists of three risk factors (host and procedure related).
- Risk index = ASA^{§1} class + duration of surgery + surgical wound classification.
- A score is assigned for each risk factor and the total score is calculated by adding the three scores together. The resultant score will be 0, 1, 2, 3 or N/A (not available).
- If an operative procedure is performed through the same incision within 24 hours e.g. for complications, combine the procedure duration times and report the higher wound class and ASA score, if they have changed.
- Risk index factors and scores are described in detail in Appendix 2.

4.2 Reporting of risk index

- Tertiary hospitals and hospitals performing more than 100 of each procedure type per year are required to calculate risk index for all eligible patients.
- Hospitals performing less than 100 of each procedure type per year are not required to calculate the risk index. Under the exemption, all eligible patients are classified as 'all' i.e. includes all possible risk index scores. However, these hospitals may elect to submit risk index data.

¹ § ASA= American Society of Anaesthesiology

5. HISWA Dataset

5.1 Numerator data fields

The numerator data fields and information required to be entered into the HISWA database are described in Table 4.

Table 4 SSI numerator data fields and descriptors for HISWA database

Data field	Descriptor
Patient ID	Unique patient identifier <ul style="list-style-type: none"> ▪ Public hospital: medical record number ▪ Private hospital: patient initials or medical record number
Date of birth	Patient date of birth
Procedure	Select correct operative procedure from drop down list e.g. primary hip arthroplasty revision knee arthroplasty emergency caesarean section
Date of procedure	Date the operative procedure was performed
Date infection identified	Date the SSI was identified.
Risk index	Patient risk index classified as 0, 1, 2, 3, N/A (not available) For hospitals performing less than 100 of each procedure per annum, risk index classification = 'all' with option to classify 0,1,2,3,N/A
Point of detection	<ul style="list-style-type: none"> ▪ Initial admission ▪ Readmission ▪ Outpatient and other post discharge
Infection classification	<ul style="list-style-type: none"> ▪ Superficial ▪ Deep or organ space
Specimen	<ul style="list-style-type: none"> ▪ Sterile ▪ Non-sterile ▪ Not obtained
Organism 1	The pathogenic organism isolated from a specimen
Organism 2	The 2 nd pathogenic organism isolated from a specimen
Organism 3	The 3 rd pathogenic organism isolated from a specimen

5.2 Denominator data fields

Table 5 describes the denominator data to be entered into the HISWA database.

- The total number of eligible patients meeting each risk index score for each type of procedure is required.
- Refer to section 4.2 and section 6. for specific HISWA requirements relating to risk index. The risk index descriptors are detailed in Appendix 2.

Table 5 SSI denominator data fields for HISWA database

Procedure names are listed	Risk 0	Risk1	Risk 2	Risk 3	All	N/A
e.g. Revision hip arthroplasty						
Elective caesarean section						

5.2.1 Denominator reporting instructions

- If a patient returns to the operating room within 24 hours for a repeat procedure through the same incision, only one procedure is reported.
- Bilateral procedures are counted as two procedures.

6. Specific Information for HISWA Operative Procedures

6.1 Elective hip and knee arthroplasty

- Procedure inclusions (denominator)
 - elective total, partial, primary and revision procedures
 - revision procedures (for both mechanical and infective reasons)
 - bilateral procedures are counted as two separate procedures.
- Procedure exclusions (denominator)
 - emergency procedures e.g. hemiarthroplasty of fractured neck of femur.
- SSI inclusions (numerator)
 - superficial SSI that are detected up to 30 days after the procedure
 - deep or organ / space SSI detected within 365 days of a procedure.
- SSI exclusions (denominator)
 - superficial SSI that are detected more than 30 days after the procedure
 - SSI detected more than 365 days after the procedure date.

- SSI risk index
 - length of surgery
 - duration cut point for hip and knee arthroplasty procedures is 2 hours (skin incision to skin closure)
 - for bilateral procedures, calculate separate procedure duration times or split total procedure time evenly.
 - wound class
 - wound classification for elective primary and revision arthroplasty for mechanical reasons is 'clean' unless other factors are present
 - wound classification for revision of arthroplasty for infective reasons is classified as 'dirty or infected.' Refer Appendix 2.
- Emergency procedures
 - an unplanned procedure performed within 24 hours of the precipitating event.
 - for example, a patient admitted through the emergency department with a fractured neck of femur following a fall and proceeds to have a total hip arthroplasty 2 days later is not classified as an emergency procedure.

6.2 Caesarean section

- Procedure inclusions (denominator)
 - classical and lower uterine segment caesarean section (LUSCS)
 - emergency and elective procedures.
- SSI inclusions (numerator)
 - superficial and deep or organ / space SSI that are detected up to 30 days after the procedure date.
- SSI exclusions (denominator)
 - superficial and deep or organ / space SSI detected more than 30 days after the procedure.
- SSI risk index
 - length of surgery
 - duration cut point for caesarean section is 46 minutes⁵ (skin incision to skin closure).

- wound class
 - wound classification for caesarean section (with or without pre-rupture of membranes or labour) is 'clean-contaminated' unless other factors are present
 - if membranes have been ruptured more than 6 hours then classify as contaminated.⁶ Refer Appendix 2.
- Emergency procedures:
 - an unplanned procedure for reasons determined as compromising to the mother or fetus requiring earlier than planned delivery which may or may not be greater than 24 hours since the precipitating event.⁷ Refer also to Appendix 1: ICD-10-AM codes for emergency and elective procedures.

7. Calculation of SSI Rate

- The SSI rate for each procedure is expressed per 100 procedures and is stratified according to risk index.
- HISWA rates do not include SSI detected by PDS.
- The SSI is included in the numerator of a rate, based on the date the operative procedure was performed, not the date the SSI was identified.
- Rate = $\frac{\text{Number of SSI} \times 100}{\text{Number of procedures}}$

8. References

1. Haley, R, Culver D, White J, Morgan W, Emori, T, Munn, V. The efficacy of infection surveillance and control programs in preventing nosocomial infection in US hospitals. *Am J Epidemiology* 1985; 121:182-205.
2. The National Healthcare Safety Network (NHSN), Centers for Disease Control (CDC), Surgical Site Infection (SSI) Event.
<http://www.cdc.gov/nhsn/PDFs/pscManual/9pscSSIcurrent.pdf>
3. Centres for Disease Control and Prevention. CDC/NHSN surveillance definition of healthcare-associated infection and criteria for specific types of infections in the acute care setting. *AJIC* 2008; 36:309-32.
http://www.cdc.gov/nhsn/PDFs/pscManual/17pscNosInfDef_current.pdf
4. National Healthcare Safety Network Report (NHSN), Data summary for 2006 through 2008, reported December 2009.
<http://www.cdc.gov/nhsn/PDFs/dataStat/2009NHSNReport.pdf>
5. Friedman, D., Bull, A., Russo, P., Gurrin, L., Richards M. Performance of the National Nosocomial Infections Surveillance Risk Index in Predicting Surgical Site Infection in Australia. *Infection Control and Hospital Epidemiology* 2007; 28:5.
6. Australian Council on Healthcare Standards (ACHS), Infection Control Clinical Indicators User Manual 2011.
7. The Royal Australian and New Zealand College of Obstetricians and Gynaecologists – College Statement C-obs 14. November 2009.

Appendix 1 HISWA Operative Procedures

List of procedures and ICD-10-AM codes* for inclusion in HISWA surveillance

Specialty	ICD-10-AM Code	Description	
Orthopaedic	Hip Arthroplasty		
	4931800	Total arthroplasty of hip, unilateral	
	4931900	Total arthroplasty of hip, bilateral	
	4932400	Revision of total arthroplasty of hip	
	4932700	Revision of total arthroplasty of hip with bone graft to acetabulum	
	4933000	Revision of total arthroplasty of hip with bone graft to femur	
	4933300	Revision of total arthroplasty of hip with bone graft to acetabulum and femur	
	4933900	Revision of total arthroplasty of hip with anatomic specific allograft to acetabulum	
	4934200	Revision of total arthroplasty of hip with anatomic specific allograft to femur	
	4934500	Revision of total arthroplasty of hip with anatomic specific allograft to acetabulum and femur	
	4931500	Partial arthroplasty of hip	
	4934600	Revision of partial arthroplasty of hip; liner / spacer exchange	
	Knee Arthroplasty		
	4951700	Hemiarthroplasty of knee	
	4951800	Total arthroplasty of knee, unilateral	
	4951900	Total arthroplasty of knee, bilateral	
	4952100	Total arthroplasty of knee with bone graft to femur, unilateral	
	4952101	Total arthroplasty to knee with bone graft to femur, bilateral	
	4952102	Total arthroplasty to knee with bone graft to tibia, unilateral	
	4952103	Total arthroplasty to knee with bone graft to tibia, bilateral	
	4952400	Total arthroplasty of knee with bone graft to femur and tibia, unilateral	
	4952401	Total arthroplasty of knee with bone graft to femur and tibia, bilateral	
	4952700	Revision of total arthroplasty of knee	
	4953000	Revision of total arthroplasty of knee with bone graft to femur	
	4953001	Revision of total arthroplasty of knee with bone graft to tibia	
	4953300	Revision of total arthroplasty of knee with bone graft to femur and tibia	
	4953400	Total replacement arthroplasty of patello-femoral joint of knee	
	4955400	Revision of total arthroplasty of knee with anatomic specific allograft	
	Obstetrics	Elective Caesarean Section	
		1652002	Elective lower segment caesarean section
1652000		Elective classical caesarean section	
Emergency Caesarean Section			
1652001		Emergency lower segment caesarean section	
1652003		Emergency classical caesarean section	

*International Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification.

Appendix 2 Specific Classifications of an Organ / Space SSI

Specific criteria must be met to be classified as an organ / space surgical site infection event.³ The full listing of site specific organ / space SSI and criteria can be found at www.cdc.gov/nhsn/PDFs/pscManual/9pscSSIcurrent.pdf

The criteria for some of the specific organ / space SSI sites relevant to HISWA operative procedures are described below.

Osteomyelitis must meet at least one of the following criteria:

Criterion 1: Organisms cultured from bone.

Criterion 2: There is evidence of osteomyelitis on direct examination of the bone during a surgical operation or histopathological examination.

Criterion 3: The patient has at least two of the following signs or symptoms with no other recognised cause:

- fever (>38⁰C), localised swelling, tenderness, heat, or drainage at suspected site of bone infection

and at least one of the following:

- organisms cultured from blood; positive blood antigen test e.g. *H.influenzae*, *S.pneumoniae*
- radiographic evidence of infection e.g. abnormal findings on x-ray, CT scan, MRI, radiolabel scan.

Joint or bursa infections must meet at least one of the following criteria:

Criterion 1: Patient has organisms cultured from joint fluid or synovial biopsy.

Criterion 2: Patient has evidence of joint or bursa infection seen during a surgical operation or histopathological examination.

Criterion 3: Patient has at least two of the following signs or symptoms with no other recognised cause:

- joint pain, swelling, tenderness, heat, evidence of effusion or limitation of motion

and at least one of the following:

- organisms and white blood cells seen on a gram stain of joint fluid
- positive antigen test on blood, urine, or joint fluid

- cellular profile and chemistries of joint fluid compatible with infection and not explained by an underlying rheumatologic disorder
- radiographic evidence of infection e.g. abnormal findings on x-ray, CT scan, MRI, radiolabel scan.

Endometritis must meet at least one of the following criteria:

Criterion 1: Organisms cultured from fluid or endometrial tissue obtained during a surgical operation, by a needle aspiration or by a brush biopsy.

Criterion 2: Patient has at least two of the following signs and symptoms with no other recognised cause:

- fever ($>38^{\circ}\text{C}$), pain, uterine tenderness, or purulent drainage from uterus.

Report postpartum endometritis as a healthcare associated infection unless the amniotic fluid is infected at the time of admission or the patient was admitted 48 hrs after rupture of the membranes.

Other infections of the female reproductive tract including vagina, ovaries, uterus or other deep pelvic tissues (excluding endometritis and vaginal cuff), must meet at least one of the following criteria:

Criterion 1: Patient has organisms cultured from tissue or fluid from the affected site.

Criterion 2: Patient has an abscess or other evidence of infection of the affected site seen during a surgical operation or histopathologic examination.

Criterion 3: Patient has two of the following signs or symptoms with no other recognized cause:

- fever ($>38^{\circ}\text{C}$), nausea, vomiting, pain tenderness or dysuria

and at least one of the following:

- organisms cultured from blood
- physician's diagnosis.

Appendix 3 Risk Index Score Calculation for SSI

1. ASA Classification

The American Society of Anaesthesiology (ASA) classification system is a numerical quantification of disease severity in patients undergoing general anaesthesia. Studies have demonstrated that ASA class is a useful indicator of host susceptibility to infection for epidemiological purposes. A score of 0 can be entered when the ASA score cannot be established.

ASA class	Description	Risk index score
1	A normal healthy patient	0
2	A patient with mild systemic disease	0
3	A patient with severe systemic disease	1
4	A patient with severe systemic disease that is a constant threat to life	1
5	A moribund patient who is not expected to survive without the operation	1

2. Length of Surgery

The CDC-NHSN⁴ lists duration cut points for surgical procedures which approximate the 75th percentile of the duration of surgery. Thus if a procedure is longer than the reported duration cut point then 1 risk point is scored. For caesarean section, the Victorian Nosocomial Infection Surveillance System cut point is used.⁵

Procedure	Duration cut point	Risk index score
Hip/knee arthroplasty	≤ 2 hours	0
Hip/knee arthroplasty	> 2 hours	1
Caesarean section	≤ 46 minutes	0
Caesarean section	> 46 minutes	1

3. Wound Classification

The CDC-NHSN² uses the surgical wound classification scheme which employs descriptive case features to postoperatively grade the degree of intra-operative microbial contamination.

Surgical wound classification	Description	Risk index score
Clean	An uninfected operative wound in which no inflammation is encountered and the respiratory, alimentary, genital, or uninfected urinary tract is not entered. In addition, clean wounds are primarily closed and, if necessary, drained with closed drainage. Operative incisional wounds that follow non-penetrating (blunt) trauma should be included in this category if they meet the criteria.	0
Clean-contaminated	An operative wound in which the respiratory, alimentary, genital or urinary tracts are entered under controlled conditions and without unusual contamination. Specifically, operations involving the biliary tract, appendix, vagina, and oropharynx are included in this category, provided no evidence of infection or major break in technique is encountered.	0
Contaminated	Open, fresh, accidental wounds. In addition, operations with major breaks in sterile technique e.g. open cardiac massage or gross spillage from the gastrointestinal tract, and incisions in which acute, non-purulent inflammation is encountered are included in this category.	1
Dirty / infected	Old traumatic wounds with retained devitalized tissue and those that involve existing clinical infection or perforated viscera. This definition suggests that the organisms causing postoperative infection were present in the operative field before the operation	1

Appendix 3 Risk Index Score Calculation (continued)

Examples for wound classification scoring

- Primary procedures will have a wound classification of 'clean' and the wound class score will be 0. If there is a major breach in sterile technique during the surgery the wound classification is 'contaminated' and the wound class score will be 1.

- Revision procedures for non-infective reasons i.e. mechanical, will have a wound classification of 'clean' and the wound class score will be 0. If there is a major breach in sterile technique during the surgery the wound classification is 'contaminated' and the wound class score will be 1.

- Revision for infective reasons: will have a wound classification of 'dirty / infected' and the wound class score will be 1.

- Caesarean sections: will have a wound classification of 'clean-contaminated', with a wound class score of 0. If the membranes have ruptured > 6hrs, then classify as 'contaminated' with a wound class score of 1, unless other factors are present as per wound class definition.

Module 3

Methicillin-resistant *Staphylococcus aureus* Healthcare Associated Infection

Methicillin-resistant *Staphylococcus aureus*

Healthcare Associated Infection

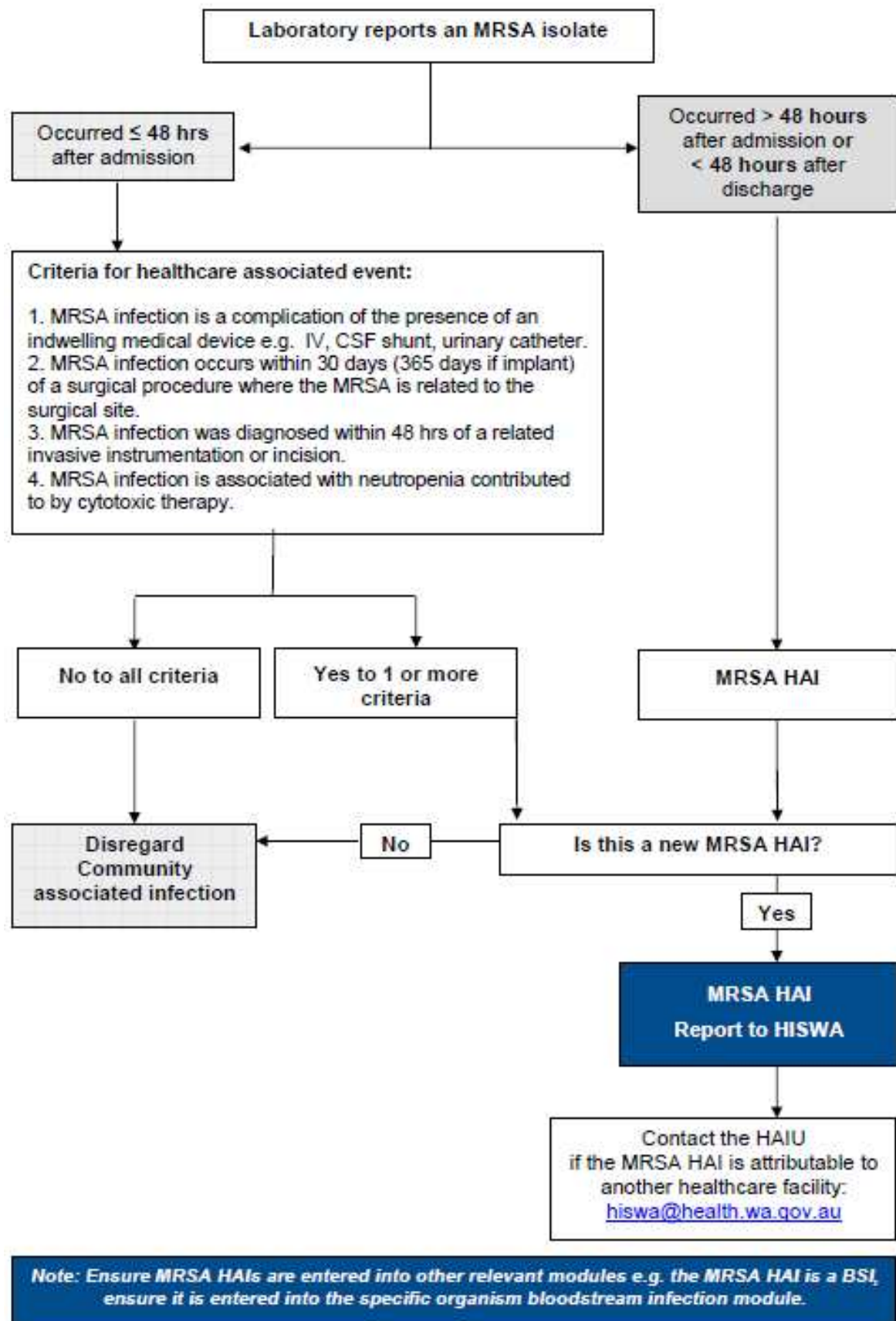
Infections caused by methicillin-resistant Staphylococcus aureus (MRSA) cause significant morbidity and mortality, prolong hospital stay and contribute to increased healthcare costs.¹ MRSA HAIs are an indicator of compliance by healthcare workers with appropriate hand hygiene, skin antisepsis and aseptic techniques for invasive procedures.² The risk of developing an MRSA HAI may be reduced if patients known to be colonised with MRSA receive decolonisation treatment prior to any invasive procedure.³

1. Methodology

For participating HCFs to make a valid comparison of their MRSA HAI rates the methodology must be similar and definitions consistently applied. Surveillance personnel are required to:

- Implement processes to ensure that all MRSA positive laboratory reports of specimens obtained at their HCF are received from the laboratory.
- Review and investigate all MRSA positive laboratory reports, including those from emergency and outpatient departments, to determine if the infection is healthcare associated and identify the attributable HCF.
- The methodology to assist with the classification of MRSA isolates is described in Figure 3. Refer to Module 1 for an introduction to HAI surveillance.

Figure 3 Flowchart for surveillance of MRSA HAI



2. Definitions

2.1 MRSA infection

- An MRSA infection is when MRSA is isolated from either:
 - a sterile site
 - a non-sterile site **and** MRSA-specific antibiotic therapy (refer Appendix 4) is administered by a clinician.²
- All MRSA strains (community or healthcare) are included in the surveillance.

Note: Patients that are given empirical treatment for a suspected MRSA infection, even if known MRSA carriers, should not be included in the surveillance.

2.2 MRSA HAI

An MRSA infection is considered to be a healthcare associated event if either criterion A or B is met:

- Criterion A: an infection acquired more than 48 hours after hospital admission or less than 48 hours after discharge and the infection was not present or incubating on admission i.e. no signs or symptoms of the MRSA infection are evident.
- Criterion B: an infection acquired 48 hours or less after admission and at least one of the following criteria is met:
 1. Is a complication of the presence of an indwelling medical device e.g. intravascular line, CSF shunt, urinary catheter and no other focus of infection is identified.
 2. Occurs within 30 days (or 1 year for implantable devices) of a surgical procedure where the infection is related to the surgical site.
 3. An invasive instrumentation or incision related to the infection was performed within 48 hours. If longer than 48 hours, there must be compelling evidence that the MRSA infection was related to the procedure.
 4. Is associated with neutropenia ($<1 \times 10^9 / L$) contributed to by cytotoxic therapy.²

2.3 New MRSA HAI

- Only the first new MRSA HAI event for a single admission period is reported.
- The intention of this definition is to exclude ongoing episodes of infection that have been previously reported. Therefore, if the admission period is prolonged, count additional MRSA HAIs if it is evident that it is a new infection i.e. unrelated to a previously reported episode.
- If a patient develops a non-sterile site infection and a sterile site infection during the same admission, then the sterile site HAI takes precedence and the non-sterile site HAI is not reported. If the non-sterile infection occurred in a previous admission, then it remains reported for that period.
- Exception: the definition of a bloodstream infection (BSI) requires that an additional MRSA BSI is reported if it is had been more than 14 days since a previous positive MRSA blood culture.

2.4 Community associated MRSA infection

These events are when the infection manifests within 48 hours of admission and do not meet criterion A or B for classification as an HAI (section 2.2).

2.5 Maternally-acquired MRSA infection

Infections that arise in neonates less than 48 hours after delivery are not considered HAI unless there is compelling evidence that the infection was related to a procedure or intervention during passage through the birth canal e.g. wound secondary to vacuum extraction.

2.6 Colonisation

Colonisation refers to MRSA isolated from a non-sterile site without clinical signs and symptoms of infection and the person is not being treated with MRSA-specific antibiotic therapy.

2.7 Site of infection

Specimens obtained from sterile sites identify definite infections and are always reported. Specimens that involve non-sterile sites require investigation and clinical judgement to determine if an infection is present.

2.7.1 Sterile site

Sterile sites include:

- Bloodstream
- Cerebrospinal fluid
- Normally sterile body cavity e.g. peritoneum, pleural, pericardial space
- Tissue sample (aspirate or biopsy) collected by aseptic procedure e.g. joint aspirate or bone biopsy

2.7.2 Non-sterile site

Non-sterile sites include:

- Sputum
- Urine
- Wound or skin and soft tissue infections (SSTIs) includes wounds, abscesses, conjunctivitis, surgical site / incisions, drain fluid, invasive device exit sites and mucous membranes.

Note: MRSA in urine is rarely a cause of primary urinary tract infection. If MRSA is isolated from urine it may reflect contamination from perineal flora, colonisation of a catheter, or indicate high grade MRSA bloodstream infection. Discussion with a clinician may be necessary to ascertain if the isolate represents MRSA infection.

2.7.3 Other

Non-sterile specimens that do not fit the categories listed above e.g. breast milk.

3. Place of Acquisition

MRSA HAI are categorised according to inpatient or non-inpatient healthcare settings where the infection was likely to have been acquired. For non-inpatient settings the MRSA infections are associated with healthcare received as an outpatient, and meet Criterion B for a MRSA HAI (Refer to section 2.2).

3.1 ICU or non-ICU (inpatient)

- MRSA HAI acquired as inpatients are stratified as ICU or non-ICU.
- ICU associated infections are detected more than 48hours after ICU admission or within 48 hours of discharge from ICU.
- Non-ICU associated MRSA HAI are associated with healthcare during a multi-day admission to wards outside of the ICU (Refer to section 6.2).
- MRSA HAI also include infections detected on readmission associated with a multi-day admission e.g. MRSA HAI caused by a surgical site infection detected on readmission.
- HITH patients are counted as non-ICU inpatients.

3.2 Non-inpatient higher-risk units – renal, haematology and oncology

- MRSA infections in patients receiving care under these units, and who are not under the care of HITH, that are acquired at home or as result of care at hospital outpatient settings e.g. haemodialysis, chemotherapy day-wards, apheresis.

3.3 Non-inpatient Outpatient Intravenous Therapy Unit (OPIV)

- MRSA infections acquired in patients who receive IV therapy in the community or at hospital outpatient settings e.g. day wards, and who are not under the care of renal, haematology and oncology specialty units or HITH.

3.4 Non-inpatient – other units

- MRSA infections acquired in patients receiving care in hospital outpatient settings who are not under the care of HITH, OPIV or specialty units above e.g. an MRSA SSI following day surgery in a patient under the care of a general surgery unit.

3.5 MRSA infections following care at another healthcare facility

- If a HCF identifies that a MRSA infection is a result of care at another HCF or develops within 48 hrs of a transfer, contact the HAIU so that the infection can be attributed to the correct HCF.

4. Previous Colonisation Status

- Patients colonised with MRSA are at an increased risk of developing MRSA infections associated with healthcare interventions. Theoretically, this risk may be reduced if these patients receive decolonisation or suppression treatment.
- Report patients known to be colonised with the infecting strain of MRSA prior to the HAI occurring e.g. patient is a known carrier of UK EMRSA 15 and develops an HAI caused by UK EMRSA 15.
- If the MRSA HAI is the first time MRSA is identified from a patient or the previous status is unknown, then record as 'no /unknown'.

5. HISWA Dataset

5.1 Numerator data fields

The numerator data fields for MRSA HAI required to be entered into the HISWA database are described in Table 6.

5.1.1 Inclusions

- All strains of MRSA causing HAI i.e. community and healthcare associated strains.
- Patients previously colonised with MRSA who develop a new MRSA HAI.

5.1.2 Exclusions

- Community associated MRSA infections
- Maternally-acquired MRSA infections
- Patients who are colonised only.

Table 6 MRSA HAI data fields and descriptors for HISWA database

Data field	Descriptor
Patient ID	Unique patient identifier
Date of birth	Patient date of birth
Patient postcode	Postcode of patients home address
Laboratory specimen number	Laboratory number assigned to the specimen
Specimen date	Date the specimen was obtained
Organism	MRSA Note: MRSA strain data will be entered by the HAIU
Infection/colonisation	<ul style="list-style-type: none"> ▪ new infection
Previously colonised	<ul style="list-style-type: none"> ▪ yes (known to be colonised with infecting MRSA strain prior to infection) ▪ no or unknown
Specimen site	<ul style="list-style-type: none"> ▪ sterile sites - bloodstream, CSF, peritoneum, pleural, pericardial, aseptic tissue ▪ non-sterile sites - sputum, urine, wound
Specimen	Sterile or non sterile classification of the specimen (as above)
Place of acquisition	<ul style="list-style-type: none"> ▪ ICU ▪ non-ICU ▪ Non-inpatient – renal ▪ Non-inpatient – haematology/oncology ▪ Non-inpatient – OPIV ▪ Non-inpatient – other/unknown

5.2 Denominator data fields

The denominator that is utilised is bed-days. Both multi-day and same-day bed-days are collected to allow for different rate calculations.

5.2.1 Inclusions

HISWA bed-day data for MRSA HAI includes:

- Inpatient admissions to rehabilitation and aged care areas in an acute HCF.
- HITH bed-days.

- Outpatient same-day admission wards/units e.g. haemodialysis units, day treatment wards, day-surgery or procedure units.

5.2.2 Exclusions

HISWA bed-day data for MRSA HAI excludes:

- Psychiatric units.
- Unqualified newborns i.e. babies with the mother (who is the patient).
- Boarders, e.g. accommodation attached to hospitals for parents or carers.
- Residential Aged Care Reporting Establishments that are co-located with public hospitals within the Western Australian Country Health Services.

5.2.3 Outpatient clinic settings and emergency department

Patients who attend outpatient clinics or emergency departments without admission to hospital are not counted in bed-days. However, MRSA HAIs that occur as a result of healthcare in these settings will be included in numerator data if criterion B of the MRSA HAI definition is met (section 2.2) e.g. a patient develops an MRSA HAI following a facet joint injection given at an outpatient clinic of a hospital.

6. Calculation of MRSA HAI Rate

6.1 Inpatient MRSA HAI rate

- The inpatient MRSA HAI rate is expressed per 10,000 multi-day bed-days.

$$\text{Inpatient MRSA HAI rate} = \frac{\text{Number of inpatient MRSA HAI} \times 10,000}{\text{Number of multi-day bed-days.}}$$

6.2 Total MRSA HAI rate

- This rate reflects the total number (inpatient and non-inpatient) of MRSA HAIs

$$\text{Total MRSA HAI rate} = \frac{\text{Number of MRSA HAI} \times 10,000}{\text{Number of multi-day and same-day bed-days.}}$$

7. References

1. Christensen K, Coombs G, Ferguson J, Redell J, Marshall C, Nimmo G et al. Multi-resistant organisms. In: Cruickshank M and Ferguson J, editors. Reducing harm to patients from healthcare associated infection: the role of surveillance. Australian Commission on Safety and Quality in Healthcare; 2008. P.129-168.
2. Australian Council on Safety and Quality in Health Care and Australian Infection Control Association (AICA) Health Care Associated Infections Advisory Committee. September 2004. Multi-resistant organism (MRO) surveillance indicator definitions. In: Australian Council for Healthcare Standards, 'ACHS Infection Control Clinical Indicators Users Manual 2011'.
3. Calfee DP, Cassandra DS, Classen D, Arias KM, Podgorny K, Anderson DJ et al. Strategies to prevent transmission of methicillin-resistant *staphylococcus aureus* in acute care hospitals. Supplement article: SHEA/IDSA Practice Recommendation. Infect Control Hosp Epidemiol. 2008; 29:S62-S80.

Appendix 4 Clarification of MRSA-Specific Antibiotic Therapy

'MRSA-specific antibiotic therapy' is the use of antimicrobials that are clinically effective in the treatment of MRSA infections. MRSA antibiotic sensitivities may vary between strains and must always be checked from the laboratory report.

■ **MRSA-specific antibiotic therapy**

- vancomycin
- teicoplanin
- linezolid
- quinupristin-dalfopristin (Synercid®)
- daptomycin

■ **Possible MRSA-specific antibiotic therapy (depending on sensitivity results)**

- fusidic acid
- rifampicin
- clindamycin
- co-trimoxazole
- quinolones (ciprofloxacin, moxifloxacin)
- doxycycline

■ **Antibiotics that are not MRSA-specific antibiotic therapy**

All strains of MRSA are resistant to these groups of antibiotics and they are not suitable for treating MRSA infections. They include:

- all penicillin-based antibiotics e.g. benzylpenicillin, flucloxacillin, amoxycillin, timentin, augmentin
- cephalosporins e.g. cephalothin, cephalixin, cefotaxime, ceftazadine, ceftriaxone, cephazolin, cefepime, cefaclor
- carbapenems e.g. imipenem, meropenem
- others e.g. metronidazole, aztreonam.

■ **Antibiotics that are reported as sensitive on laboratory testing, but are not likely to be clinically effective against MRSA infection**

Antibiotics belonging to this group include:

- gentamicin, tobramycin, amikacin - as single therapy
- erythromycin, roxithromycin, clarithromycin.

Module 4

Clostridium difficile Infection

***Clostridium difficile* Infection**

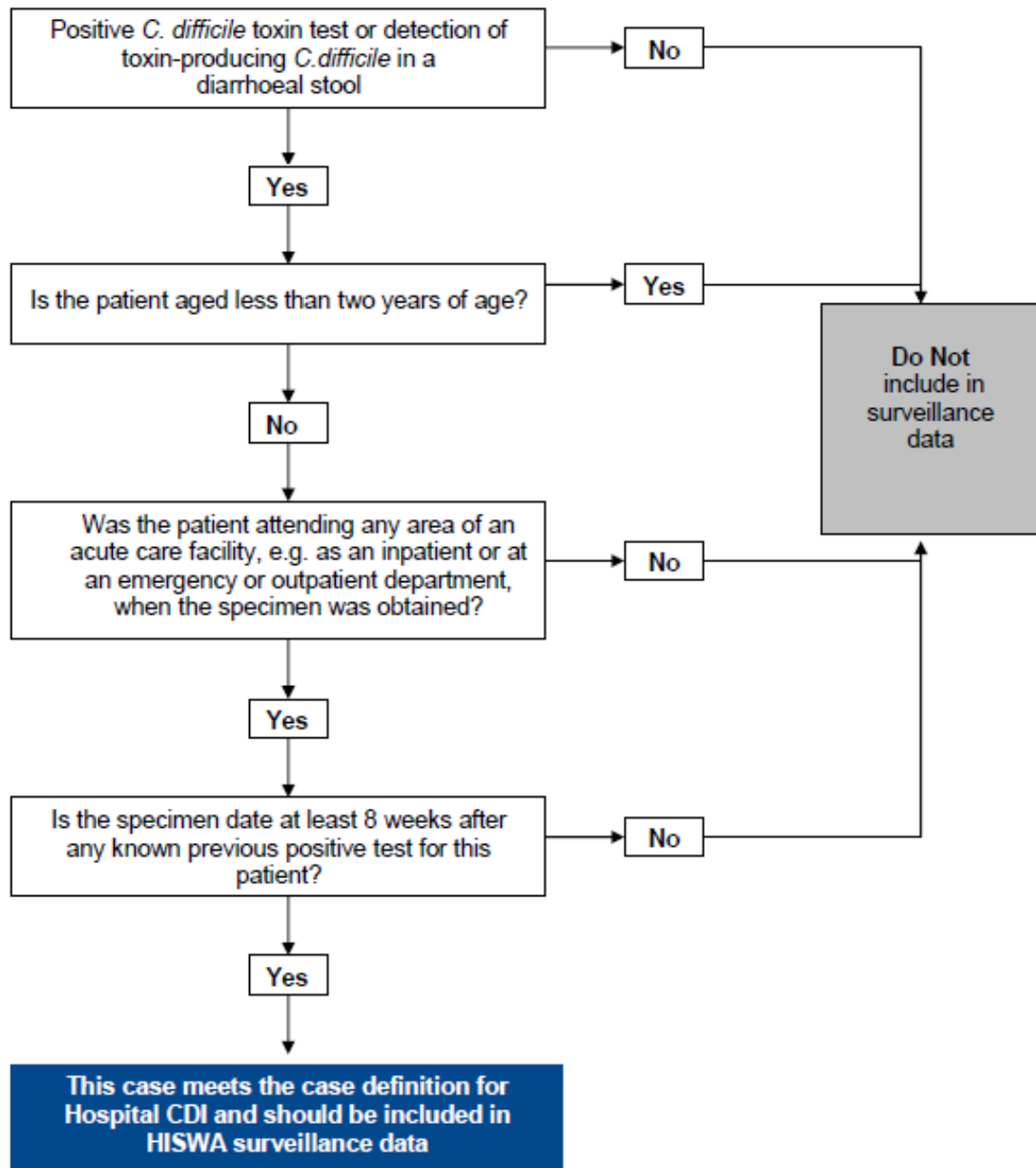
Clostridium difficile is the most common cause of healthcare associated and antibiotic-associated diarrhoea. The severity of infection varies from mild diarrhoea to pseudomembranous colitis, toxic megacolon and death. Hypervirulent strains that are associated with epidemic spread and high rates of severe disease and death have recently been identified in Australia.² Identification of hospitalised patients with *Clostridium difficile* infection (CDI) by optimal surveillance systems and prompt implementation of contact precautions are the key to preventing transmission. Antimicrobial stewardship programs are an essential CDI prevention strategy to minimise the frequency and duration of antimicrobial use and to promote narrow spectrum antibiotic prescribing.^{1, 2}

1. Methodology

Surveillance of hospital-identified CDI is the minimum requirement for national and HISWA surveillance. The methodology to assist with the classification of hospital-identified CDI is described in figure 4. Surveillance personnel are required to:

- Implement processes to ensure they receive all laboratory reports that detect *C.difficile* from specimens of diarrhoeal stools obtained at their HCF, including from the emergency department and outpatient setting.
- Classification of hospital-identified CDI cases is intended to be derived from laboratory reports and does not require case review by surveillance personnel.
- Apply the definition of a hospital-identified CDI case consistently. Refer to Module 1 for an introduction to HAI surveillance.
- Additional surveillance of severe CDI disease, and healthcare or community - associated CDI cases, is recommended, however, it is optional for HISWA hospitals (Refer section 5).

Figure 4 Flowchart for determining a hospital-identified CDI case



2. Definitions

2.1 Hospital-identified CDI case

- A hospital-identified CDI case is CDI identified in a patient attending any area of a hospital i.e. admitted patients and those attending emergency and outpatient departments.
- A hospital-identified CDI case reflects the burden of CDI on a hospital and describes healthcare-associated infections, community-associated infections, as well as CDI of indeterminate or unknown origin (Refer to section 5.2).

2.2 CDI case

- A CDI case is defined as a case of diarrhoea i.e. an unformed stool that takes the shape of the container, that meets the following criteria:
 - the stool sample yields a positive result in a laboratory assay for *C.difficile* infection toxin A and / or B

OR

- a toxin-producing *C.difficile* organism is detected in the stool sample by culture or other means.

2.2.1 Exclusions

- Formed stools, i.e. do not take the shape of the container, even if toxin positive.
- Cases where a previous positive test has been obtained within the last 8 weeks i.e. only include cases once in an 8 week period.
- Patients less than 2 years old at date of admission.

2.2.2 Diarrhoea descriptors

- Diarrhoeal stools that take the shape of the container are described in laboratory reports as semi-formed, watery, loose, liquid or fluid.

Note: An additional positive test obtained from a specimen collected from the same patient more than 8 weeks since the last positive test is regarded as a new case

3. HISWA Dataset

3.1 Numerator data fields

The numerator data fields for hospital-identified CDI cases required to be entered into the HISWA database are described in Table 7.

Table 7 CDI numerator data fields and descriptors for HISWA database

Data field	Descriptor
Patient ID	Unique patient identifier
Date of birth	Patient date of birth
Patient postcode	Postcode of patients home address
Lab specimen number	Laboratory number assigned to the specimen
Specimen date	Date the specimen was obtained
Organism	<i>Clostridium difficile</i>
Infection/colonisation	For every case enter: new infection
Previously colonised	For every case enter: no / unknown
Specimen site	For every case enter: Other
Specimen	For every case enter: Non-sterile
Place of acquisition	For every case enter: Hospital CDI

3.2 Denominator data fields

The denominator that is utilised is bed-days and includes same-day bed-days.

3.2.1 Inclusions

HISWA bed-day data for hospital-identified CDI includes:

- All inpatient wards or units within the acute hospital including psychiatric, rehabilitation and aged care admissions.
- HITH admissions.
- All outpatient and day admission wards or units e.g. outpatient clinics, haemodialysis units, day of surgery or procedure units.
- Counts of bed-days of patients less than 2 years of age is currently included in HISWA bed-day data, however, this patient age group is excluded from HISWA numerator data.

3.2.2 Exclusions

- Boarders e.g. accommodation attached to hospitals for parents or carers.
- Emergency and outpatient department attendance data is not included in bed-day counts provided to HISWA.

4. Calculation of Hospital-Identified CDI Rate

4.1 HISWA rate

- The hospital-identified CDI rate reflects the burden of CDI at a HCF.
- CDI rates will be calculated and reported to HISWA using bed-days and expressed per 10,000 bed-days.
- Bed-days include both multi-day and same-day bed-days.
- $$\text{HI-CDI rate} = \frac{\text{Total number of hospital-identified CDI cases}}{\text{Total number of bed-days at the hospital}} \times 10,000$$

5. Enhanced Surveillance (Optional)

- National surveillance does not require classification of healthcare and community-associated CDI cases or severe and non-severe CDI disease. Surveillance of these classifications is optional, however, it is recommended for HISWA hospitals.
- Enhanced surveillance requires an individual case review in addition to the routine review of laboratory reports required for hospital identified CDI surveillance.
- HCFs may be requested to undertake enhanced surveillance for target periods and also if the rate of hospital identified CDI is comparatively high or increasing significantly at their facility.
- HISWA definitions for enhanced surveillance align with recommended international definitions and are described in section 5.1 and 5.2.^{3,4,5}

5.1 Severe CDI case

- A severe CDI case is defined as a CDI case that meets any of the following criteria within 30 days of symptom onset:
 - history of admission to an intensive care unit (ICU) for treatment of complications from CDI e.g. vasopressor therapy for shock
 - history of surgery for treatment of toxic megacolon, perforation or refractory colitis
 - death caused by CDI within 30 days of symptom onset.
- Clinical criteria that have been associated with severe CDI include:
 - greater than sixty years of age
 - temperature greater than 38.30C
 - serum albumin <25g/L
 - peripheral white blood cell count >15,000 cells/microL
 - deteriorating renal function
 - elevated serum lactate
 - endoscopic evidence of pseudomembranous colitis or treatment in the ICU
 - subtotal colectomy procedure or diagnosis of toxic megacolon.

5.1.1 Calculation of incidence of severe CDI

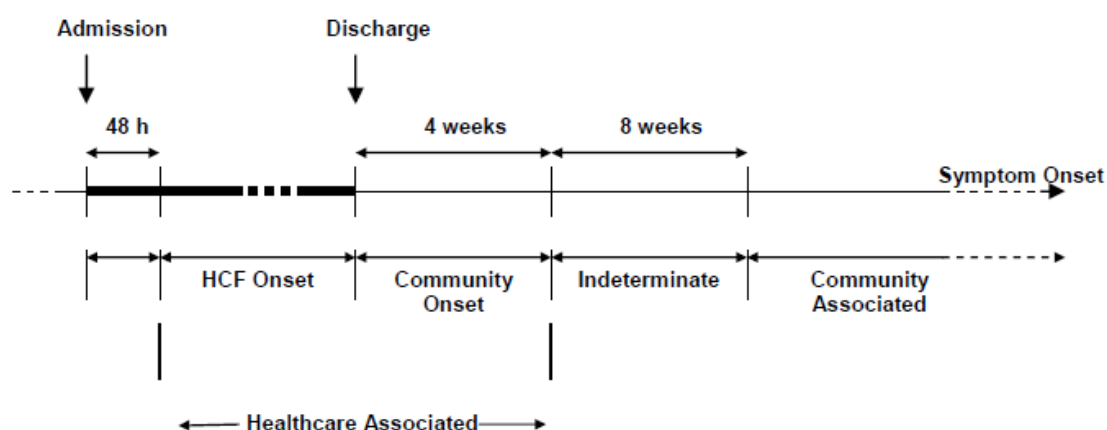
- For HCFs monitoring severe disease, this should be expressed as the proportion of total hospital- identified CDI cases in the reporting period that were severe.
- The raw numbers as well as the proportion should be reported to aid interpretation.
- The proportion should be calculated for the reporting period as follows:
$$\frac{\text{Patient episodes of hospital-identified CDI – severe disease}}{\text{Patient episodes of hospital- identified CDI -total hospital CDI cases}}$$

5.2 Definitions of healthcare or community-associated CDI cases

Each CDI case is classified according to the place of probable exposure described below and in figure 5. For HISWA purposes a HCF is an acute care facility.

- Healthcare-associated CDI are classified as HCF onset **or** community onset.
 - HCF onset: symptom onset or date and time of stool specimen collection is greater than 48 hrs after admission to a HCF.
 - community onset: symptom onset was in the community or within 48 hrs of admission to a HCF, and symptom onset was less than 4 weeks after the last discharge from a HCF.
- Community-associated CDI cases
 - symptom onset or date and time of stool specimen was in the community or within 48hrs of admission to a HCF provided the symptom onset was more than 12 weeks after the last discharge from a HCF.
 - record if the CDI case was admitted to a HCF from a residential care facility.
- Indeterminate onset
 - criteria for community or healthcare-associated are not met e.g. CDI case with symptom onset in the community between 4 and 12 weeks of the last discharge from a HCF.
- Unknown
 - exposure setting can not be determined because of a lack of data to classify.

Figure 5 Time line for healthcare or community-associated CDI definitions



Note: Healthcare-associated – community onset cases should be:

- attributed to the reporting period during which, the case was discharged from the HCF before CDI symptom onset e.g. if the case was discharged on the 28 May and readmitted with CDI on 5 June, the case should be assigned to May.
- attributed to the HCF from which the case was discharged, providing they were an inpatient at that HCF for more than 48 hours.

5.2.1 Rate calculation

- Rates for healthcare-associated CDI cases will be expressed per 10, 000 bed-days (excluding same-day bed-days).
- Rate =
$$\frac{\text{Total number of healthcare-associated CDI cases} \times 10,000}{\text{Total number of bed-days}}$$

5.3 Recurrent CDI cases

A recurrent CDI case is an episode that occurs within 8 weeks or less after the onset of a previous CDI episode, provided that CDI symptoms from the earlier episode have resolved with or without therapy. These cases are not included in the hospital identified CDI case definition and calculation, and monitoring is optional.

6. References

1. Stuart R L and Marshall C. *Clostridium difficile* infection: a new threat on our doorstep. *Med J Aust* 2011; 194 (7):331-332.
2. Cheng A C, Ferguson J K, Richards M J et al. Australasian Society for Infectious Diseases guidelines for the diagnosis and treatment of *Clostridium difficile* infection. *Med J Aust* 2011; 194 (7): 353-358.
3. Australian Commission on Safety and Quality in Health Care. Implementation Guide for Hospital Surveillance of *Clostridium difficile* Infection, Consultation Edition, Version 3, 2011.
4. Clinical Practice Guidelines for *Clostridium difficile* Infection in Adults: 2010 Update by the Society for Healthcare Epidemiology of America (SHEA) and the Infectious Diseases Society of America (IDSA). *Infection Control and Hospital Epidemiology* 31(5): 431-455.
5. McDonald LC, Coignard B et al. 2007. Recommendations for surveillance of *Clostridium difficile*-associated disease. *Infection Control and Hospital Epidemiology* 28: 140-145.

Module 5

Vancomycin-Resistant Enterococci Sterile Site Infection

Vancomycin-Resistant Enterococci Sterile Site Infection

1. Introduction

Bloodstream and other sterile site infections caused by vancomycin-resistant enterococci (VRE) have been associated with significant mortality and morbidity for critically ill or immunocompromised patients. Surveillance of sterile site infections allows evaluation of strategies to reduce the spread of VRE and colonisation of patients receiving care in higher-risk units.

2. Methodology

- Review all vancomycin-resistant enterococci (VRE) positive laboratory reports, including those from emergency and outpatient departments.
- Report new VRE infections from sterile sites that are healthcare-associated infections (HAIs) or community-associated infections (CAIs).
- If the VRE sterile site infection is a HAI, identify the attributable HCF.
- A HISWA VRE surveillance spreadsheet is provided. Save the spreadsheet file and enter the infection data when the laboratory report is received. Each time a case is entered send the spreadsheet to HISWA via e-mail at:
hiswa@health.wa.gov.au

3. Definitions

3.1 VRE sterile site infection

- A VRE sterile site infection is when VRE is isolated from a specimen obtained from a sterile site.¹
- Sterile sites include:
 - bloodstream
 - cerebrospinal fluid
 - normally sterile body cavity e.g. pleural, peritoneum, pericardial space
 - tissue sample collected by aseptic procedure e.g. biopsy or aspirate.

- Do not report VRE isolated from a specimen obtained from a non-sterile site e.g. wound, urine, sputum.

Note: Patients that are given empirical treatment for a suspected VRE infection, even if known VRE carriers, should not be included in the surveillance.

3.2 VRE sterile site HAI

The VRE infection is considered to be a healthcare-associated event if either criterion A or B is met:

- Criterion A: an infection acquired more than 48 hours after hospital admission or less than 48 hours after discharge and the infection was not present or incubating on admission i.e. no signs or symptoms of the VRE infection are evident.
- Criterion B: an infection acquired 48 hours or less after admission and at least one of the following criteria is met:
 1. Is a complication of the presence of an indwelling medical device e.g. intravascular line, CSF shunt, and no other focus of infection is identified.
 2. Occurs within 30 days (or 1 year for implantable devices) of a surgical procedure where the infection is related to the surgical site.
 3. An invasive instrumentation or incision related to the infection was performed within 48 hours. If longer than 48 hours, there must be compelling evidence that the VRE infection was related to the procedure.
 4. Is associated with neutropenia ($<1 \times 10^9 / L$) contributed to by cytotoxic therapy.¹

3.3 Inpatient or non-inpatient HAI

A VRE infection that is classified as HAI, is further categorised as:

- Inpatient HAI: is associated with healthcare during a multi-day admission to hospital or hospital-in-the-home (HITH).
- Non-inpatient HAI: meets Criterion B for a HAI and is associated with healthcare received in hospital outpatient settings (e.g. haemodialysis, peritoneal dialysis, chemotherapy day-wards, apheresis, day surgery).

3.4 VRE sterile site CAI

- The VRE infection manifests within 48 hours of admission and does not meet either criterion A or B for classification as an HAI.
- CAIs include VRE infections present on admission to an acute HCF from a RCF.

3.5 New VRE sterile site infection

- Only the first new VRE infection for a single admission period is reported.
- If the admission period is prolonged, count additional VRE HAIs if it is evident that it is a new infection i.e. unrelated to a previous event.
- Exception: the definition of a bloodstream infection (BSI) requires that an additional VRE BSI is reported if it is had been more than 14 days since a previous positive VRE blood culture. This rule applies to HAIs and CAIs.

3.6 Colonisation

- Colonisation refers to VRE isolated from a non-sterile site without clinical signs and symptoms of infection and the person is not being treated for VRE infection.
- Cases of VRE colonisation are not reported.

4. Higher-risk units

- Each acute HCF is required to identify their higher-risk units.
- Report VRE sterile site infections acquired in patients receiving care from the following higher-risk units:
 - ICU
 - Haemodialysis
 - Peritoneal dialysis
 - Medical oncology
 - Haematology
 - Transplant (solid organ [e.g. liver, lung, kidney], bone marrow)
 - Other unit (any other unit not listed above)
- If 'other unit' selected, please specify the unit or specialty.

4.1 ICU

- ICU-associated VRE infections are detected more than 48 hours after admission to ICU or within 48 hours of discharge from ICU.

4.2 Haemodialysis, peritoneal dialysis, haematology, medical oncology, transplant or other specified units

- VRE infections acquired in patients receiving care under higher-risk units or other units may be classified as either HAIs (inpatient or non-inpatient) or CAIs.

5. Admission from Residential Care Facilities

- Record a VRE sterile site infection, identified at the acute care HCF, that occurs in a patient who has been admitted from a residential care facility (RCF).
- A RCF refers to all private and public facilities registered to provide 24 hour non-acute care to persons who are not able to live independently. This includes nursing homes, hostels, psychiatric facilities, hospices and rehabilitation facilities.

6. Attributable Healthcare Facility

- If a HCF identifies that a VRE sterile site infection is a result of care at another HCF or develops within 48 hrs of a transfer, contact the HAIU so that the infection can be attributed to the correct HCF.

7. Previous VRE Colonisation

- Report patients known to be colonised with the infecting strain of VRE prior to the VRE infection occurring.

8. HISWA Dataset

8.1 Numerator data fields

Table 1 describes the numerator data fields for VRE sterile site infection required to be entered into the surveillance spreadsheet provided for HISWA contributors.

8.1.1 Inclusions

- Patients previously colonised with VRE who develop a VRE sterile site infection.
- Healthcare and community-associated VRE sterile site infections.

8.1.2 Exclusions

- VRE infections from non-sterile sites e.g wound, urine, sputum.
- Patients who are colonised with VRE only.

Table 8 VRE sterile site infection data fields and descriptors

Data field	Descriptor
Hospital / Private Haemodialysis Unit	Name of hospital or private haemodialysis unit
Patient identifier	Unique patient identifier
Date of birth	Patient date of birth
Admission date	Date of admission to hospital
Discharge date	Date of discharge from hospital
Laboratory service provider	Name of laboratory reporting the VRE infection
Laboratory specimen number	Laboratory number assigned to the specimen
Specimen date	Date the specimen was obtained
VRE species / classification	e.g. vanB E.faecium Typing will be added by the HAIU
Sterile specimen site	<ul style="list-style-type: none"> ▪ bloodstream, CSF, peritoneum, pleural, pericardial space, aseptic tissue
HAI or CAI	<ul style="list-style-type: none"> ▪ HAI - inpatient ▪ HAI - non-inpatient ▪ CAI
Higher-risk unit	<ul style="list-style-type: none"> ▪ ICU, haemodialysis, peritoneal dialysis, haematology, medical oncology, transplant ▪ Specify 'other unit' if not listed above
Admission from a RCF	<ul style="list-style-type: none"> ▪ yes ▪ no ▪ unknown
Previous VRE colonisation	<ul style="list-style-type: none"> ▪ yes (known to be colonised with infecting VRE strain prior to infection) ▪ no (not previously colonised) ▪ unknown

8.2 Denominator data fields

The HAIU will utilise multi-day and same-day bed-day denominator data to calculate infection rates as required.

9. References

1. Australian Council on Safety and Quality in Health Care and Australian Infection Control Association (AICA) Health Care Associated Infections Advisory Committee. September 2004. Multi-resistant Organism (MRO) Surveillance Indicator Definitions. In Australian Council for Healthcare Standards, 'ACHS Infection Control Clinical Indicators Users Manual 2011'.

Module 6

Staphylococcus aureus Bloodstream Infection

Staphylococcus aureus Bloodstream Infection

Staphylococcus aureus bloodstream infections cause significant illness and serious complications such as osteomyelitis, endocarditis and septic arthritis. Even with advanced medical care, mortality remains high. The majority of healthcare associated Staphylococcus aureus bloodstream infections (HA-SABSI) are related to the presence of intravascular devices and these events are increasingly viewed as preventable adverse events. Quality improvement programs that have involved surveillance and implementation of preventative measures and policies, have resulted in sustained reductions in HA-SABSI.¹

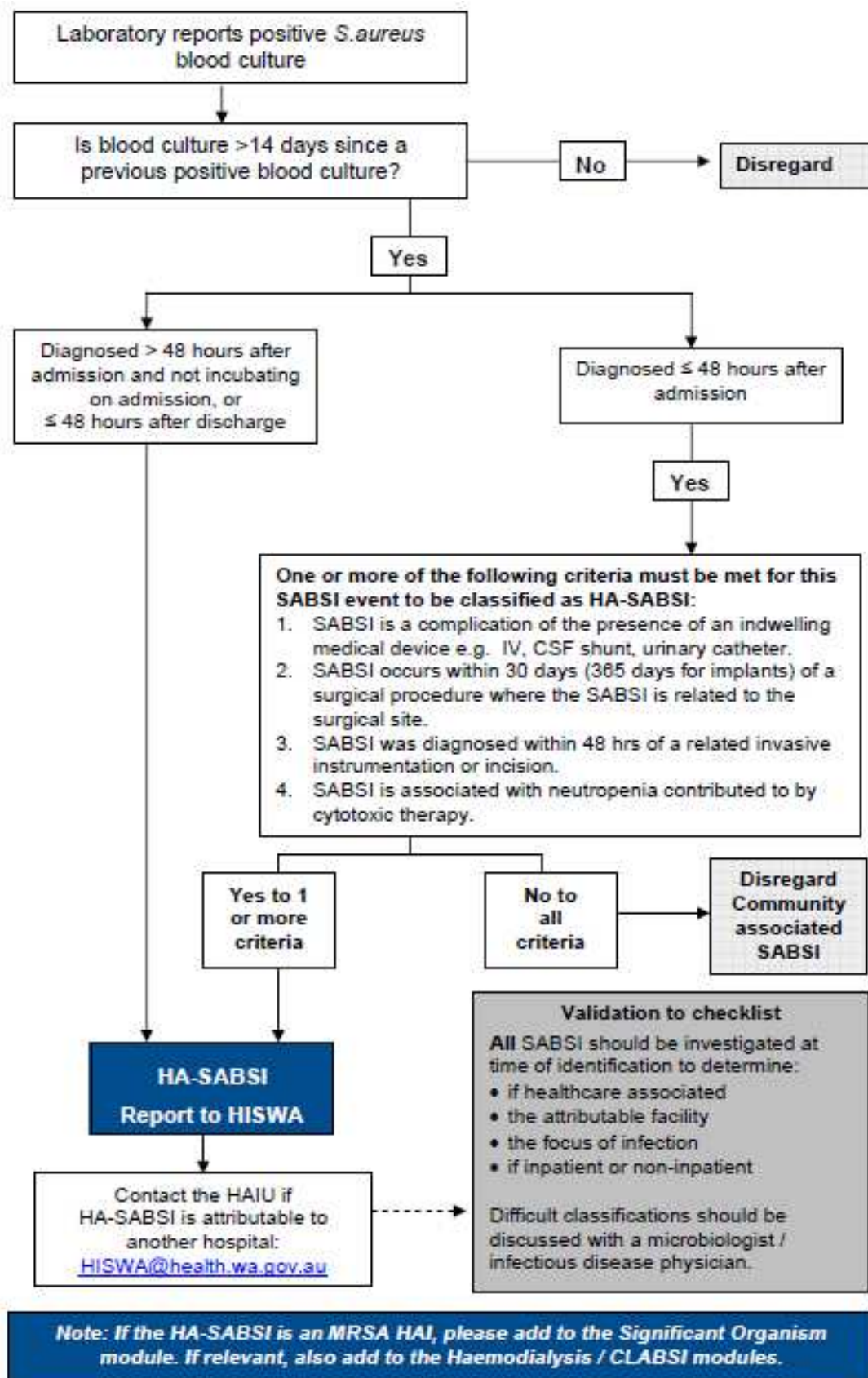
1. Methodology

For participating hospitals to make a valid comparison of their HA-SABSI rates, the methodology must be similar and definitions consistently applied. Surveillance personnel are required to:

- Implement processes to ensure that all positive laboratory reports are received.
- Investigate all positive *S.aureus* blood culture laboratory reports, including those from emergency and outpatient departments, to determine if the SABSI is healthcare associated and the attributable facility.
- Liaise with key stakeholders, clinical microbiologists / infectious diseases physicians to assist with the classification of SABSI episodes.
- The methodology to assist with the classification of SABSI is outlined in Figure 6. Refer to Module 1 for an introduction to HAI surveillance

Note: Surveillance personnel should take opportunities to promote best practice for blood culture collection to optimise BSI detection i.e. blood specimens drawn for culture should be obtained from 2 - 4 blood draws from separate venipuncture sites (within a few hours) and not through a vascular catheter.³ The top of the culture bottle must be disinfected prior to access and aseptic technique used during collection.

Figure 6 Flowchart for surveillance of HA-SABSI



2. Definitions

2.1 *Staphylococcus aureus* bloodstream infection

- A patient episode of SABSI is defined as a positive blood culture for *S.aureus*.
- Only the first isolate per patient within a 14 day period is counted. If the same patient has a further positive blood culture reported greater than 14 days after the last positive blood culture then an additional episode is recorded (14-day rule).²
- The 14-day rule is to be applied to SABSI that occur in haemodialysis patients (not the 21 days specified for haemodialysis access-associated bloodstream infection surveillance).³

Note: The 14 day rule: if a patient has 4 sets of positive S.aureus blood cultures over the initial 3 days of that patient's admission, only one episode of SABSI is recorded. If the same patient had a further set of positive blood cultures on day 5 of the same admission, these would not be counted.

A further positive S.aureus blood culture on day 20 of the admission is recorded as a second patient episode of SABSI i.e. it is greater than 14 days since the last positive culture on day 5.

2.1.1 Contaminants

- *S.aureus* is an uncommon blood culture contaminant and thus there will be few false positive isolates.⁴
- A *S.aureus* positive blood culture will only be considered a contaminant, and not reported in the surveillance data, if the clinical picture is unsupportive of infection and either a repeat blood culture is negative and/or no antimicrobial treatment is given.

2.2 Healthcare associated SABSIs (HA-SABSIs)

The SABSIs are considered to be healthcare associated if either criterion A or B are met:

- Criterion A: the patient's first positive blood culture is collected more than 48 hours after hospital admission or less than 48 hours after discharge and a staphylococcal infection was not present or incubating on admission.

*Note: Incubating on admission: if there were documented clinical signs of staphylococcal infection on admission **and** the SABSIs are not associated with a prior admission or hospital procedure, then the episode was likely incubating on admission and is not counted as healthcare associated. If there is uncertainty, then the episode should be classified as healthcare associated.*

- Criterion B: the patient's first positive blood culture is collected less than or equal to 48 hours after admission and one or more of the following clinical criteria was met :
 1. The SABSIs are a complication of the presence of an indwelling medical device e.g. intravascular line, haemodialysis vascular access, cerebrospinal fluid shunt, urinary catheter.
 2. The SABSIs occur within 30 days (or 365 days for implantable devices) of a surgical procedure where the SABSIs are related to the surgical site.
 3. An invasive instrumentation or incision related to the SABSIs was performed within 48 hours.
 4. The SABSIs are associated with neutropenia (neutrophil count $<1 \times 10^9/L$) contributed to by cytotoxic therapy.
- If none of these criteria are met, then the episode of SABSIs is considered to be community-associated.

2.3 Maternally-acquired SABSIs

SABSIs that arise in neonates less than 48 hours after delivery are not considered HABSIs unless there is compelling evidence that it is related to a procedure or intervention during the birth.

3. Focus of Infection

HA-SABSI are categorised according to the likely source of the infection. These definitions can also be used to clarify the application of criterion B of the HA-SABSI definition.

3.1 Intravascular (IV) line related (clarifies criterion B1)

- An IV line is in situ within 48 hrs of the HA-SABSI episode and is not related to an infection at another body site i.e. there is no other identifiable focus of infection.²
- For haemodialysis patients a HA-SABSI is haemodialysis access-associated if there is either clinical infection at the vascular access site or no identifiable infection at another site.³
- There is no minimum period of time that the IV line must be in situ in order for the HA-SABSI to be considered IV line related.
- An introducer used in intravascular procedures e.g. angiography, is considered an IV line.⁵ Therefore, a HA-SABSI occurring within 48 hours of these procedures is IV line related unless there is another identifiable focus of infection.

3.2 Non intravascular device related (clarifies criterion B1)

- The device was in situ within 48 hours of the HA-SABSI episode and there was clinical or microbiological evidence that the HA-SABSI arose from the insertion site or an associated organ.
- Examples of non IV devices include shunts, suprapubic catheters, chest tubes, urinary catheters, peritoneal catheters, percutaneous endoscopic gastrostomy (PEG) catheters.

3.3 Procedure related (clarifies criterion B2 and B3)

- There is clinical or microbiological evidence that the HA-SABSI arose from infection related to a surgical procedure within the last 30 days or within 365 days of a deep incisional /organ space infection related to a surgically implanted device.

- examples of implantable devices are prostheses, permanent pacemakers, implantable cardioverter defibrillators, nerve stimulation implants, expandable breast implants, screws, wires and surgical mesh.
- There is invasive instrumentation or incision performed within the previous 48 hours e.g. cardiac catheterisation, pacing wires, endoscopic retrograde cholangiopancreatography (ERCP). If the time interval was longer, there must be compelling evidence that the HA-SABSI was related to the procedure.

3.4 Organ site focus

- There is clinical or bacteriological evidence that the HA-SABSI developed as a result of infection at a specific organ site e.g. skin & soft tissue, respiratory tract, urinary tract, gastrointestinal tract, and is not related to a procedure or an indwelling medical device.
- To diagnose infection at a specific body site, refer to the National Healthcare Safety Network (NHSN) definitions for infection.⁶
- An organ site focus of infection is classified as “Other” for HISWA purposes.

3.5 Unknown / disseminated focus

- The source of the HA-SABSI cannot be determined or there are multiple organ site foci of *S. aureus* infection i.e. disseminated infection.

3.6 Neutropenia

- Neutropenia is defined as a neutrophil count less than $1 \times 10^9 / L$ (1000/mm³).
- Mucositis (inflammation of the oral and gastrointestinal mucosa) has been associated with the development of a BSI in neutropenic patients.
- Therefore, a BSI that develops in a neutropenic patient with mucositis, a central line in-situ and no identified focus of infection, should not be classified as CLABSI unless there is compelling evidence that the central line is the source of the BSI e.g.
 - the line site is clinically infected, or a positive tip culture with the same organism
 - resolution of fever on removal of the catheter
 - opinion of a microbiologist / infectious diseases physician.

- The focus of HA-SABSI for neutropenic patients with clinical mucositis is considered the oral / gastrointestinal site and these will be categorised as 'other' (organ site focus).

4. Place of Acquisition

HA-SABSI are categorised according to healthcare settings where the infection was likely to have been acquired.

4.1 Inpatient

- An inpatient HA-SABSI event is associated with healthcare provided during a multi-day admission (overnight stay) to a HCF and meets either criterion A or B of the HA-SABSI definition. These include HITH patients.
- These events may occur during the multi-day admission or are detected on readmission following a multi-day admission e.g. HA-SABSI caused by a surgical site infection detected on readmission.

4.2 Non-inpatient

- A non-inpatient HA-SABSI event is associated with healthcare received as an outpatient and meets criterion B of the HA-SABSI definition (section 2.2).
- Non-inpatient HA-SABSI are related to the presence of indwelling medical devices, procedures, day surgery or treatments such as haemodialysis, apheresis, chemotherapy and IV therapy provided in outpatient setting.
- Outpatient settings include day wards, day of surgery units, outpatient clinics, hospital home healthcare services (not HITH) or emergency departments.

5. Healthcare Facility Attribution

- If the HA-SABSI event develops 48 hours or less of transfer from one HCF to another, it is attributed to the transferring HCF.
- When a patient is transferred between HCFs with a peripheral IV line in situ and subsequently develops a HA-SABSI, it is attributed :
 - to the transferring HCF if either the SABSI or an IV site infection occurs within 48 hours of transfer, unless there is compelling evidence to the contrary

- to the receiving hospital if the SABSI or an IV site infection occurs greater than 48 hours after transfer.
- A HA-SABSI associated with a central venous catheter or haemodialysis access device is attributed to the HCF or haemodialysis unit where the device was previously accessed prior to developing signs and symptoms of infection.
- If a surgical procedure or invasive instrumentation is the source of the HA-SABSI, it will be attributed to the hospital where the initial procedure was performed. If there have been recurrent procedures, the HA-SABSI will be attributed to the HCF where the most recent procedure or manipulation occurred.

6. Classification of *Staphylococcus aureus*

- *S.aureus* infections are commonly treated with beta-lactam antibiotics that include penicillins, cephalosporins, carbapenems and monobactams.
- Beta-lactam resistance is due to the production of a beta-lactamase enzyme by some strains of *S. aureus* and is detected in the laboratory using methicillin or oxacillin.
- *S.aureus* isolates are classified according to methicillin sensitivity:
 - methicillin-sensitive *S.aureus* (MSSA). *S.aureus* isolates that are sensitive to methicillin and therefore sensitive to flucloxacillin
methicillin-sensitive = flucloxacillin sensitive
 - methicillin-resistant *S.aureus* (MRSA). *S.aureus* isolates that are resistant to methicillin and therefore resistant to flucloxacillin
methicillin-resistant = flucloxacillin resistant

7. HISWA Dataset

7.1 Numerator data fields

The numerator data fields and information required to be entered into the HISWA database are described in Table 8.

Table 9 HA-SABSI numerator data fields and descriptors for HISWA database

Data field	Descriptor
Patient ID	Unique patient identifier
Date of birth	Patient date of birth
Patient postcode	Postcode of patients home address
Laboratory specimen number	Laboratory number
Specimen date	Date the specimen was obtained
Organism	MSSA MRSA MRSA and MSSA (isolated from the same specimen)
Acquisition	Inpatient Non-inpatient
Focus of infection	IV line related Procedure related Non-IV device related Other (organ site focus) Unknown / disseminated

7.2 Denominator data fields

The denominator that is utilised is bed-days. Both multi-day and same-day bed-days are collected to allow for different rate calculations.

7.2.1 Inclusions

HISWA bed-day data for HA-SABSI includes:

- Inpatient admissions to rehabilitation and aged care areas within an acute HCF.
- HITH.
- Outpatient and same-day admission wards / units e.g. haemodialysis units, day treatment wards, day surgery or procedure units.

7.2.1 Exclusions

HISWA bed-day data for HA-SABSI excludes:

- Psychiatric units.

- Unqualified newborns i.e. babies with the mother (who is the patient).
- Boarders, e.g. accommodation attached to hospitals for parents or carers.
- Residential Aged Care Reporting Establishments that are co-located with public hospitals within the Western Australia Country Health Services.

7.2.3 Outpatient clinic settings and emergency department

Patients who attend outpatient clinics or emergency departments without admission to hospital are not counted in bed-days. However, HA-SABSI events that occur as a result of healthcare received in these settings will be included in numerator data if criterion B of the HA-SABSI definition is met (section 2.2) e.g. a patient develops a SABSI following a facet joint injection given at an outpatient clinic of a hospital and there was *S.aureus* infection at the injection site.

8. Calculation of HA-SABSI Rates

8.1 Calculation of total HA-SABSI

- The HA-SABSI rate is expressed per 10,000 bed-days

$$\text{HA-SABSI rate} = \frac{\text{Inpatient and non-inpatient SABSI} \times 10,000}{\text{Number of bed-days (multi-day and same-day)}}$$

8.2 Calculation of inpatient only HA-SABSI

- The inpatient HA-SABSI rate is expressed per 10,000 bed-days (multi-day only)

$$\text{Inpatient SABSI rate} = \frac{\text{Number of inpatient SABSI} \times 10,000}{\text{Number of multi-day bed-days}}$$

9. References

1. Collignon P, Dreimanis D, Ferguson J, van Gessel H, Taylor P, Wilkinson I, Worth L. In: Cruickshank M and Ferguson J, editors. Reducing harm to patients from healthcare associated infection: the role of surveillance. Australian Commission on Safety and Quality in Healthcare; 2008. p.129-168.
2. The Australian Commission on Safety and Quality in Health Care (ACSQHC). Implementation Guide for Hospital Surveillance of *Staphylococcus aureus* Bloodstream Infection, Consultation Edition, Version 6, 2011.
3. Centers for Disease Control and Prevention (CDC), National Healthcare Safety Network (NHSN), Dialysis Event (DE), June 2011.
<http://www.cdc.gov/nhsn/PDFs/pscManual/8pscDialysisEventcurrent.pdf>
4. Collignon P, Wilkinson I, Gilbert M, Grayson L, and Whitby M. Health care-associated *Staphylococcus aureus* bloodstream infections: a clinical indicator for all hospitals. *Med J Aust.* 2006; 184: 404-06.
5. Centres for Disease Control and prevention (CDC), National Healthcare System Network (NHSN), Device-associated module, Central line associated bloodstream infection (CLABSI) event, June 2011.
http://www.cdc.gov/nhsn/PDFs/pscManual/4PSC_CLABScurrent.pdf
5. Horus TC, Andrus, M, Dudeck MA,. CDC/NHSN Surveillance Definition of healthcare associated infection and criteria for specific types of infections in the acute care setting. *Am J Infect Control* 2008;36:309-32.
<http://www.cdc.gov/ncidod/dhqp/pdf/nnis/NosInfDefinitions.pdf>

Module 7

Central Line-Associated Bloodstream Infection

Central Line-Associated Bloodstream Infection

Central lines, also referred to as central venous catheters (CVCs), serve a vital role in the management of critically ill patients. However, central line-associated bloodstream infections (CLABSI) significantly increase morbidity, mortality and contribute to increased healthcare costs. In the era of “zero tolerance”, CLABSI are viewed as preventable adverse events if evidence-based infection prevention practices are followed and integrated with monitoring and feedback of rates to key stakeholders.^{1,2} This approach should be taken by every healthcare facility (HCF) to achieve and maintain a zero CLABSI rate.

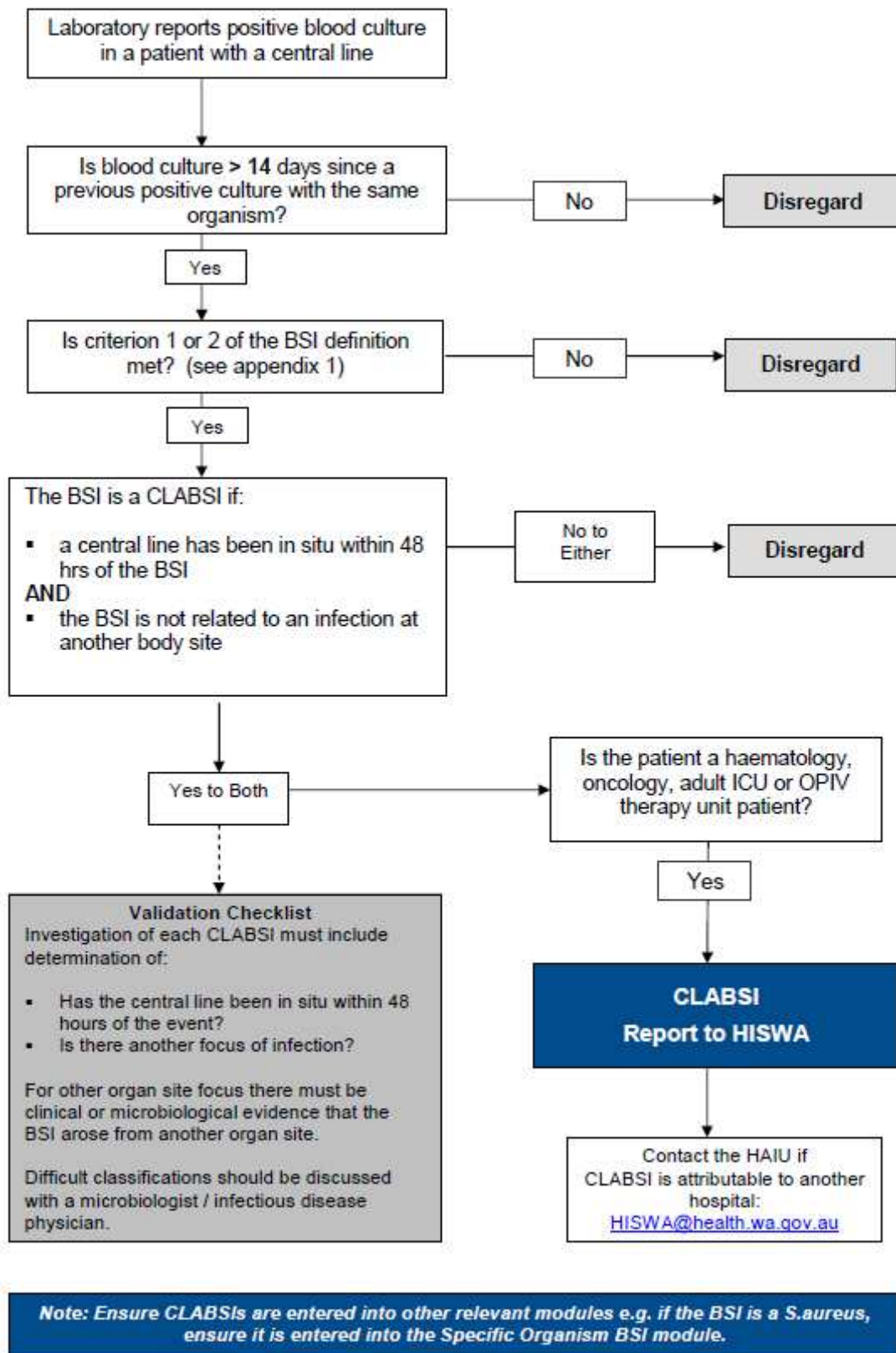
1. Methodology

For participating hospitals to make a valid comparison of their CLABSI rates the methodology must be similar and definitions consistently applied. Surveillance personnel are required to:

- Implement processes to ensure that all positive blood culture reports are received.
- Investigate all reported bloodstream infections (BSIs) to determine if the event is healthcare associated the attributable facility and if the patient has a CVC in situ.
- Liaise with key stakeholders, clinical microbiologist / infectious diseases physicians to assist with the classification of CLABSI events.
- The methodology to assist with classification of CLABSI is described in Figure 7. Refer also to Module 1 for an introduction to surveillance of HAIs.

Note: Surveillance personnel should take opportunities to promote best practice for blood culture collection to optimise BSI detection and classification of potential skin contaminants i.e. blood specimens drawn for culture should be obtained from 2 - 4 blood draws from separate venipuncture sites (within a few hours) and not through a vascular catheter.³ The top of the culture bottle must be disinfected prior to access and aseptic technique used during collection.

Figure 7 Flowchart for the surveillance of CLABSI



2. Definitions

2.1 Central line-associated bloodstream infection (CLABSI)

- First, the criteria for classification as a BSI event must be met (refer to Appendix 5).
- A CLABSI is a laboratory confirmed BSI in a patient where a central line has been in situ within the 48 hour period before the detection of the BSI, and is not related to an infection at another body site i.e. there is no other identifiable focus of infection.
- If a focus of infection other than the central line is considered the likely source of the BSI, there must be clinical or bacteriological evidence that the BSI arose from that site e.g. a culture from another site shows the same organism in the blood or there is clinical evidence of infection at another site if a culture was not obtained. To diagnose infection at a specific body site, application of the NHSN definitions for infection is required. ⁴
- Where both a central and peripheral line have been in situ within 48 hours of the BSI and there is no identifiable focus of infection, the event is classified as a CLABSI unless there is evidence of clinical infection at the peripheral site.
- There is no minimum period of time that the central line must be in place in order for the BSI to be considered central line-associated.
- A CLABSI due to the same organism (s) that occurs within 14 days of the original event is not counted as a new episode.

2.1.1 Neutropenia

- Neutropenia is defined as a neutrophil count less than $1 \times 10^9 / L$ (1000/mm³).
- Mucositis (inflammation of the oral and gastrointestinal mucosa) has been associated with the development of a BSI in neutropenic patients.
- Therefore, a BSI that develops in a neutropenic patient with mucositis, a central line in-situ and no identified focus of infection, should not be classified as CLABSI unless there is compelling evidence that the central line is the source of the BSI e.g.
 - the line site is clinically infected, or a positive tip culture with the same organism is isolated
 - resolution of fever on removal of the central line

- opinion of a microbiologist or infectious diseases physician
- The focus of BSI for neutropenic patients with clinical mucositis is designated as the oral / gastrointestinal site.

2.3 Central lines

- A central line is an intravascular catheter where the tip of the catheter terminates at or close to the heart or in one of the great vessels which is used for infusion, blood withdrawal or haemodynamic monitoring. The site of insertion or the type of catheter does not determine if a line qualifies as a central line.
- The following are considered great vessels for CLABSI surveillance: aorta, pulmonary artery, superior/inferior vena cava, brachiocephalic veins, internal jugular veins, subclavian veins, external iliac veins, common femoral veins.

2.3.1 Types of central line

- The main types of central lines are:
 - **non-tunnelled CVCs:** these are central lines placed in either the internal jugular or subclavian vein with the distal tip lying in the superior vena cava
 - **tunnelled CVCs:** the central line is tunnelled subcutaneously between the skin insertion site and the point where the catheter enters the blood vessel. Some have a cuff which sits in the subcutaneous tunnel and are referred to as cuffed catheters. These catheters are suitable for long term use
 - **peripherally inserted central catheters (PICCs):** these are central lines that are inserted percutaneously into peripheral veins e.g. basilica, brachial, cephalic. They are suitable for short, intermediate and long term use
 - **implanted ports:** these central lines are surgically inserted, placed under the skin and accessed with specific port needles. They are for long term use.
- An introducer is considered an intravascular catheter, and depending on the location of its tip, may be a central line.
- Central lines are sometimes described as permanent or temporary, however, HISWA does not stratify CLABSI by these terms.

2.3.2 Intravascular devices not included

- The following are not considered central lines:
 - pacemaker wires and other non-lumened devices inserted into central blood vessels or the heart, because fluids are not infused, pushed, nor withdrawn
 - femoral arterial catheters, extracorporeal membrane oxygenation (ECMO) and intra-aortic balloon pump devices (IABP).

2.3.3 Stratification by insertion site

- Central lines are stratified by the insertion site for reporting and analysis.
 - centrally-inserted (CI): the skin entry point is on the trunk of the patient
 - peripherally-inserted (PI): the line is inserted through a limb vein e.g. PICC.
- A higher risk of infection with CI lines is reported in some patient settings.⁵

3. Stratification by Unit

CLABSI events are stratified according to specific high risk specialty units.

3.1 Adult haematology, oncology or outpatient intravenous therapy (OPIV) units

- Patients managed by these units often have central lines in situ following discharge from hospital. Therefore all CLABSI events that occur either during a hospital admission or as an outpatient are reported.

3.2 Adult ICU

- A CLABSI event that occurs more than 48 hours after admission to an adult ICU or within 48 hours of discharge from ICU are reported as ICU-associated.
- High dependency unit, or step down unit, patients should only be included if they are co-located within the ICU and managed by the same medical and nursing staff.
- When paediatric patients are admitted to an adult ICU on an ad-hoc basis, they should be included in the surveillance.

4. Healthcare Facility Attribution

- If a CLABSI event develops within 48 hours of transfer of an inpatient from another facility it will be attributed to the transferring facility.
- If a CLABSI develops in a non-inpatient setting, it will be attributed to the facility where the device was last accessed prior to developing signs and symptoms of infection.

5. HISWA Dataset

5.1 Numerator data fields

The numerator data fields and information required to be entered into the HISWA database are described in Table 9.

Table 10 CLABSI numerator data fields and descriptors for HISWA database

Data field	Descriptor
Patient ID	Unique patient identifier
Date of birth	Patient date of birth
Lab specimen number	Lab number assigned to the specimen
Specimen date	Date the specimen was obtained
Type of central line	The type of central line that was inserted in the patient <ul style="list-style-type: none">▪ centrally-inserted (CI) central line▪ peripherally-inserted (PI) central line
Place acquired	Unit associated with management of the central line: <ul style="list-style-type: none">▪ ICU▪ haematology unit▪ oncology unit▪ outpatient IV therapy (OPIV) unit
Organism 1	The pathogenic organism isolated from a blood culture
Organism 2	The 2nd pathogenic organism isolated from a blood culture
Organism 3	The 3rd pathogenic organism isolated from a blood culture

5.2 Denominator data fields

The denominator that is utilised is central line-days and these are calculated either by tracking or tally methodologies.

5.2.1 Calculating central line-days in Haematology/Oncology/OPIV units

- A tracking method that counts central line days from the insertion date to the removal date, or to the end of reporting period, whichever comes first.
- If a line remains in situ at the end of a reporting period, start counting the same line anew from the first day of the next reporting period.
- Count central line days during hospital admissions and as outpatients.

5.2.2 Calculating central line days in ICU

- A tally method that counts the number of patients in ICU that have a CI line or a PI central line in situ at approximately the same time each day. Totals are tallied at the end of the month.
- Patients with two or more CI central lines in situ are counted as one CI central line.
- Patients with two or more PI central lines in situ are counted as one PI-central line.
- If there is a PI and CI line in situ, count the CI line only.
- Central line data obtained from electronic databases may be used if it is validated and the difference is not greater of less than 5% from manual counts.
- A central line tally tool template is available on the HAIU website.⁶

5.2.3 Sampling of central line days in ICU

- Sample-based estimates of central line days using the tally method have been shown to yield results that are valid for surveillance of CLABSI.⁷
- Central line days must be counted on a minimum of 3 non-consecutive days per week and a monthly calculation is extrapolated from the sample count (refer to Appendix 6). Do not count on public holidays.
- A central line day sampling tool and a excel format template which calculates line days from sampled data is available on the HAIU website.⁸

6. Calculation of Rates

6.1 CLABSI rate

- The CLABSI rate is expressed per 1,000 central line-days

$$\text{CLABSI rate} = \frac{\text{Number of CLABSI} \times 1000}{\text{Number of central line-days}}$$

6.2 Adult ICU central line utilisation ratio

- The central line utilisation ratio (CLUR) provides an indication of the degree to which ICU patients are exposed to the risk of CLABSI.
- It enables ICUs to determine whether their unit is comparable to other similar units in terms of CI and PI central line utilisation.
- The CLUR is expressed as a percentage

$$\text{CLUR} = \frac{\text{Number of line days} \times 100}{\text{Number of bed-days (multi and same-day bed-days)}}$$

7. References

1. Royer, T. Implementing a Better Bundle to Achieve and Sustain a Zero Central Line-Associated Bloodstream Infection Rate. *Journal of Infusion Nursing* 33 (6): 398-406 November/December 2010.
2. Provonost, P J, Goeschel CA, Watson S, Lubomski LH, Berenholtz, SM, Thompson, DA, Sinopoli D J et al. 'Sustaining reductions in catheter related bloodstream infections in Michigan intensive care units: observational study'. *BMJ online* 340:c309
3. Centres for Disease Control and prevention (CDC), National Healthcare System Network (NHSN), Device-associated module, Central line associated bloodstream infection (CLABSI) event, June 2011.
http://www.cdc.gov/nhsn/PDFs/pscManual/4PSC_CLABScurrent.pdf
4. Horus TC, Andrus, M, Dudeck MA,. CDC/NHSN Surveillance Definition of healthcare associated infection and criteria for specific types of infections in the acute care setting. *Am J Infect Control* 2008;36:309-32.
<http://www.cdc.gov/ncidod/dhqp/pdf/nnis/NosInfDefinitions.pdf>
5. Maki D, Kluger M, and Crnich, C. 'The Risk of Bloodstream Infection in Adults with Different Intravascular Devices: A Systemic Review of 200 Published Prospective Studies', *Mayo Clin Proc.* 2006;81(9):1159-1171.
6. Healthcare Associated Infection Unit (HAIU), Central Line Days – ICU Tally Tools. http://www.public.health.wa.gov.au/3/277/3/surveillance_hiswa.pm. See "Tools" section.
7. Klevens, R et al, 'Sampling for collection of central line-day denominators in surveillance of healthcare associated bloodstream infections' *Infection Control Hospital Epidemiology*, vol. 27, pp 338 – 342.

Appendix 5: CLABSI - Definition of a Bloodstream Infection (BSI)²

A BSI must meet one of the following criteria:

Criterion 1: recognised pathogen (all patients > 1 year)
<ul style="list-style-type: none"> ■ The patient has a recognised pathogen isolated from one or more blood cultures i.e. one or more positive blood cultures. <p>Comments</p> <ul style="list-style-type: none"> ▪ a 'recognised pathogen' does not include organisms considered common skin contaminants/commensals ▪ examples of recognised pathogens include: <i>Staphylococcus aureus</i>, <i>Escherichia coli</i>, <i>Klebsiella</i> spp, <i>Proteus</i> spp, <i>Salmonella</i> spp, <i>Candida</i> spp, <i>Pseudomonas</i> spp ▪ where mixed isolates are obtained, with one being a recognised pathogen, the common skin contaminant/commensal organism is to be disregarded.
Criterion 2: common skin contaminants/commensals (all patients > 1 year)
<ul style="list-style-type: none"> ■ The patient has at least one of the following signs and symptoms within 24 hours of a positive blood culture being collected: <ul style="list-style-type: none"> ▪ fever (>38°C); ▪ chills or rigors; or ▪ hypotension <p>AND</p> <ul style="list-style-type: none"> ▪ there is isolation of the same common skin contaminant/commensal from two or more blood cultures drawn on separate occasions within a 48 hour period. <p>Comments</p> <ul style="list-style-type: none"> ■ Common skin contaminant/commensal organisms include: <ul style="list-style-type: none"> ▪ diptheroids (<i>Corynebacterium</i> spp) ▪ coagulase-negative staphylococci ▪ <i>Micrococcus</i> and <i>Aerococcus</i> spp ▪ <i>Propionibacterium</i> spp ▪ <i>Bacillus</i> spp (not <i>B.anthraxis</i>) ▪ viridians group streptococci ▪ non-pathogenic Neisseria. ■ Refer also to the NHSN list of common skin contaminants/commensals: www.cdc.gov/nhsn/library.html ■ Examples of coagulase negative staphylococci include: <i>S.epidermidis</i>, <i>S.cohnii</i>, <i>S.simulans</i>, <i>S.lugdunensis</i>, <i>S.capitis</i>, <i>S.haemolyticus</i>, <i>S.warneri</i>, <i>S.schleiferi</i>, <i>S.saprophyticus</i>, <i>S.caprae</i>. ■ "Same" common skin contaminant/commensal organisms are one strain only, not mixed strains.

Note: Criterion 3 is not relevant to HISWA indicator i.e. patients aged one year or less.²

Appendix 5: CLABSI - Definition of a Bloodstream Infection (BSI) ² (continued)

Sameness of common skin contaminants/commensals

- Skin contaminants/commensals isolated from two or more blood cultures drawn on separate occasions are assumed to be the same organism if the skin contaminant/commensal is identified to the species level from one culture and a companion blood culture is identified with only a descriptive name i.e. genus level.
- Only genus and species identification are required to determine the sameness of organisms. If additional comparative methods are available at your facility (e.g. antibiograms), they should be used only in consultation with a microbiologist or infections diseases physician.
- The organism identified to the species level should be reported (see below).

Culture (species level)	Companion culture (genus level)	Report as
<i>Staphylococcus epidermidis</i>	Coagulase-negative staphylococci	<i>Staphylococcus epidermidis</i>
<i>Bacillus cereus</i>	<i>Bacillus</i> spp	<i>Bacillus cereus</i>
<i>Micrococcus luteus</i>	<i>Micrococcus</i> spp	<i>Micrococcus luteus</i>
<i>Streptococcus salivarius</i>	<i>Streptococcus viridans</i>	<i>Streptococcus salivarius</i>

Appendix 6 CLABSI Sampling of ICU Central Line Days (Worked Example)

Central line sampling tool		
Year: 2010	Month: August	
Day of Month	No. of patients with 1 or more	
	CI central lines	PI central lines
1	20	5
2		
3	22	5
4		
5	15	4
6		
7		
8	24	3
9		
10	25	3
11		
12	24	4
13		
14		
15	20	4
16		
17	22	4
18		
19	18	4
20		
21		
22	25	3
23		
24	22	3
25		
26	25	3
27		
28	22	3
29	24	3
30		
31	20	3
Total line day counts	328	54

Instructions for Line Day Data Collection

■ Patients with 1 or more central lines in situ on a day are counted only once as per these rules:

▶ if there are 2 or more CI central lines in situ count 1 CI central line

▶ if there are 2 or more PI central lines in situ count 1 PI central line

▶ if there is a PI and a CI central line in situ, count 1 CI central line only.

■ Counts of central line days will cease on patient discharge from ICU even if the lines remain in situ.

■ Count lines at approximately the same time each day.

■ Counts of central lines can be performed daily or by sampling, preferably on 3 or more non-consecutive days per week.

Calculations

Total number of central lines (a)	328	54
Number of days when counts (b)	15	15
Average number of central lines per day (c) = a/b	21.9	3.6
Number of days in the month (d)	31	31
Total central line days for month (e) = c x d	678	112

Module 8

Haemodialysis Access-Associated Bloodstream Infection

Haemodialysis Access-associated Bloodstream Infection

Haemodialysis places patients at high risk for healthcare associated infection for many reasons, including the immunocompromised state intrinsic to end stage renal disease, the high prevalence of diabetes, and numerous human, environmental and procedural factors. The invasiveness of the haemodialysis procedure, which requires vascular access, is an established risk factor for bloodstream infection (BSI). This is a serious complication from the presence of intravascular devices that can result in significant additional morbidity and mortality.¹

1. Methodology

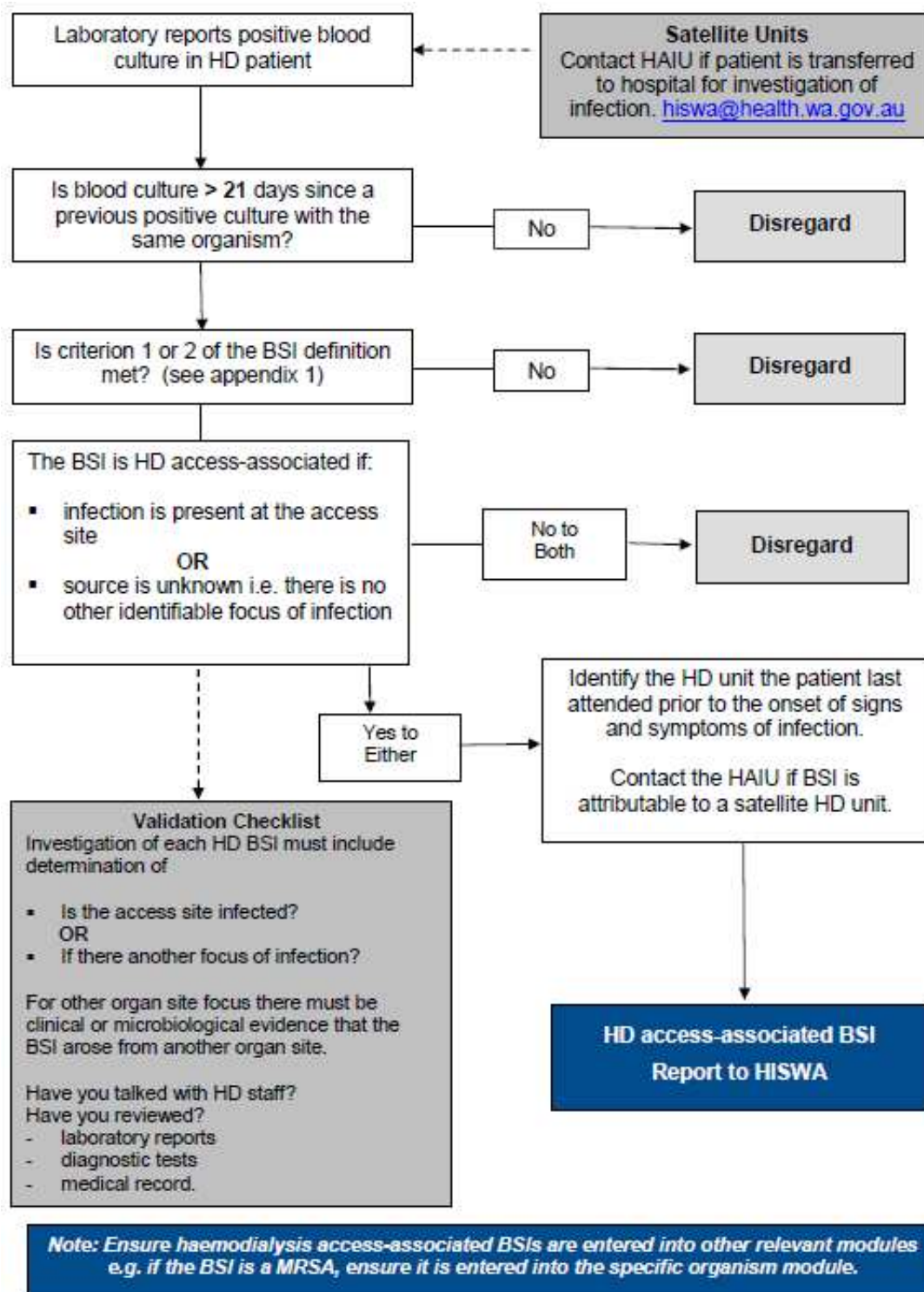
For haemodialysis (HD) units to make a valid comparison of access-associated BSI rates the methodology must be similar and definitions consistently applied.

Communication between hospital and satellite HD service providers is essential to ensure that access-associated BSI are identified and attributed to the correct unit.

- Hospital surveillance personnel are required to:
 - implement processes to ensure all positive blood culture reports from HD patients are received and investigated to determine if the BSI is access-associated and the attributable HD unit.
- Satellite HD personnel are required to:
 - contact the HAIU if a patient is transferred to a hospital directly from dialysis for investigation of infection and report if blood cultures or access site specimens were obtained prior to transfer.
- Methodology to assist with classification of HD access-associated BSI is described in Figure 8. Refer to Module 1 for an introduction to HAI surveillance.

Note: Surveillance personnel should take opportunities to promote best practice for blood culture collection to optimise BSI detection and classification of potential skin contaminants i.e. blood specimens drawn for culture should be obtained from 2 - 4 blood draws from separate venipuncture sites (within a few hours) and not through a vascular catheter.² The top of the culture bottle must be disinfected prior to access and aseptic technique used during collection.

Figure 8 Flowchart for surveillance of haemodialysis access-associated BSI



2. Definitions

2.1 HD vascular access

- Refers to any intravascular access utilised for the purpose for haemodialysis e.g. cuffed or non-cuffed central venous catheters, arterio-venous grafts or fistulae (refer to section 4).

2.1 HD access site infection

- A HD access site infection is defined as the presence of one or more of the following symptoms at the access site: purulent discharge, increased swelling or redness.²

2.2 Haemodialysis access-associated BSI

- First, the criteria for classification as a BSI must be met (refer Appendix 7).
- A HD access-associated BSI is defined as, a BSI in a HD patient where the source of the BSI is an access site infection, or is unknown i.e. there is no other identifiable focus of infection.²
 - if a HD access site infection is present the BSI is **always** classified as access- associated
 - where there is no access site infection, active investigation must be taken to determine the presence or absence of a focus of infection.
 - if a focus of infection other than the access device is considered the likely source of the BSI, there must be clinical or bacteriological evidence that the BSI arose from that site e.g. a culture from an infected site shows the same organism in the blood or there is clinical evidence of infection at another site but a culture was not obtained. To diagnose infection at a specific site, application of the NHSN definitions for infection is required.³

Example: HD patients often have chronic vascular wounds e.g. leg ulcers, which are colonised with micro-organisms and are not clinically infected. If the same organism is identified in a BSI, it is unlikely that the colonised wound is the source of the BSI. Rather, it is probable that these organisms have been transmitted to the access site resulting in a BSI or access site infection. Therefore, if there are no other sources of infection, these cases are classified as a HD BSI.

2.3 New access-associated BSI events

- There must be 21 days or more between positive blood cultures with the same organism for a HD access-associated BSI to be counted as a new event ² i.e. BSIs with the same organism that occur less than 21 days apart are considered ongoing infection and are not counted as a new event.

2.4 Attribution of BSI to a HD Unit

- An access-associated BSI will be attributed to the HD unit where the access device was last accessed prior to developing signs and symptoms of infection, unless there is compelling evidence to the contrary.

3. Stratification of Haemodialysis Access Types

- Haemodialysis access types are stratified for reporting and analysis and are listed in order of increasing risk of infection:
 - arteriovenous fistula (AVF) – the connection of an artery and a vein using the patient's own blood vessels
 - arteriovenous graft (AVG) – the connection of an artery and a vein using synthetic or native grafts (graft types are combined for reporting)
 - cuffed catheters - permanent or semi-permanent, tunnelled central lines
 - non-cuffed catheters - temporary, non-tunnelled central lines.

4. HISWA Dataset

4.1 Numerator data fields

The numerator data fields for HD access-associated BSI required to be entered into the HISWA database are described in Table 10.

Table 11 Haemodialysis access-associated BSI numerator data fields and descriptors for HISWA database

Data field	Descriptor
Patient ID	Unique patient identifier
Date of birth	Patient date of birth
Laboratory specimen number	Laboratory number assigned to the specimen
Specimen date	Date the specimen was obtained
Type of access	Type of access <ul style="list-style-type: none">▪ AVF▪ AVG (native & synthetic)▪ Non-cuffed catheter▪ Cuffed catheter
Organism 1	The pathogenic organism isolated from a blood culture
Organism 2	The 2nd pathogenic organism isolated from a blood culture
Organism 3	The 3 rd pathogenic organism isolated from a blood culture

4.2 Denominator data fields

- The denominator used is the number of patient-months, stratified by the type of vascular access type.
- The data fields required to be entered into the HISWA database each month are described in Table 11.

Table 12 Haemodialysis access-associated BSI denominator data fields for HISWA database

Access type	Number of patient-months
AVF	
AVG (synthetic and native combined)	
Cuffed catheter	
Non-cuffed catheter	

4.2.1 Denominator data collection

- The number of patients who received HD on the first two working days of each month, stratified by access type, are counted.
- A sample tool for denominator data collection in Satellite units only, is shown in Appendix 8. A blank collection tool is available from the HAIU website.⁴
- Each HD patient is only counted once each month on the specified collection date.
- If the patient has multiple vascular access types, count only the access type with the highest risk of infection, e.g. catheters have a higher risk than AVF or AVG. Refer to Section 4.
- Non-cuffed catheters are not included in counts from Satellite HD units, as utilisation in this setting is rare.

4.2.2 Inclusions

The following patients are included in the surveillance:

- Chronic adult HD patients
- Patients receiving HD as ‘visitors’ to another HD unit within Western Australia.

4.2.3 Exclusions

The following patients are excluded in the surveillance:

- Patients with acute renal failure requiring HD.
- HD patients who are short term visitors from outside WA, i.e. less than 1 week.

5. Calculation of Rates

- The haemodialysis access-associated BSI rate is expressed per 100 patient-months, stratified by access type, and can be interpreted as the proportion of patients with each access type who develop a BSI each month.
- $$\text{BSI rate} = \frac{\text{Number of access-associated BSI} \times 100}{\text{Number of patient-months}}$$

6. References

1. Association for Professionals in Infection Control and Epidemiology (APIC). Guide to the elimination of infections in haemodialysis. Washington: APIC; 2010.
2. Centers for Disease Control and Prevention (CDC), National Healthcare Safety Network (NHSN), Dialysis Event (DE), June 2011.
<http://www.cdc.gov/nhsn/PDFs/pscManual/8pscDialysisEventcurrent.pdf>
3. Horus TC, Andrus, M, Dudeck MA. CDC/NHSN Surveillance Definition of healthcare associated infection and criteria for specific types of infections in the acute care setting. Am J Infect Control 2008; 36:309-32.
<http://www.cdc.gov/ncidod/dhqp/pdf/nnis/NosInfDefinitions.pdf>
4. Department of Health, Western Australia, Healthcare Associated Infection Unit (HAIU) website, Denominator Data Collection Tool.
www.public.health.wa.gov.au/cproot/3010/2/Satellite%20Data%20Tool%20Website.pdf

Appendix 7 Haemodialysis Access-associated BSI - Definition of a Bloodstream Infection (BSI)

A BSI must meet one of the following criteria:

Criterion 1: recognised pathogen (all patients > 1 year)
<ul style="list-style-type: none"> ■ The patient has a recognised pathogen isolated from one or more blood cultures i.e. one or more positive blood cultures. <p>Comments</p> <ul style="list-style-type: none"> ▪ a 'recognised pathogen' does not include organisms considered common skin contaminants/commensals ▪ examples of recognised pathogens include: <i>Staphylococcus aureus</i>, <i>Escherichia coli</i>, <i>Klebsiella</i> spp, <i>Proteus</i> spp, <i>Salmonella</i> spp, <i>Candida</i> spp, <i>Pseudomonas</i> spp ▪ where mixed isolates are obtained, with one being a recognised pathogen, the common skin contaminant/commensal organism is to be disregarded.
Criterion 2: common skin contaminants/commensals (all patients > 1 year)
<ul style="list-style-type: none"> ■ The patient has at least one of the following signs and symptoms within 24 hours of a positive blood culture being collected: <ul style="list-style-type: none"> ▪ fever (>38°C); ▪ chills or rigors; or ▪ hypotension <p>AND</p> <ul style="list-style-type: none"> ▪ there is isolation of the same common skin contaminant/commensal from two or more blood cultures drawn on separate occasions within a 48 hour period. <p>Comments</p> <ul style="list-style-type: none"> ■ Common skin contaminant/commensal organisms include: <ul style="list-style-type: none"> ▪ diptheroids (<i>Corynebacterium</i> spp) ▪ coagulase-negative staphylococci ▪ <i>Micrococcus</i> and <i>Aerococcus</i> spp ▪ <i>Propionibacterium</i> spp ▪ <i>Bacillus</i> spp (not <i>B.anthraxis</i>) ▪ viridians group streptococci ▪ non-pathogenic Neisseria. ■ Refer also to the NHSN list of common skin contaminants/commensals: www.cdc.gov/nhsn/library.html ■ Examples of coagulase negative staphylococci include: <i>S.epidermidis</i>, <i>S.cohnii</i>, <i>S.simulans</i>, <i>S.lugdunensis</i>, <i>S.capitis</i>, <i>S.haemolyticus</i>, <i>S.warneri</i>, <i>S.schleiferi</i>, <i>S.saprophyticus</i>, <i>S.caprae</i>. ■ "Same" common skin contaminant/commensal organisms are one strain only, not mixed strains.

Note: Criterion 3 is not relevant to HISWA indicator i.e. patients aged one year or less.²

Appendix 7 Haemodialysis Access-associated BSI - Definition of a Bloodstream Infection (BSI) (continued)

Sameness of common skin contaminants/commensals

- Skin contaminants/commensals isolated from two or more blood cultures drawn on separate occasions are assumed to be the same organism if the skin contaminant/commensal is identified to the species level from one culture and a companion blood culture is identified with only a descriptive name i.e. genus level.
- Only genus and species identification are required to determine the sameness of organisms. If additional comparative methods are available at your facility (e.g. antibiograms), they should be used only in consultation with a microbiologist or infections diseases physician.
- The organism identified to the species level should be reported (see below).

Culture (species level)	Companion culture (genus level)	Report as
<i>Staphylococcus epidermidis</i>	Coagulase-negative staphylococci	<i>Staphylococcus epidermidis</i>
<i>Bacillus cereus</i>	<i>Bacillus</i> spp	<i>Bacillus cereus</i>
<i>Micrococcus luteus</i>	<i>Micrococcus</i> spp	<i>Micrococcus luteus</i>
<i>Streptococcus salivarius</i>	<i>Streptococcus viridans</i>	<i>Streptococcus salivarius</i>

Appendix 8 HISWA Sample Denominator Data Collection Tool for Satellite Haemodialysis Units

Month	No. of patients with a cuffed (tunneled) catheter, e.g. Hickman			No. of patients with an AV Fistula			No. of patients with an AV Graft (native & synthetic)			No. of patients with a non-cuffed (non-tunneled) catheter e.g. Vascath		
	Shift 1	Shift 2	Shift 3	Shift 1	Shift 2	Shift 3	Shift 1	Shift 2	Shift 3	Shift 1	Shift 2	Shift 3
Day/Date												
Monday Date	4	6	0	12	14	0	4	2	0	Do not count		
Tuesday Date	4	5	0	16	10	0	3	1	0	Do not count		
Totals for each shift / Add Mon & Tues for each shift	a 8	b 11	c 0	a 28	b 24	c 0	a 7	b 3	c 0	Not applicable		
Monthly access type total = add all shift totals	Total no of cuffed catheter patient-months = (a+b+c)= 19			Total no of AVF patient-months = (a+b+c) = 52			Total no of AVG patient-months = (a+b+c) = 10			Not applicable		
<p style="text-align: center;">Data Collection Instructions</p> <ul style="list-style-type: none"> ▪ Count one access type for each patient on the specified collection dates. ▪ If a patient has more than one access type, count the access type that is associated with the higher risk of infection, e.g. catheters are higher risk than AVF or AVG. ▪ Non-cuffed catheters are not counted. If a non-cuffed catheter is insitu, count the access type that is usually insitu for that patient. ▪ Count only chronic HD patients attending the unit. ▪ Count HD patients present on collection dates that are visitors from other WA HD units. ▪ Do not count short term visitors from outside WA i.e. less than 1 week. ▪ Enter data on HISWA database at the end of each month and finalise. 												
<p style="text-align: center;">Data Collection Dates</p> <p style="text-align: center;">See "Key Dates" on the HAIU website.</p>												

Module 9

Occupational Exposure

Occupational Exposure

An occupational exposure occurs when a healthcare worker (HCW) is at risk of acquiring a blood borne viral disease, such as hepatitis B, hepatitis C or human immunodeficiency virus, through exposure to an infected patient's blood or body fluids. Occupational exposures are increasingly regarded as preventable. In addition to the traditional approaches of adherence to standard precautions and education, the adoption of safety engineered medical devices (SEMDs) is an effective measure in reducing the risk of some exposures.¹

1. Methodology

- All HCFs should have incident monitoring systems in place for the reporting and management of occupational exposures.
- All occupational exposures where a risk assessment has been performed and follow-up is deemed necessary are to be reported to HISWA.
- The minimal data on each occupational exposure is reported to HISWA. This data is consistent with the requirements for the ACHS, however, hospitals should collect additional information on each exposure to ensure a risk management approach is undertaken to prevent occupational exposures.

2. Definitions

2.1 Occupational exposure

- An occupational exposure is an incident that occurs during the course of a person's paid or unpaid employment where there is a risk of acquiring a blood borne virus (BBV) following exposure to another person's blood, tissue, or other body fluids that are potentially infected with a BBV. Occupational exposures are classified as parenteral or non-parenteral.

2.1.1 Parenteral exposure

- Parenteral (or percutaneous) exposures include:
 - any incident where there is penetration of the skin or mucous membranes with a sharp object that may be contaminated with blood, tissue or other potentially infectious body fluids. Sharp objects include, but are not limited to, needles, scalpels, broken glass, broken capillary tubes, surgical instruments, wires, spicules of bone and teeth
 - penetration of a dirty / contaminated glove with a clean sharp object
 - human bites if the skin is broken.

2.1.2 Non-parenteral exposure

- Non-parenteral (or non-percutaneous) exposures include:
 - any incident where a persons mucous membranes (eyes, nose, mouth) or where non-intact skin (e.g. skin abrasions, open wounds or skin that is damaged with dermatitis) is exposed to blood, tissue or other potentially infectious body fluids.

2.2 Blood and body fluids

- *The following body fluids are considered a potential risk for BBV transmission:*
 - blood, serum, plasma and all tissue or body fluids visibly contaminated with blood
 - breast milk, pleural, amniotic, pericardial, peritoneal, synovial and cerebrospinal fluids, uterine / vaginal secretions or semen
 - laboratory specimens containing concentrated BBV .^{2,3}
- Faeces, nasal secretions, saliva, sputum, sweat, tears, urine, and vomitus carry a minimal risk of BBV infection unless they are visibly contaminated with blood or where there is no obvious blood but there is potential for blood contamination.^{2,3}
- There is no evidence that a BBV is transmitted by blood contamination of intact skin, by inhalation or by faecal-oral contamination.

3. Healthcare Worker Classification

3.1 Inclusions

All HCWs, students, contractors and volunteers are included in the surveillance and classified according to Table 12.

Table 13 Classification of HCW occupations and descriptors

HISWA Classification	Descriptor
Doctor	All medical officers, specialist clinicians, dentists, visiting and student doctors.
Nurse	All nurses - registered, enrolled; student; midwife; nursing assistant.
Allied Health	Clinical healthcare professions distinct from medicine, dentistry and nursing e.g. social work, dietetics, podiatry, pharmacy, audiology occupational therapy, physiotherapy, radiography, psychology, speech pathology and prosthetics and student allied health.
Patient Support Services	Other HCWs providing services that support clinical patient care e.g. patient care assistants, ward orderlies, phlebotomists, all technicians (laboratory, theatre, respiratory, orthopaedic, pathology and anaesthetic) and CSSD/TSSU staff.
Environmental Services	HCWs mainly involved in maintaining equipment and the environment e.g. housekeeping, catering, cleaning, laundry workers, waste management, plumbers, engineers, carpenters, maintenance, visiting contractors.
Other	Other employees / workers who do not fit into the above classifications e.g. administrative, clerical, information technology, chaplains, volunteers, transport, security.

3.2 Exclusions

The following occupational exposures are excluded from surveillance:

- Occupational exposures that are not officially reported and documented e.g. anecdotal reports.
- Visitors who are not employees e.g. patient visitors.

4. HISWA Dataset

4.1 Numerator data fields

The numerator data fields required to be entered into the HISWA database are described in Table 13.

Table 14 Occupational exposure data fields and descriptors for HISWA database

Data field	Descriptor
Identifier	HCW identifier - initials or DOB
Exposure date	The date of the occupational exposure incident
Occupation	The classification of the HCW reporting the occupational exposure as per Table 12
Type of exposure	<ul style="list-style-type: none">▪ parenteral▪ non-parenteral

4.1.1 Inclusions

- Report all occupational exposures where a risk assessment has been performed and follow-up is required.
- Report occupational exposures from staff working in all departments of a hospital, including:
 - day wards and units e.g. dialysis
 - emergency and outpatient departments
 - psychiatric hospitals and psychiatric units within hospitals
 - HITH
 - rehabilitation wards within hospitals

4.2 Denominator data fields

The denominator used is the total number of bed-days for the HCF (multi-day and same-day bed-days). Emergency department and outpatient clinic presentations are not included in bed-day data.

5. Calculation of Rates

- The occupational exposure rate is expressed per 100 bed-days.
- Occupational exposure rate = $\frac{\text{Number of exposure} \times 100}{\text{Total number of multi and same-day bed-days}}$

6. References

1. Jagger, J. Caring for healthcare workers: a global perspective. *Infect Control Hosp Epidemiol.* 2007; 28:1-4.
2. Centres for Disease Control and Prevention. Updated U.S. public health service guidelines for the management of occupational exposures to HBV, HCV, and HIV and recommendations for post exposure prophylaxis. 2001. MMWR / vol 50 / No. RR-11
3. Centres for Disease Control and Prevention. Updated U.S. public health service guidelines for the management of occupational exposures to HIV and recommendations for post exposure prophylaxis. 2005. MMWR / vol 54 / No.RR-9,

Module 10

Bed-Day and Separation Data

Bed-Day and Separation Data

The establishment of baseline HAI rates and ensuring ongoing monitoring is essential to reduce HAIs. In WA, public HCFs and private HCFs contracted to provide care for public patients, are required to submit data to HISWA for a suite of mandatory HAI surveillance indicators, some of which are also required under the National Healthcare Agreements 2009. Collection of HCF bed-day and separation data is necessary to calculate infection rates for these indicators and generate timely reports.

1. Requirements

- Administrators responsible for management of patient information data are required to provide monthly bed-day and separation data to surveillance personnel.
- Surveillance personnel are required to obtain and check bed-day and separation data and submit to HISWA within 30 days from the end of the reporting month.
- The mandatory indicators and reporting requirements are outlined in Module 1.

2. Definitions

For public hospitals, data is calculated using the Western Australian Health Management Information Group (WAHMIG) definitions as outlined below.

2.1 Bed-Days

- Bed-days are defined and calculated as multi-day and same-day.
- HITH patients are included in all bed-day data.

2.1.1 Multi-day bed-days

A designated multi-day bed that is occupied by an admitted patient at midnight on a specified day for a minimum of one night i.e. admitted to and separated from the HCF on different dates.

2.1.2 Same-day bed-days

A designated same-day bed /chair that is occupied by an admitted same-day patient i.e. is admitted to and separated from the HCF on the same date.

2.2 Separations

- Separations are defined as formal and statistical.
- Separations submitted to HISWA include both formal and statistical separations.
- HITH patients are included in all separation data.

2.2.1 Formal separations

This is the administrative process by which a HCF records the cessation of inpatient treatment and / or care and / or accommodation of a patient.

2.2.2 Statistical separations

This is the administrative process by which a HCF records the cessation of an episode of care for a patient within the one hospital stay i.e. there is a change of care type category (not change of ward, treatment or client status)

2.3 Newborns

Unqualified newborns are babies who do not require clinical care and are with the mother who is the admitted patient. A qualified newborn is a newborn who requires clinical care and becomes an admitted patient.

3. HISWA Data Fields

Data fields required to be entered into HISWA database are described in Table 14

Table 15 Monthly bed-day data required for HISWA

Month	ICU	Non-ICU	Psychiatric
Multi-day bed-days			
Same-day bed-days			
Multi-day separations (formal and statistical)			
Same-day separations (formal and statistical)			

4. HISWA Data Field Descriptors

HISWA data fields, inclusions and exclusions are described in Table 15.

Table 16 HISWA bed-day data fields

Multi-day bed-days	
ICU	Admitted patients with an overnight stay in ICU
Non-ICU	Admitted patients with overnight stay in the HCF, excluding ICU and psychiatric units.
Psychiatric	Admitted patients with overnight stay in a psychiatric unit.
Inclusions	HITH patients, qualified newborns.
Exclusions	Same-day admissions, unqualified newborns, boarders (accommodation attached to hospitals for carers/ mother-craft), WACHS Small Hospitals and residents of Residential Aged Care Reporting Establishments.
Multi-day separations (includes formal and statistical separations)	
ICU	Patients discharged or separated from ICU following an episode of care that includes an overnight stay.
Non-ICU	Patients discharged from all wards, excluding ICU and psychiatric units, following an episode of care that includes an overnight stay.
Psychiatric	Patients discharged from psychiatric units following an episode of care that includes an overnight stay.
Inclusions	HITH, qualified neonates.
Exclusions	Same-day admissions, unqualified newborns, boarders (accommodation attached to hospitals for carers/ mother-craft), WACHS Small Hospitals and residents of Residential Aged Care Reporting Establishments.
Same-day bed-days and separations (includes formal and statistical separations)	
ICU	Patients discharged from the HCF directly from ICU on the same-day of admission. This does not include transfers from the ICU to wards.
Non-ICU	Patients discharged from the HCF, excluding ICU and psychiatric units, on the same day of admission.
Psychiatric	Patients discharged from psychiatric units on the same day of admission.
Inclusions	HITH, same-day patients e.g. dialysis units, day-surgery, qualified newborns
Exclusions	Overnight stay patients, unqualified newborns, boarders (accommodation attached to hospitals for boarders/carers/mother-craft), WACHS Small Hospitals and residents of Residential Aged Care Reporting Establishments.

Note: contracted patients i.e. activity funded by other hospitals will be counted in the denominator data of the contracted hospital only. Patients undergoing organ procurement will not to be included in any denominator data.

5. National Surveillance Data

- Patient-days are the standard denominator used for national reporting of HAI surveillance data. Denominator data for all public HCFs in WA will be obtained from the state information management system as required.
- Patient-days are calculated by counting the total patient-days of those patients separated during the specified period, including those admitted before the specified period. Patient-days of those patients admitted during the specified period who did not separate until the following reporting period are not counted until then.¹
- Occupied bed-days or bed-days is a term commonly used to express a similar concept to patient-days. However, there is no national standard for calculating occupied bed-days.

5.1 Variations between HISWA and National Data

- HISWA uses bed-days to calculate rates. The yearly variance between calculations of patient-days and occupied bed-days is reported to be less than one percent, however the monthly variation can be quite significant for smaller hospitals.¹
- For the *Clostridium difficile* infection indicator, children less than 2 years of age are excluded from patient-day counts but are included in HISWA bed-day counts.

6. References

1. The Australian Commission on Safety and Quality in Health Care (ACSQHC). Data Set Specification. Surveillance of Healthcare Associated Infections: *Staphylococcus aureus* Bacteraemia and *Clostridium difficile* Infection. Version 3, July/August 2010.
www.health.gov.au/internet/safety/publishing.nsf/Content/PriorityProgram-03

Abbreviations and Acronyms

ACCESS	Australian Collaborating Centre for Enterococcus and Staphylococcus Species
ACHS	Australian Council for Healthcare Standards
ACSQHC	Australian Commission on Safety and Quality in Healthcare
AICA	Australian Infection Control Association
ASA	American Society of Anaesthesiology
AV	arteriovenous
AVF	arteriovenous fistula
AVG	arteriovenous graft
BSI	bloodstream infection
CDC	Centres for Disease Control and Prevention
CDCD	Communicable Disease Control Directorate
CI	confidence interval
CI central line	centrally-inserted central line
CI-CLABSI	centrally-inserted central line-associated bloodstream infection
CLABSI	central line-associated bloodstream infection
CLUR	central line utilisation ratio
CVC	central venous catheter
HA-SABSI	healthcare associated <i>Staphylococcus aureus</i> bloodstream infection
HAI	healthcare associated infection
HAIU	Healthcare Associated Infection Unit
HISWA	Healthcare Infection Surveillance Western Australia
HITH	hospital-in-the-home
ICD-10-AM	International Classification of Diseases 10 th Revision Australian Modification
ICU	intensive care unit
IV	intravascular
IVD	intravascular device
MRSA	methicillin-resistant <i>Staphylococcus aureus</i>
MSSA	methicillin-sensitive <i>Staphylococcus aureus</i>
NHSN	National Healthcare Safety Network
OPIV	outpatient intravenous therapy
PDS	post discharge surveillance
PI central line	peripherally-inserted central line
PI-CLABSI	peripherally inserted central line-associated bloodstream infection
<i>S.aureus</i>	<i>Staphylococcus aureus</i>
SABSI	<i>Staphylococcus aureus</i> bloodstream infection
SEMD	safety engineered medical device
SSI	surgical site infection
TMS	theatre management system
VICNISS	Victorian Department of Health Nosocomial Infection Surveillance System
WA	Western Australia
WACHS	Western Australia Country Health Service

Notes

Notes

Notes



Delivering a **Healthy WA**

