Healthcare Associated Infection (HAI) Clinical Indicator Manual

Version 3.3

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NSW GOVERNMENT

CLINICAL EXCELLENCE COMMISSION

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Revision History (most recent updates are highlighted in yellow)		
Version	**Date**	**Changes**
3.3	September 2021	Glossary of terms added. Introduction – Data collection and governance section added. Section 2 - *Staphylococcus aureus* Blood Stream Infection (SAB). Specifies follow up for 90 days applies to deep incisional/organ space infections related to a surgically implanted device. Section 3 – MRSA acquisition in ICU. Updated text in Methodology section to increase clarity. Section 4 - Vancomycin-resistant Enterococcal Blood Stream Infections. Specifies follow up for 90 days applies to deep incisional/organ space infections related to a surgically implanted device. Inclusion of examples of data collection for this clinical indicator. Section 5 - Carbapenemase-producing *Enterobacterales* blood stream infection. Specifies follow up for 90 days applies to deep incisional/organ space infections related to a surgically implanted device. Inclusion of examples of data collection for this clinical indicator. Clarification of CPE acquisition. Inclusion of CPE- BSI Validation Check List. Section 7 – Surgical Site Infection. Added definitions of elective and emergency surgery to the glossary and text in this section. Exclusion of hemiarthoplasty for fractured neck of femur (Austin Moore arthroplasty). Appendix C with ICD-10 codes deleted to avoid inclusion of outdated information as these codes are updated regularly.
3.2	December 2020	Section 6 - updated criterion for elevated white cell count for definition of severe C. difficile and tool to assess severity Section 7 - updated definition of superficial incisional SSI to include criterion regarding surgeon diagnosis of infection. Updated checklist for superficial incisional SSI
3.1	October 2020	Section 6.2 Pg. 36 - Surveillance for and definition of severe *C. difficile*. Section 6.5 Pg. 38 - Tool to Assess Severity of *C. difficile* Infection. Section 7 Pg. 46-47 - Text has been modified. Separates primary and revisions and makes reporting of both mandatory, not optional. Pg. 47-49 - 4 New clinical indicators added to reflect the above. Pg. 52 - Modification to validation check list. Pg. 53 - Flow chart for joint infection surveillance inserted. Pg. 69 - Removed the ICD-10-AM code for Austin Moore procedures.

Contents

Acronyms and abbreviations

CEC	Clinical Excellence Commission
CI	Clinical Indicator
CGU	Clinical Governance Unit
CLABSI	Central Line Associated Blood Stream Infection
CDI	*Clostridioides difficile* infection
CPE	Carbapenemase-producing *Enterobacterales*
HAI	Healthcare Associated Infection
ICU	Intensive care units
IPAC	Infection Prevention and Control
LHD	Local Health District
MRSA	Methicillin-resistant *Staphylococcus aureus*
NSW	New South Wales
QIDS	Quality Improvement Data System
SABSI	*Staphylococcus aureus* bloodstream infection
SHN	Specialty Health Networks
VRE	Vancomycin-resistant Enterococci

Glossary

Elective surgery	Surgery that is deemed necessary by the treating clinician, but which can be delayed for at least 24 hours. These patients are generally booked onto the elective surgery waiting list. Elective surgery patients may also be described as planned or booked patients.
Emergency surgery	A surgical intervention to treat acute trauma or illness whereby the patients' clinical acuity is assessed by the clinician as requiring surgery within 24 hours. The patient may require immediate surgery, or present for surgery at a later time following this assessment. Emergency surgery patients may also be described as unplanned, unbooked, acute or urgent patients.
Episode	The occurrence of a positive blood culture for an organism. For surveillance purposes, only the first isolate of the organism per patient is counted, unless at least 14 days has passed without a positive culture, after which a subsequent episode is recorded.
Healthcare facility attribution	If a blood stream infection develops within 48 hours of transfer from one healthcare facility to another healthcare facility, it is attributable to the transferring (originating) facility. If a blood stream infection is related to a surgical site (operation within the past 30 days or 90 days for deep incisional/organ space infections) or to invasive instrumentation, it is attributable to the facility where the procedure or instrumentation occurred. If a blood stream infection is related to a peripheral intravenous cannula (PIVC) or other intravascular device inserted by the NSW Ambulance Service, it is to be entered into the Incident Information Management System under the NSW Ambulance Service.

Introduction

This New South Wales (NSW) Healthcare Associated Infection (HAI) Clinical Indicator Manual outlines the minimum level of HAI surveillance that NSW public healthcare organisations (PHO) providing acute care services are to undertake. The Manual was developed in consultation with NSW local health districts (LHDs) and specialty health networks (SHNs) to provide healthcare facilities with a framework to conduct HAI surveillance activities in key areas of increased risk.

The goals of the mandatory NSW HAI Surveillance are to:

- Ensure appropriate clinical indicators are collected and reported in keeping with national and international recommendations
- Ensure all NSW public healthcare organisations use standardised definitions and methodology
- Ensure the data is valid and robust.

NSW HAI Clinical Indicator data are regularly reviewed, and cumulative data are available to NSW PHOs via Quality Improvement Data System (QIDS) on the Clinical Excellence Commission (CEC) website.

All facilities are expected to review their own data to identify issues and act on these in a timely manner.

The NSW HAI Clinical Indicator Manual contains the technical information to allow standardised definitions and methodology for surveillance personnel who are collecting and reporting data to the NSW Ministry of Health.

Practices recommended in this manual are based on the expectation that PHOs have at least basic infection prevention and control (IPAC) systems in place and adequate resources for surveillance, data collection, analysis and reporting.

Data collection and Governance

Surveillance information collected at the LHD is signed off by the Director of Clinical Governance Unit (CGU) each month. This is submitted to the NSW Ministry of Health where a validation process is performed. The data is then returned to the GCU for a final check and inclusion of any events occurring during the three months follow up period where appropriate (such as deep surgical site infections). Once finalised it is returned to the Ministry for data entry into Quality Improvement Data System (QIDS) and/or for National Reporting to the Australian Institute for Health and Welfare (AIHW).

The following mandatory indicators are reported nationally (health care associated) *Staphylococcus aureus* blood stream infection (SABSI), Central Line Associated Blood Stream Infection (CLABSI) and *Clostridioides difficile* infection (CDI). The remainder of the indicators are for NSW Health reporting only.

Surveillance Definition

Surveillance is the systematic collection, management, analysis, interpretation and communication of data for the use in planning, implementation and evaluation of healthcare practice. The primary purpose of surveillance in infection prevention and control is to monitor for sentinel events, and to monitor HAIs to report to the relevant stakeholders including Infection Prevention and Control services. Control of disease depends on first defining its epidemiology including incidence, risk factors, distribution and disease burden.

Rationale for Surveillance

Surveillance of HAIs aims to provide reliable objective data on which to base infection prevention and control interventions. Surveillance data allows determination of whether a problem exists; it identifies the size of the problem and allows observation of trends over time. A sound surveillance system helps to:

- Determine baseline rates of HAIs
- Detect changes in rates or distribution of HAIs
- Drive investigation of significant increases in HAI rates
- Measure the effectiveness of infection prevention and control activities
- Monitor compliance with established infection prevention and control practices.

Elements of Surveillance

There are four key elements of surveillance, summarised below. They are:

1. **Detect and monitor**

   A well-functioning surveillance system should be able to establish baseline rates for HAI in a healthcare facility and therefore be able to detect clusters or outbreaks.

2. **Identify risk factors for infection**

   Surveillance data can be used to identify patients or practices associated with a higher risk of infection.

3. **Evaluate interventions**

   The collection of longitudinal data before and after an intervention may be used to investigate whether preventive measures were successful. Data collected through surveillance can also identify areas where infection prevention and control measures were ineffective.

4. **Provide information to inform and educate**

   Surveillance systems require the information gathered to be analysed and distributed to relevant staff within the healthcare facility. Local evidence of the effectiveness of preventative interventions can serve to reinforce good practice.

Selection of Surveillance Indicators

This manual outlines the minimum level of HAI surveillance that an NSW PHO providing inpatient care is to undertake. In addition to these indicators, IPAC teams must identify other surveillance activities that will meet their healthcare organisation’s priorities and objectives,

in consultation with local stakeholders, and make best use of available resources. This is likely to include targeted surveillance for specific HAIs, organisms, medical/surgical procedures and infections in high-risk patient populations rather than facility-wide surveillance of all infections.

Criteria for choice of specific HAI surveillance indicators include:

- Those that are widely applicable across district health services and/or healthcare organisations
- Those that are easy to measure and meaningful
- Those indicative of serious morbidity and/or mortality
- Those that have validated definitions
- Those that can be reduced by appropriate intervention.

Surveillance Methodology

The value of surveillance is enhanced by providing high quality comparative data. For data to be meaningful, the methodology must be similar. This includes case finding activities, validation of surveillance definitions and periodic review of surveillance activities.

Definitions

Standardised surveillance definitions are essential for successful data collection and analysis. Compared with the 2008 manual, this manual contains two new indicators, the expansion of existing indicators and the deletion of one indicator.

The definitions used in this manual are consistent with those of the US National Healthcare Surveillance Network (NHSN) of the Centers for Disease Control and Prevention (CDC), the Australian Commission on Safety and Quality in Health Care (ACSQHC), the VICNISS Healthcare Associated Infection Surveillance Coordinating Centre, The Australian Council for Healthcare Standards (ACHS) and Healthcare Associated Infection Surveillance Western Australia (HISWA).

Active case finding

Active case finding processes are required to identify patients who develop HAIs from the time of their admission until discharge, and/or on readmission with infection. The following principles and practices associated with active case finding are recommended:

a) Active case finding processes need to be done at least several times a week.

b) Processes must be in place to ensure all relevant laboratory results are available in a timely manner – e.g. all SABSI results are available to IPAC or their delegate.

c) Any laboratory result relevant to a surveillance indicator should be investigated and interpreted in conjunction with information from clinical sources.

d) Each case finding method has both value and limitations therefore a combination of case finding methods is recommended. Example methods of active case finding are given below:

    - Liaison with ward or clinical staff and regular ward rounds

- Review of culture reports from microbiology department and regular review of incident notification system reports
- Use of patient information systems such as surgical lists for relevant operations to identify denominator data
- Review of readmission data reports
- Review of theatre data management systems
- Total chart review for clinical data such as medical records, imaging reports, medication charts, wound reports, microbiology reports
- Review of targeted administration and clinical coding reports
- Review of targeted pharmacy dispensing records
- Analysis of laboratory reports for samples of interest (e.g. joint fluid samples; wound swabs)
- Analysis of laboratory reports for pathogens of interest (e.g. methicillin-resistant *S. aureus (*MRSA), Vancomycin-resistant *enterococcus* (VRE).

Passive case finding

Passive case finding relies on health workers reporting infections of interest to IPAC or by using ICD-10 coding. This requires the least amount of time but is also the least effective way to identity infections. Passive surveillance systems do not usually provide high quality or timely data and they may not be used as the only method of detecting HAIs.

Denominator data

Patient-based surveillance requires identification of all eligible patients for inclusion in the surveillance indicator. Denominators vary for different indicators and include occupied bed days; patient days; central-line and Intensive care units (ICU) bed days, or number of surgical procedures. For example, in a reporting period:

- All patients undergoing specific surgical operation(s) must be counted in the denominator for surgical site infections (SSI) in the reporting period
- All patients in ICUs must have their central line days counted for CLABSI surveillance in the reporting period.

Data quality

The quality of the data is influenced by the performance of the screening and diagnostic test for the health-related event, the clarity of hardcopy or electronic surveillance forms, the quality of training and supervision of persons who complete these surveillance forms, and the care exercised in data management. Computer-based forms with cross-checking of information yield more accurate results than paper-based systems with no controls. Numerator, denominator and rate data should undergo regular checks for data quality.

Data validation

All NSW PHO contributing to surveillance need to have internal validation processes in place to ensure the data they are submitting is reliable and valid. Hospitals should periodically

review and validate their internal processes to ensure they are effectively collecting the required data, preferably by an independent audit to assess the following;

- Ensure that HAI definitions are met
- Ensure communication has occurred with the relevant stakeholders (e.g. SSI discussed with relevant surgical teams)
- The availability of cross checking of patients admitted for procedures with infection notifications
- The availability of cross checking of laboratory reports against relevant cases being investigated (e.g. all positive joint fluid samples) to detect potential missing cases.
- Examine other case finding methods to look for missed cases (e.g. patient letters, check of readmission records, admission to home antibiotic programs, Infectious Diseases consultation records)

The Mandatory Indicators for Surveillance of HAIs in NSW

1. Centrally inserted CLASI in adult and paediatric intensive care units
2. Peripherally inserted CLASI in adult and paediatric intensive care units
3. *Staphylococcus aureus* bloodstream (SABSI) infection
4. Acquisition of methicillin-resistant *S. aureus* in adult and paediatric intensive care units
5. Vancomycin-resistant enterococcal blood stream infection (VRE-BSI) (*Enterococcus faecium* or *Enterococcus faecalis* only)
6. Carbapenemase-producing *Enterobacterales* blood stream infection (CPE-BSI)
7. Carbapenemase-producing *Enterobacterales* (CPE*)* healthcare acquired screening and/or clinical isolates
8. *Clostridioides difficile* infection (CDI)
9. Surgical site infections (SSI) following cardiac surgery
10. Surgical site infections (SSI) following knee arthroplasty
11. Surgical site infections (SSI) following hip arthroplasty

Deleted indicator

Acquisition of meropenem-resistant *Acinetobacter baumannii* (MRAB) in intensive care units is no longer a mandatory HAI clinical indicator, but individual units may continue to collect this data if locally relevant.

Reporting Requirements

NSW Health Clinical Indicators (CI) - HAI	Mandatory	Frequency of reporting	Requirements for data submission
CLABSI in Intensive Care Units; centrally and peripherally inserted lines	YES	MONTHLY	Within 30 days of the end of the reporting month[1]
SABSI	YES		
Intravascular access device associated SABSI	NO		
MRSA acquisition in Intensive Care Units	YES		
VRE-BSI	YES		
VRE-BSI *vanA* and *vanB*	NO		
CPE-BSI	YES		
CPE -screening and/or clinical isolates (HAI)	YES		
CDI	YES		
Severe CDI	NO		
SSI following elective and emergency cardiac surgery (deep infections up to 90 days after surgery)	YES		Within 45 days of the end of the reporting month
SSI following elective and emergency cardiac surgery (superficial infections up to 30 days after surgery)	YES		
SSI following elective and emergency hip or knee arthroplasty including revision (deep infections up to 90 days after the procedure)	YES		
SSI following elective and emergency hip or knee arthroplasty including revision (superficial infections up to 30 days after surgery)	YES		

This manual is to be used in conjunction with the following: NSW Health Performance Framework and Performance Agreement.

Data analysis

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

Reports from these clinical indicators are reported via QIDS on the CEC website.

As some of the indicators have changed, reports will include data that will allow comparison with previous reports. For example, the inclusion of emergency surgery for SSI will be included in the overall report, but data for non-emergency procedures will also be reported and available for comparison.

[1] HCFs are to submit their data to the NSW Clinical Excellence Commission within 45 days of the close of the reporting period – e.g. March data is due by 15 May.

Further Reading

- Australian Commission on Safety and Quality in Health Care HAI Surveillance 2019
- European Centre for Disease Prevention and Control - Healthcare-associated Infections Surveillance Network 2019
- Best Practices for Surveillance of Health Care-Associated Infections: Public Health Ontario, 2014

SECTION 1

Central Line Associated Blood Stream Infections in ICU (CLABSI)

Clinical Indicator (CI 1)

CI 1.1 **Rate of adult ICU-associated centrally inserted CLABSIs**		
Numerator	The total number of ICU-associated centrally inserted CLABSIs for the reporting month	x 1000
Denominator	The total number of central line days in adult ICU for the reporting month	
CI 1.2 **Rate of paediatric ICU-associated centrally inserted (CI) CLABSIs**		
Numerator	The total number of ICU-associated centrally inserted CLABSIs for the reporting month	x 1000
Denominator	The total number of central line days in paediatric ICU for the reporting month	
CI 1.3 **Rate of adult ICU-associated peripherally inserted (PI) CLABSIs**		
Numerator	The total number of ICU-associated peripherally inserted CLABSIs for the reporting month	x 1000
Denominator	The number of peripherally inserted -central line days in adult ICU for the reporting month	
CI 1.4 **Rate of paediatric ICU-associated peripherally inserted (PI) CLABSIs**		
Numerator	The total number of ICU-associated peripherally inserted CLABSIs for the reporting month	x 1000
Denominator	The number of peripherally inserted -central line days in paediatric ICU for the reporting month	

1.1 Rationale

CLABSI in ICU have declined by more than 60% since the implementation of a central line insertion bundle in 2007 across NSW ICUs.

The majority of CLABSI events are preventable through the embedding of prevention and reduction strategies into routine clinical practice.

Timely investigation of significantly higher than expected numbers of events or rates of infection may identify system issues relating to preventative factors.

Practice point: CLABSI include infections that occur in central lines inserted centrally and peripherally.

1.2 Methodology

NSW definitions for CLABSI are based on the definitions of both CDC/NHSN and ACSQHC.

In order to have meaningful data surveillance personnel are required to:

- Implement processes to make sure all positive blood culture reports are received (or are available from relevant laboratories)
- Investigate all reported blood stream infections in ICU patients with a central line to determine if the definition criteria for CLABSI are also met
- Liaise with key stakeholders to ensure surveillance criteria are met
- Periodically review cases to ensure data validation – see an example validation tool in section 1.5 - CLABSI Validation Check List - Adults

NOTE: this last point is making sure there is a process for validating the events. This is for internal and external accreditation and ensures surveillance is robust.

Practice point: All CLABSI events should be investigated to assess if there were preventable causes.

Case definition

A CLABSI is a laboratory-confirmed blood stream infection (BSI) in a patient where the central line was in place for > 2 calendar days (48hrs) on the date of event, with the day of device placement being Day 1.

and

The central line was in place on the date of event or the day before. If the central line was in place for > 2 calendar days (48 hours) and then removed, the CLABSI criteria must be fully met on the day of discontinuation or the next day.

Because some positive blood cultures represent contamination, careful attention to the surveillance definition is required to ensure only “true infections” are reported. For more detail about the identification of potential contaminant bacterial species, please see Appendix A**.** Definition of a Laboratory Confirmed Blood Stream Infection

Criteria required to meet the definition

The blood stream infection **must** meet one of the following criteria:

Criterion 1
Patient has a recognised bacterial or fungal pathogen cultured from one or more blood cultures
and
The organism cultured from blood is not related to an infection at another site

OR

Criterion 2
Patient has at least one of the following signs or symptoms: fever (>38^{0}C), chills or hypotension
and
Signs and symptoms and positive laboratory results are not related to an infection at another site
and
A potential contaminant bacteria species is cultured from two or more blood cultures drawn on separate occasions within 48 hours

OR

Criterion 3 (for a patient < 1 year of age where criteria 1 or 2 are not met)
At least one of the following signs or symptoms: fever (>38^{0}C core), hypothermia (<36^{0}C core), apnoea or bradycardia
and
Signs and symptoms and positive laboratory results are not related to an infection at another site
and
A potential contaminant organism (e.g. coagulase negative staphylococcus) is cultured from two or more blood cultures drawn on separate occasions within 48 hours

AND

Criterion elements must occur within a 24-hour timeframe of the positive blood culture; for example, positive blood cultures and fever.

Central lines

A central line is defined as an intravascular catheter where the tip of the catheter terminates at or close to the heart or in one of the great vessels. The line may be 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.

Types of central line

The main types of central lines are:

- **Non-tunnelled central venous catheters (CVCs)**: these are central lines placed in either the internal jugular or subclavian vein or femoral 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.
- **Peripherally inserted central catheters** (PICCs): these are central lines that are inserted into peripheral veins but with the distal tip lying in the superior vena cava e.g. insertion sites basilic, brachial or cephalic veins.
- **Implanted ports**: these central lines are surgically inserted, placed under the skin and accessed with specific port needles.

For further information please refer to NSW Health Policy Directive**,** Intravascular Access Devices (IVAD) – Infection Prevention and Control.

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 or withdrawn
- Arterial catheters – either femoral or radial
- Extracorporeal membrane oxygenation (ECMO) catheters
- Haemodialysis reliable outflow (HeRO) dialysis catheters
- Intra-aortic balloon pump (IABP) devices.

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 (usually brachiocephalic)

1.3 Additional Notes

Determining location of attribution

The CLABSI will be attributed to the ICU if the following are present (and meet the definitions above):

- The line was inserted in ICU and the CLABSI occurs while the patient is an inpatient in the same ICU
- The line was inserted in ICU and the CLABSI meets the surveillance criteria within 48 hours[1] of transfer to another unit or facility (and is attributed to the facility where the central line was inserted)
- The line was inserted in another site (e.g. the Emergency Department, Operating Theatre), the CLABSI meets the surveillance criteria, and the patient has been an ICU inpatient for more than 48 hours.

Site attribution

If a patient with more than one line (e.g. a peripheral and a central line) develops a blood stream infection that can clearly be attributed to the peripheral line (e.g. pus at the insertion site of the peripheral line and the same pathogen from pus and blood), it should not be reported as a CLABSI.

If the patient has more than one **central line**, only one line is counted.

Patients suspected or known to have accessed their own central lines that may have contributed to the CLABSI are included in CLABSI surveillance. A facility must implement prevention efforts to protect the line.

If a patient has a permanent implanted catheter and no other central line is present, they are included if the port is used for intravenous access. The day of first accessing the port is

[1] For the purpose of this Manual 48 hours is considered the same as two calendar days.

counted as Day 1. Surveillance is continued until one day after the port is de-accessed, the port is removed or the patient is discharged, whichever comes first.

CLABSI recurring within 14 days

If the CLABSI criteria are met again within 14 days and the same organism(s) is identified, a clinical review should be undertaken to determine if the CLABSI is the same event or a new event. The clinical review should include consultation with a clinical microbiologist or infectious diseases physician and consider the following: completion of antimicrobial therapy, resolution of signs and symptoms with negative blood cultures, and central line change. If the original infection has resolved, and a new central line has been inserted and the CLABSI criteria are met again, a new CLABSI event should be reported.

Date of the event

The date of the CLABSI event is the date when the first positive blood culture was collected. For potential contaminant organisms, this is the date the first potential contaminant blood culture was collected.

1.4 NSW Data Set

Numerator fields

- Centrally inserted (CI) or Peripherally inserted (PI) central line associated blood stream infection
- Adult and paediatric patients.

Denominator data

The denominator is the number of ICU-central line days in the reporting month. The same time period must be used for the collection of the denominator and numerator. It is the count of the number of patients with a central line in situ stratified by CI central lines and PI central lines. Only one central line day is attributed to each patient regardless of the number of lines.

The number of line days can be calculated either by tally or by tracking.

Tracking method

- Track each patient in ICU with a central line by recording the date of insertion and the date of removal. Count the number of days each patient had one or more central lines in place during the surveillance period and add together the counts for all patients.

Tally Method

- Count the number of patient line days each day at approximately the same time (i.e. patients with one or more central lines in place). Please see **Appendix B** for a Central Line Days tally tool.

When denominator data are available from electronic databases, these sources may be used if the counts are not substantially different from manually collected counts (plus or minus 5%) and are validated for a minimum of 3 months.

ICU

ICU includes adult and paediatric ICUs. For the purpose of surveillance for this clinical indicator, ICU includes ICUs, CICUs, CCUs, HDUs and COUs collocated to an ICU.

Present on admission

An infection is “present on admission” if the date of the event (BSI) is within 2 calendar days of admission, or two days prior to admission. These are not considered healthcare associated infections and not reported.

For more detail see: ACSQHC CLABSI Implementation Guide

Practice point. Irrespective of how many central lines a patient has in place on any one day, only one-line day is counted for that patient.

1.5 Central Line Associated Blood Stream Infection Validation Check List – Adults (sample only)

Organism identified (*organism name*)

Date of first positive blood culture: [Click here to enter a date.]

Date of Central Line insertion: [Click here to enter a date.]

Type of Central line: (circle) CL ☐ PICC ☐

Patient Identification Details:

Instructions: To meet the case definition, events must fulfil either criteria 1 or 2 AND the date criteria.

Criteria 1			
	Please tick		**Initials**
Does the patient have a recognised pathogen in one or more blood cultures?	Y ☐	N ☐	
Is it likely the blood stream infection is a CLABSI and not related to an infection at another site?	Y ☐	N ☐	

OR

If any of these are NO, this DOES NOT fit the criteria for a CLABSI

Criteria 2:			
If a common skin contaminant is identified, please complete below	**Please tick**		**Initials**
Was the same common skin contaminant cultured from two or more sets of blood cultures drawn on separate occasions within 48 hours of each other*?	Y ☐	N ☐	
Is there at least one of the following signs or symptoms: fever (>38°C) or chills or hypotension within 24 hours of collection of the positive culture?	Y ☐	N ☐	
Is it likely that the signs, symptoms or positive laboratory results are related to a CLABSI and not infection at another site?	Y ☐	N ☐	

AND

If any of these are NO, this DOES NOT fit the criteria for a CLABSI

Date criteria			
Date of BSI and Catheter insertion	**Please tick**		**Initials**
Was the date of the BSI at least 48 hours after the CI/PICC was inserted?	Y ☐	N ☐	
If the CI/PICC was removed, was the BSI within 24 hours of the line removal?	Y ☐	N ☐	

If any of these are NO, this DOES NOT fit the criteria for a CLABSI

Does this CLABSI meet surveillance criteria Y ☐ N ☐

Is this attributable to your facility Y ☐ N ☐

(If no, please ensure you contact the relevant facility to ensure this is reported)

Name _____

(Person completing this form)

Date Completed. [Click here to enter a date.]

Please keep this document as evidence that you have validated this indicator.

SECTION 2

Staphylococcus aureus Blood Stream Infection (SABSI) (CI 2)

CI 2.1 **Rate of HA MSSA BSI (SAB) (inpatient)**		
Numerator	The total number of SABSI episodes that are MSSA for the reporting month	x 10 000
Denominator	The number of occupied bed days for the reporting month	
CI 2.2 **Rate of HA MRSA BSI (SAB) (inpatient)**		
Numerator	The total number of SABSI episodes that are MRSA for the reporting month	x 10 000
Denominator	The number of occupied bed days for the reporting month	
CI 2.3 **Rate of HA MSSA BSI (SAB) (non-inpatient)**		
Numerator	The total number of SABSI episodes that are MSSA for the reporting month	x 10 000
Denominator	The number of occupied bed days for the reporting month	
CI 2.4 **Rate of HA MRSA BSI (SAB) (non-inpatient)**		
Numerator	The total number of SABSI episodes that are MRSA for the reporting month	x 10 000
Denominator	The number of occupied bed days for the reporting month	
CI 2.5 **Community associated MSSA BSI (SAB)** episodes (numerator only)		
Numerator:	The total number of community associated methicillin sensitive SABSI episodes for the reporting month	
CI 2.6 **Community associated MRSA BSI (SAB)** episodes (numerator only)		
Numerator	The total number of community associated **methicillin resistant** *SABSI* episodes for the reporting month	

CI 2.7 **Rate of intravascular access associated HA MSSA BSI (SAB) (not mandatory)**		
Numerator:	The total number of intravascular access device associated SAB episodes that are MSSA for the reporting month	x 10 000
Denominator	The number of occupied bed days for the reporting month	
CI 2.8 **Rate of intravascular access associated HA MRSA BSI (SAB) (not mandatory)**		
Numerator	The total number of intravascular access device associated SAB episodes that are MRSA for the reporting month	x 10 000
Denominator	The number of occupied bed days for the reporting month	

2.1 Rationale

Staphylococcus aureus (S. aureus) blood stream infection (SABSI) causes significant morbidity and mortality. A sizeable proportion of SABSIs are related to the presence of intravascular access devices (IVAD) and these are increasingly being recognised as preventable events. Definitions of *S. aureus* blood stream infections SABSIs) are based on those of the Australian Commission on Safety and Quality in Health Care *Implementation Guide for the Surveillance of Staphylococcus aureus blood stream infection*.

2.2 Methodology

For SABSI rates to be comparable methodology must be similar, and definitions consistently applied. Surveillance personnel are required to:

- Liaise with the participating laboratory to ensure that data regarding all *S. aureus* blood cultures are received or are readily available
- Investigate **all** positive *S. aureus* blood cultures from all facility departments (including outpatients, hospital in the home and mental health units)
- Liaise with relevant stakeholders to ensure surveillance definitions are met
- Periodically (for example quarterly) review cases to ensure data validation. See 2.4 – *Staphylococcus aureus* Blood Stream Infection Check List - Adults for a tool to assist with validation.

Case definition

***Staphylococcus aureus* blood stream infection**

Staphylococcus aureus blood stream infection (SABSI) is defined as (at least one) positive blood culture for *S. aureus*.

Only the first isolate per patient within a 14-day period is counted. If the same patient has another positive blood culture reported more than 14 days after the last positive blood culture, then an additional episode is reported.

Best practice recommends that 2 sets of blood cultures be collected from separate sites on the patient for identification of SABSI.

NB: Staphylococcus argenteus is part of the *Staphylococcus aureus* complex and should be included in the above.

The presence of contaminants

Staphylococcus aureus is a rare contaminant in a blood culture, but contamination may be more common in children.

A SABSI will only be considered a contaminant and not reported in the surveillance data if

- The clinical picture is does not support infection AND either a repeat blood culture is negative

  AND/OR

- The clinical picture is not consistent with infection and no *Staphylococcus aureus* targeted treatment is given.

Present or incubating on admission

The episode is not counted if

- The positive blood culture was collected less than 48 hours after admission AND patient does not meet criterion 2 below
- The positive blood culture was collected more than 48 hours after admission AND there were documented clinical signs of staphylococcal infection on admission

  AND

- There is no evidence of an associated prior admission or medical procedure received in hospital (see criterion 2).

Consultation with the patient's medical officer or an infectious diseases physician is required to make this determination.

Healthcare associated *Staphylococcus aureus* blood stream infection (HAI-SABSI)

A SABSI will be considered healthcare associated if it meets either Criterion 1 or Criterion 2.

Criteria required to meet the HAI SABSI definition

Criterion 1

The patient's first positive *Staphylococcus aureus* blood culture was collected more than 48 hours after hospital admission or less than 48 hours after discharge from hospital provided the event was NOT considered to be present or incubating on admission

OR

Criterion 2

The patient's first positive *Staphylococcus aureus* blood culture was collected less than or equal to 48 hours after hospital admission and one or more of the following key clinical criteria were met for the patient-episode of SAB:

SABSI is a complication of the presence of an indwelling medical device (e.g. intravascular line, haemodialysis vascular access, CSF shunt, urinary catheter)

OR

SABSI occurs within 30 days of a surgical procedure where the SABSI is related to the surgical site or 90 days for deep incisional/organ space infections related to a surgically implanted device

OR

SABSI was diagnosed within 48 hours of a related invasive instrumentation or incision

OR

SABSI is associated with neutropenia* contributed to by cytotoxic chemotherapy.

** Neutropenia is defined as at least two separate calendar days with values of absolute neutrophil count (ANC) or total white blood cells count (WBC) <500 cells/mm3 (0.5 X 10^9/L) on or within a seven-day time period which includes the date the positive blood specimen was collected (Day 1), the 3 calendar days before and the 3 calendar days after.*

If none of these criteria are met, the SABSI is **community associated**.

Healthcare facility attribution

If the SABSI develops within 48 hours of transfer from one healthcare facility to another healthcare facility, it is attributable to the transferring (originating) facility.

If the SABSI is related to a surgical site (operation within the past 30 days or 90 days for deep incisional/organ space infections) or to invasive instrumentation, it is attributable to the facility where the procedure or instrumentation occurred.

If the SABSI is related to a peripheral intravenous cannula (PIVC) or other intravascular device inserted by the NSW Ambulance Service, it is to be entered into the Incident Information Management System under the NSW Ambulance Service.

Stratification of *Staphylococcus aureus* by antibiotic susceptibility

SABSIs are classified according to cefoxitin susceptibility (phenotype) which reliably reflects methicillin susceptibility and the presence of the *mecA* gene.

- Methicillin-sensitive *S. aureus* (MSSA)
- Methicillin-resistant *S. aureus* (MRSA) including methicillin-resistant *S. aureus* defined as non-multiply resistant.

Methicillin susceptibility is usually reported as flucloxacillin/dicloxacillin susceptibility in microbiology laboratory reports.

Intra vascular access device associated *Staphylococcus aureus* blood stream infection

SABSIs associated with intravascular access devices (e.g. peripheral intravenous access devices, central venous access devices, peripherally inserted central catheters) will be reported as a separate indicator. These SABSIs should be included in the total number of SABSIs for the facility and in this indicator. This subset of SABs represents infections which are likely to be preventable with implementation of local IPAC interventions. The reporting of this indicator separately is optional.

Surveillance validation

Validation of surveillance data is required to ensure data is accurate and robust and it is recommended this is conducted quarterly. Surveillance personnel need to arrange regular audits of reports against laboratory data to assess:

- The completeness of notifications (examine all positive *S. aureus* blood cultures)
- Ensure the correct assignment of healthcare associated status (examine all unique *S. aureus* events)
- Ensure the correct assignment of organism phenotype (examine reported phenotypes and compare with laboratory reports).

Note:

An episode of SABSI should be regarded as a complication of a surgical procedure (and therefore a HAI) if:

- There is an infection that fulfils the surveillance criteria of a Surgical Site Infection (SSI) that is proven or likely to be due to *S. aureus*
- In the presence of a surgically implanted device if there is a device infection within a three-month period (90 days) after implantation and is likely to be the source of infection (devices include permanent pacemakers, joint prostheses, nerve stimulators, breast implants, surgical mesh)
- If the time interval between invasive instrumentation or incision is more than 48 hours there must be compelling evidence that the infection was related to the invasive device or procedure

2.3 NSW Data Set

Numerator fields

The following will be reported (for HAI SABSIs only):

- MSSA
  - MSSA associated with intravascular access device (optional)
- MRSA (includes non-multiply resistant MRSA)
  - MRSA associated with intravascular access device (optional)

Denominator data

The denominator is occupied bed days and includes Hospital in the home (HITH), rehabilitation, aged care and mental health beds within a healthcare facility providing inpatient as well as same-day procedures such as dialysis and same day surgery or procedure units.

Patient Days

National data collection uses the denominator “patient days” which 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 reference period are not counted.

2.4 HAI SABSI Validation Check List – Adults (sample only)

Organism identified: MSSA ☐ MRSA ☐

Date of first positive blood culture: [Click here to enter a date.]

Patient Identification Details:

Instructions: To meet the case definition, events must fulfil either *criterion 1* or *2*

Criterion 1: The patient's first *Staphylococcus aureus* blood culture was collected more than 48 hours after hospital admission or less than 48 hours after discharge from hospital.			
	Please tick		**Initials**
Patient meets this criterion.	Y ☐	N ☐	
Is there more than 14 days since a previous SABSI episode	Y ☐	N ☐	

OR

If any of these are NO, this DOES NOT fit the criteria for a HA-SAB

Criterion 2: The patient's first positive *Staphylococcus aureus* blood culture was collected less than or equal to 48 hours after hospital admission and one or more of the following key clinical criteria was met for the patient-episode of SABSI			
	Please tick		**Initials**
SABSI is a complication of the presence of an indwelling medical device (e.g. intravascular line, haemodialysis vascular access, Cerebrospinal fluid (CSF) shunt, urinary catheter)	Y ☐	N ☐	
SABSI occurs within 30 days of a surgical procedure where the SAB is related to the surgical site	Y ☐	N ☐	
SABSI was diagnosed within 48 hours of a related invasive instrumentation or incision	Y ☐	N ☐	
SABSI is associated with neutropenia (neutrophils less 0.5 x 10^9/L) on two occasions contributed to by cytotoxic therapy	Y ☐	N ☐	

Does this SAB meet surveillance criteria Y ☐ N ☐

Is this attributable to your facility Y ☐ N ☐

(If NO, please ensure you contact the relevant facility to ensure this is reported)

Difficult classifications should be discussed with a microbiologist/infectious disease physician

Name _____

Date Completed. [Click here to enter a date.]

Notes:

SECTION 3

Methicillin-resistant *Staphylococcus aureus* (MRSA) Acquisition in ICU (CI 7)

CI 7 **Calculation of ICU MRSA acquisition (infection and colonisation) rates (per 1000 occupied bed days)**		
Numerator	Numbers of new MRSA infections or MRSA colonisations in ICU	x 1,000
Denominator	Number of ICU occupied bed days in the reporting month	

3.1 Rationale

This indicator is designed for monitoring acquisition of MRSA in Intensive Care Units (ICUs). Acquisition (colonisation or infection) of MRSA or other multidrug resistant organisms (MROs) in ICU is a key measure of the success of ICU infection prevention and control measures.

To make this a more reliable measure, standardised screening processes are required in ICU. Refer to the Infection Prevention and Control Policy and the Infection Prevention and Control Practice Handbook for further advice.

ICUs that have a high admitted burden of MRSA may experience greater difficulty with MRSA containment. The proportion of ICU admissions in which MRSA colonisation is detected at admission should be analysed locally.

All **new** isolates of MRSA identified in an ICU patient are to be included.

3.2 Methodology

When undertaking surveillance of ICU MRSA acquisition:

- Facility must implement processes to make sure all surveillance culture reports are received from or are available from relevant laboratories
- Need to have processes to check if there is a history of prior MRSA colonisation
- All patients should be screened for MRSA colonisation on admission to ICU by a combination of nose and perineum +/- any wounds and line exit sites.
- Patients detected with MRSA up to 48 hours after ICU discharge are also counted as ICU associated acquisitions, regardless of whether the discharge MRSA screens were negative
- Patients readmitted to ICU within 48 hours of ICU discharge who test MRSA positive on ICU admission screening are also counted as ICU acquisitions
- Patients who previously had MRSA and who have been formally demonstrated and documented to be ‘clear’ of MRSA colonisation are counted as new acquisitions if they

become MRSA positive > 48 hours after ICU admission or within 48 hours of ICU discharge

- If a patient has MRSA identified from multiple sites during the same admission, this is only counted once as a new patient acquisition
- If a patient has an ICU associated MRSA blood stream infection this may need to be counted in more than one indicator as follows:
    - SABSI indicator
    - CLABSI indicator (if MRSA bloodstream infection is due to a central line infection)
    - ICU MRSA acquisition indicator (if patient is not previously known to be MRSA colonised or infected)

Case definitions

Methicillin-resistant *Staphylococcus aureus*

All new isolates of MRSA in patients in ICU confirmed by a validated reference method including positive blood cultures. Methicillin-resistant isolates include non-multiple resistant methicillin-resistant strains.

ICU MRSA acquisition

ICU MRSA acquisition refers to patients not previously known to be MRSA colonised and who are negative on admission screening, who become colonised or infected >48 hours after ICU admission.

Intensive Care Units – Adult and/or Paediatric

An Intensive Care Unit includes an ICU, Cardiothoracic ICU, Coronary Care Unit, High Dependency Unit, Close Observation Unit, Neonatal ICU or Paediatric ICU. For further details, see Intensive Care NSW webpage.

Surveillance validation

To validate surveillance data for this indicator:

- Compliance with admission, discharge and weekly screening should be audited regularly.
- Cross check MRSA-SABSIs and MRSA-CLABSIs in ICU to ensure they are also recorded as MRSA acquisition if appropriate.

3.3 NSW Data Set

Numerator fields

The following will be reported:

- Numbers of new MRSA infections or MRSA colonisations in ICU.

Denominator data

The denominator is the total number of ICU occupied bed days in the reporting period. This is the total number of bed days of all admitted patients accommodated in ICU during the reporting period. It is taken from the count of the number of inpatients in ICU at midnight.

3.4 Audit of MRSA Screening in ICU

Screening of MROs (usually MRSA and/or VRE) is part of HAI surveillance and may give valuable information on the effectiveness of IPAC measures. In order to adequately assess compliance with screening measures we recommend you periodically audit admissions/discharges to your ICU or other clinical area for specimens collected. This can be used to support accreditation evidence: National Standards: Standard 3 Preventing and Controlling Healthcare-Associated Infection Standard

SECTION 4

Vancomycin-resistant Enterococcal Blood Stream Infections (VRE-BSI) (CI 10)

Healthcare associated (HA) VRE-BSI		
CI 10.1 **Rate of HA VRE-BSI (per 10,000 occupied bed days)**		
Numerator	The total number of HA VRE-BSI episodes for the reporting month	x 10,000
Denominator	The number of occupied bed days for the reporting month	
CI 10.2 **Percentage of HA enterococcal BSIs resistant to vancomycin (%)**		
Numerator	The total number of HA VRE-BSI episodes for the reporting month	X 100
Denominator	The total number of HA enterococcal BSI episodes (VSE and VRE) for the reporting month (Refer to case definitions)	
10.3a (not mandatory) **Healthcare associated *vanA* VRE-BSI** (number only)		
10.3b (not mandatory) **Healthcare associated *vanB* VRE-BSI** (number only)		
10.3c (not mandatory) **Healthcare associated both *vanA* and *vanB* VRE-BSI** (number only)		
10.3d (not mandatory) **Healthcare associated VRE-BSI with other or unknown *van* gene** (number only)		
10.4 **Community associated VRE-BSI** (number only)		

4.1 Rationale

Although the rate of enterococcal blood stream infection in acute PHOS may not have changed significantly over time, the proportion that are resistant to vancomycin is increasing. This is likely to represent increasing colonisation rates with vancomycin-resistant enterococci (VRE) but may also reflect antimicrobial use and effectiveness of infection prevention; therefore, VRE-BSI has been added to the reportable clinical indicators. For the purposes of surveillance, only isolates of *Enterococcus faecium* and *Enterococcus faecalis* will be included as these accounts for more than 95% of clinical isolates.

Various types of VRE are characterised on phenotypic and genotypic bases and two main types predominate, *vanA* and *vanB*, with some isolates having both. Data on both the overall rate of VRE blood stream infection, the proportion of enterococcal blood isolates that are resistant to vancomycin and whether these are *vanA*, *vanB* or both will be reported.

As enterococci are sometimes contaminant organisms, particularly when common skin contaminants are identified in the same blood culture set, reviewing blood cultures to ensure they meet surveillance criteria is required.

4.2 Methodology

For VRE rates to be comparable, methodology must be similar, and definitions consistently applied. Surveillance personnel are required to:

- Liaise with the participating laboratory to ensure that the results of all *E. faecium and E. faecalis* blood cultures are received
- Liaise with the participating laboratory to ensure all VRE isolates are identified and, where possible, the resistance type is available (only *vanA* or *vanB*)
- Investigate **all** positive VRE blood cultures from all facility departments
- Liaise with relevant stakeholders to ensure surveillance definitions are met.

Case definitions

Vancomycin-resistant enterococcal blood stream infection (VRE-BSI)

VRE-BSI is defined as at least one positive blood culture for vancomycin-resistant *Enterococcus faecium* or *Enterococcus faecalis* **and** the absence of other potential contaminant species in the same culture set. Mixed cultures that contain VRE along with other pathogens such as *Escherichia coli* or *Staphylococcus aureus* are included.

Note: Only the first isolate per patient within a 14-day period is counted (i.e. an episode). If the same patient has another positive blood culture reported greater than 14 days after the last positive blood culture, then an additional episode is reported.

Healthcare associated VRE-BSI

The **VRE-BSI** will be considered **healthcare associated** if it meets either Criterion 1 or Criterion 2.

Criterion 1

The patient's first positive blood culture was collected more than 48 hours after hospital admission or less than 48 hours after discharge

OR

Criterion 2

The patient's first positive blood culture was collected less than or equal to 48 hours after hospital admission and one or more of the following key clinical criteria was met for the patient-episode of BSI:

The BSI is a complication of the presence of an indwelling medical device (e.g. intravascular line, haemodialysis vascular access, CSF shunt, urinary catheter)

OR

The BSI occurs within 30 days of a surgical procedure where the BSI is related to the surgical site or 90 days for deep incisional/organ space infections related to a surgically implanted device

OR

The BSI was diagnosed within 48 hours of a related invasive instrumentation or incision

OR

The BSI is associated with *neutropenia on at least two occasions contributed to by cytotoxic therapy

**Neutropenia is defined as at least two separate calendar days with values of absolute neutrophil count (ANC) or total white blood cells count (WBC) <500 cells/mm3 (0.5 X 109/L) on or within a seven-day time period which includes the date the positive blood specimen was collected (Day 1), the 3 calendar days before and the 3 calendar days after.*

If none of these criteria are met, the VRE-BSI is considered to be community associated.

Enterococcal blood stream infection (enterococcal BSI)

Enterococcal BSI is defined as at least one positive blood culture for either *Enterococcus faecium* or *Enterococcus faecalis* **and** the absence of concomitant skin contaminants in the same culture set. This includes both vancomycin sensitive (VSE) and vancomycin resistant (VRE) enterococcal blood cultures.

Note: Only the first isolate per patient within a 14-day period is counted. If the same patient has another positive blood culture reported greater than 14 days after the last positive blood culture, then an additional episode is reported.

Healthcare associated enterococcal BSI

Healthcare associated enterococcal BSI is defined as an enterococcal blood stream infection (VSE and/or VRE) which meets either Criterion 1 or 2 described in the highlighted box in the section above ("**Healthcare associated VRE-BSI**"). This data will be included in the denominator for CI 10.2 as specified in **Section 4.3** below.

Practice point: Do not report BSI if the following are present:

Either a repeat blood culture within 48 to 72 hours of the initial positive culture is negative

and/or

The clinical picture is unsupportive of infection and no antimicrobial treatment effective against the enterococcal isolate is given.

Number of positive blood cultures

Enterococci are occasionally present only in a single blood culture and in one study, outcomes were identical in patients with a single positive culture for *Enterococcus* compared with those with multiple positive blood cultures. If a single blood culture is positive, this must be reviewed by relevant stakeholders to ensure surveillance definitions are met.

Healthcare organisation attribution

If the BSI develops within 48 hours of transfer from one healthcare organisation to another, it is attributable to the transferring organisation.

If the BSI is related to a surgical site (within 30 days) or to invasive instrumentation, or 90 days for deep incisional/organ space infections related to a surgically implanted device it is attributable to the facility where the procedure or instrumentation occurred.

4.3 NSW Data Set

Numerator fields

The following will be reported:

- Number of episodes of healthcare associated VRE blood stream infection (HA VRE-BSI)

Optional Numerator Data

Where *vanA* or *vanB* status is reported, this is an optional data field and will be reported as numbers only for each of *vanA*, *vanB*, both or other.

Denominator data

There are two denominators:

1) Organisations rate of HA VRE-BSI (CI 10.1)

   The denominator is occupied bed days and includes HITH, rehabilitation, aged care and mental health beds within a healthcare facility providing inpatient as well as same-day procedures such as dialysis, and same day surgery or procedure units.

2) The proportion of HA enterococcal BSIs resistant to vancomycin (%) (CI 10.2)

   The denominator is the number of unique HA enterococcal (*E. faecium and E. faecalis*) BSIs for the reporting period. These may be vancomycin sensitive (VSE) or vancomycin resistant (VRE).

An example of data collection for the VRE-BSI Clinical Indicators

This section provides a worked example of the steps that can be taken to obtain data for CI 10.1 and CI 10.2.

Step 1: Obtain data from the Microbiology Laboratory regarding all enterococcal BSIs for the facility during the reporting month.

The following information will be used for this example for the reporting month of April:

Patient	Date of collection	Organism(s) isolated	Vancomycin resistant?	*van* gene detected
A	2nd April	*Enterococcus faecalis*	No	-
B	10th April	*Enterococcus gallinarum*	Yes	*vanC*
C	12th April	*Enterococcus faecium*	Yes	*vanA*
D	12th April	*Enterococcus faecium, Klebsiella pneumoniae*	Yes	*vanB*
C	13th April	*Enterococcus faecium*	Yes	*vanA*
C	16th April	*Enterococcus faecium*	Yes	*vanA*
E	22nd April	*Enterococcus faecium*	No	-

Step 2: Include only isolates of *Enterococcus faecium* and *Enterococcus faecalis.*

Patient B is removed as his/her BSI is due to *Enterococcus gallinarum*, leaving the following enterococcal BSIs:

Patient	Date of collection	Organism(s) isolated	Vancomycin resistant?	*van* gene
A	2nd April	*Enterococcus faecalis*	No	-
C	12th April	*Enterococcus faecium*	Yes	*vanA*
D	12th April	*Enterococcus faecium, Klebsiella pneumoniae*	Yes	*vanB*
C	13th April	*Enterococcus faecium*	Yes	*vanA*
C	16th April	*Enterococcus faecium*	Yes	*vanA*
E	22nd April	*Enterococcus faecium*	No	-

Step 3: Include only healthcare associated BSIs.

Each enterococcal BSI is reviewed to determine whether it is healthcare associated (i.e. it meets Criterion 1 or 2 as per Case Definitions):

Patient	Date of collection	Organism(s) isolated	Vancomycin resistant?	*van* gene	Healthcare associated?
A	2nd April	*Enterococcus faecalis*	No	-	Yes
C	12th April	*Enterococcus faecium*	Yes	*vanA*	Yes
D	12th April	*Enterococcus faecium, Klebsiella pneumoniae*	Yes	*vanB*	Yes
C	13th April	*Enterococcus faecium*	Yes	*vanA*	Yes
C	16th April	*Enterococcus faecium*	Yes	*vanA*	Yes
E	22nd April	*Enterococcus faecium*	No	-	No

As only healthcare associated BSIs are included, patient E is removed, leaving the final list of HA enterococcal BSIs as follows:

Patient	Date of collection	Organism(s) isolated	Vancomycin resistant?	*van* gene	Healthcare associated?
A	2nd April	*Enterococcus faecalis*	No	-	Yes
C*	12th April	*Enterococcus faecium*	Yes	*vanA*	Yes
D	12th April	*Enterococcus faecium, Klebsiella pneumoniae*	Yes	*vanB*	Yes
C*	13th April	*Enterococcus faecium*	Yes	*vanA*	Yes
C*	16th April	*Enterococcus faecium*	Yes	*vanA*	Yes

Step 4: Calculate or obtain the numerator and denominator values for the Healthcare associated VRE-BSI Clinical Indicators.

CI 10.1 Rate of HA VRE-BSI (per 10,000 occupied bed days)

Numerator = The total number of HA VRE-BSI episodes for the reporting month

= 2 (made up of one episode each from patients C* and D)

Denominator = The number of occupied bed days for the reporting month

CI 10.2 Percentage of HA enterococcal BSIs resistant to vancomycin (%)

Numerator = The total number of HA VRE-BSI episodes for the reporting month

(**Note:** This is the same numerator as that of CI 10.1)

= 2 (made up of one episode each from patients C* and D)

Denominator = The total number of HA enterococcal BSI episodes (VSE and VRE) for the reporting month

= 3 (made up of one episode each from patients A, C* and D) Calculated percentage = 66.7%

***Note:** The three positive blood cultures for patient 'C' are counted as one episode of enterococcal BSI (as only the first isolate per patient within a 14-day period is counted).

4.4 VRE- BSI Validation Check List – Adults (sample only)

Organism identified: *E. faecalis* ☐ *E. faecium* ☐
Vancomycin resistant: Yes ☐ No ☐

Patient Identification Details:

If VRE please complete: *vanA* ☐ *vanB* ☐ vanA and *vanB* ☐
unknown/other ☐

Date of first positive blood culture: Click here to enter a date. *Instructions: To meet the case definition, events must fulfil* either *criterion 1* or *2*

Criterion 1: The patient's first VRE blood culture was collected more than 48 hours after hospital admission or less than 48 hours after discharge from hospital			
	Please tick		**Initials**
Patient meets this criterion	Y ☐	N ☐	

OR

Criteria 2: The patient's first positive VRE blood culture was collected less than or equal to 48 hours after hospital admission and one or more of the following key clinical criteria was met for the patient-episode of VRE-BSI			
	Please tick		**Initials**
VRE-BSI is a complication of the presence of an indwelling medical device (e.g. intravascular line, haemodialysis vascular access, CSF shunt, urinary catheter)	Y ☐	N ☐	
VRE-BSI occurs within 30 days of a surgical procedure where the BSI is related to the surgical site or 90 days for deep incisional/organ space infections related to a surgically implanted device	Y ☐	N ☐	
VRE-BSI was diagnosed within 48 hours of a related invasive instrumentation or incision	Y ☐	N ☐	
VRE-BSI is associated with neutropenia (neutrophils less 0.5 x 10^9/L) on two occasions contributed to by cytotoxic therapy	Y ☐	N ☐	

If any of these are NO, this DOES NOT fit the criteria for a VRE-BSI

Does this VRE-BSI meet surveillance criteria Y ☐ N ☐
Is this attributable to your organisation Y ☐ N ☐
(If NO, please ensure you contact the relevant facility to ensure this is reported)

Name _____
Date Completed. [Click here to enter a date.]
Notes:

Note: this form could be used for validating all HAI enterococcal bacteraemia episodes

SECTION 5

Carbapenemase-producing *Enterobacterales* (CPE) (CI 11)

Healthcare Associated CPE per 10,000 occupied bed days		
CI 11.1 **Rate of HA CPE-BSI (per 10,000 occupied bed days)**		
Numerator 1	The total number of HA CPE-BSI episodes for the reporting month	x 10,000
Denominator	The number of occupied bed days for the reporting month.	
CI 11.2 **Rate of HA CPE acquisitions (per 10,000 occupied bed days)**		
Numerator 2	The total number of patients with HA CPE acquisition (from screening or clinical samples).	
Denominator	The number of occupied bed days for the reporting month	x 10,000

5.1 Rationale

Infection with organisms such as *Enterobacterales* that have acquired carbapenemase (conferring resistance to carbapenems) are an increasing problem in many countries. These organisms are resistant to many of the currently available antimicrobial agents and are associated with increased morbidity and mortality. At the time of writing this manual CPE is not endemic in Australia and all CPE isolates will be notifiable to Health Protection NSW by laboratories. CPE notification is mandatory for laboratories to closely monitor CPE rates and burden in Australian hospitals in order to prevent outbreaks and delay the organism from becoming endemic in the future.

5.2 Methodology

For carbapenemase-producing *Enterobacterales* (CPE) rates to be comparable, methodology must be similar, and definitions consistently applied. Surveillance personnel are required to:

- Liaise with the participating laboratory to ensure that reports of all CPE isolates are received (including screening and clinical isolates)
- Investigate all positive CPE blood cultures from all facility departments
- Liaise with relevant stakeholders to ensure surveillance definitions are met.

Case definitions

Carbapenemase-producing *Enterobacterales* blood stream infection (CPE-BSI)

CPE-BSI is defined as a positive blood culture for an *Enterobacterales* species (e.g. including but not limited to *Klebsiella* species and *Escherichia coli*) that has a carbapenemase-producing gene detected by PCR (laboratories should follow the NSW Health Pathology policy on microbiological detection of CPE).

Only the first isolate per patient within a 14-day period is counted. If the same patient has another positive blood culture reported greater than 14 days after the last positive blood culture, then an additional episode is reported.

There are a number of different types of carbapenemase genes found in CPE; the five most important globally are Imipenemase (IMP), *Klebsiella pneumoniae* carbapenemase (KPC), New-Delhi metallo-β-lactamase (NDM), Oxacillinases (OXA) and Verona integron-encoded metallo-β-lactamase (VIM). If a patient has another positive blood culture within 14 days with an *Enterobacterales* species harbouring a carbapenemase gene which is different from that reported previously, this should be counted as a new episode.

Healthcare associated CPE-BSI

CPE will be considered **healthcare associated** if it meets either Criterion 1 or Criterion 2.

Criterion 1

The patient's first positive CPE blood culture was collected more than 48 hours after hospital admission or less than 48 hours after discharge

OR

Criterion 2

The patient's first positive CPE blood culture was collected less than or equal to 48 hours after hospital admission and one or more of the following key clinical criteria was met for the patient-episode of CPE-BSI:

CPE is a complication of the presence of an indwelling medical device (e.g. intravascular line, haemodialysis vascular access, CSF shunt, urinary catheter)

OR

CPE-BSI occurs within 30 days of a surgical procedure where the CPE-BSI is related to the surgical site or 90 days for deep incisional/organ space infections related to a surgically implanted device

OR

CPE-BSI was diagnosed within 48 hours of a related invasive instrumentation or incision

OR

CPE-BSI is associated with *neutropenia on at least two occasions contributed to by cytotoxic therapy

**Neutropenia is defined as at least two separate calendar days with values of absolute neutrophil count (ANC) or total white blood cells count (WBC) <500 cells/mm3 (0.5 X 109/L) on or within a seven-day time period which includes the date the positive blood specimen was collected (Day 1), the 3 calendar days before and the 3 calendar days after.*

CPE acquisition

All new patients from which carbapenemase-producing *Enterobacterales* (CPE) are isolated (**from screening or clinical cultures from any site** including blood cultures) from samples collected >48 hours after hospital admission or <48 hours after discharge are counted. Patients are counted at the time CPE is first isolated, whether the initial isolate represents colonisation or infection. If a patient has CPE identified from multiple sites during the same

admission (due to detection of ongoing colonisation or ongoing/new infection(s), the patient is only counted once as a new acquisition. Patients who are identified as a new CPE acquisition from a blood stream infection will also need to be counted in the CPE blood stream infection indicator.

Although there is no agreed definition of CPE clearance, this may change during the life of this manual. If patients are deemed to have cleared CPE and are again identified to be colonised with CPE, this will be reported as a new episode.

If a patient has a positive CPE isolate with a carbapenemase **gene** which is different from that reported previously, this should be reported as a new acquisition.

Healthcare Facility Attribution

If CPE is identified within 48 hours of transfer from one healthcare organisation to another healthcare organisation, it is attributable to the transferring facility.

If the CPE is identified more than 48 hours after transfer from one healthcare organisation to another healthcare organisation and is epidemiologically linked to the transferring healthcare facility, it is attributable to the transferring organisation.

5.3 NSW Data Set

Numerator fields

The following will be reported:

- Number of episodes of healthcare associated CPE blood stream infection
- Number of cases of healthcare associated CPE acquisition (detected from screening or clinical samples)

Denominator data

The denominator is the total number of occupied bed days in the reporting period. This includes HITH, rehabilitation, aged care and mental health beds within a healthcare facility providing inpatient as well as same-day procedures such as dialysis, and same day surgery or procedure units.

An example of data collection for the CPE Clinical Indicators

This section provides an example of data collection and extraction for CI 11.1 and CI 11.2.

Step 1: Obtain data from the Microbiology Laboratory regarding all CPE isolates for the facility during the reporting month.

The following information will be used for this example for the reporting month of October: Patients may have more than one positive specimen as can be seen below.

Patient	Date of collection	Sample type	Organism(s) isolated	CPE gene detected
A	6th Oct	Urine	*Klebsiella pneumoniae*	NDM
A	6th Oct	Blood	*Klebsiella pneumoniae*	NDM
B	8th Oct	Rectal screen	*Enterobacter cloacae*	IMP-4

Patient	Date of collection	Sample type	Organism(s) isolated	CPE gene detected
A	10th Oct	Blood	*Klebsiella pneumoniae*	NDM
C	15th Oct	Wound	*Enterobacter cloacae*	IMP-4
D	15th Oct	Blood	*Klebsiella pneumoniae*	NDM
D	16th Oct	Blood	*Klebsiella pneumoniae*	NDM
E	22nd Oct	Rectal screen	*Enterobacter cloacae*	IMP-4
D	23rd Oct	Blood	*Klebsiella pneumoniae, Escherichia coli*	NDM, OXA-48
F	27th Oct	Urine	*Enterobacter aerogenes*	IMP-4
B	30th Oct	Urine	*Enterobacter cloacae*	IMP-4

Step 2: Include only healthcare associated CPE-BSIs or CPE acquisitions.

Each CPE is reviewed to determine whether it is healthcare associated (i.e. it meets Criterion 1 or 2 as per Case Definitions):

Patient	Date of collection	Sample type	Organism(s) isolated	CPE gene detected	Healthcare associated ?
A	6th Oct	Urine	*Klebsiella pneumoniae*	NDM	Yes
A	6th Oct	Blood	*Klebsiella pneumoniae*	NDM	Yes
B	8th Oct	Rectal screen	*Enterobacter cloacae*	IMP-4	Yes
A	10th Oct	Blood	*Klebsiella pneumoniae*	NDM	Yes
C	15th Oct	Wound	*Enterobacter cloacae*	IMP-4	Yes (but previously known IMP-4 patient)
D	15th Oct	Blood	*Klebsiella pneumoniae*	NDM	Yes
D	16th Oct	Blood	*Klebsiella pneumoniae*	NDM	Yes
E	22nd Oct	Rectal screen	*Enterobacter cloacae*	IMP-4	No

Patient	Date of collection	Sample type	Organism(s) isolated	CPE gene detected	Healthcare associated ?
D	23rd Oct	Blood	*Klebsiella pneumoniae, Escherichia coli*	NDM, OXA-48	Yes
F	27th Oct	Urine	*Klebsiella oxytoca*	OXA-48	No
B	30th Oct	Urine	*Enterobacter aerogenes*	IMP-4	Yes

Patients with CPE which are not healthcare associated are removed from the list. In addition, patient C is removed as he/she was previously known to be IMP-4 positive so he/she is not counted as a new CPE acquisition for the reporting month. The final list of HA CPE-BSIs or CPE acquisitions is as follows:

Patient	Date of collection	Sample type	Organism(s) isolated	CPE gene detected	Healthcare associated ?
A	6th Oct	Urine	*Klebsiella pneumoniae*	NDM	Yes
A	6th Oct	Blood	*Klebsiella pneumoniae*	NDM	Yes
B	8th Oct	Rectal screen	*Enterobacter cloacae*	IMP-4	Yes
A	10th Oct	Blood	*Klebsiella pneumoniae*	NDM	Yes
D	15th Oct	Blood	*Klebsiella pneumoniae*	NDM	Yes
D	16th Oct	Blood	*Klebsiella pneumoniae*	NDM	Yes
D	23rd Oct	Blood	*Klebsiella pneumoniae, Escherichia coli*	NDM, OXA-48	Yes
B	30th Oct	Urine	*Enterobacter aerogenes*	IMP-4	Yes

Step 3: Calculate or obtain the numerator and denominator values for the CPE Clinical Indicators.

CI 11.1 Rate of HA CPE-BSI (per 10,000 occupied bed days)

Numerator = The total number of HA CPE-BSI for the reporting month

= 3 (one episode for patient A and two episodes for patient D s patient D has *Enterobacterales* species with two different CPE genes in blood cultures)

Denominator = The number of occupied bed days for the reporting month

CI 11.2 Rate of HA CPE acquisitions (per 10,000 occupied bed days)

Numerator = The total number of patients with HA CPE acquisition (from screening or clinical samples)

= 4 (patients A, B and D, with patient D counted twice due to confirmation of two different CPE genes in this patient)

Denominator = The number of occupied bed days for the reporting month

5.4 CPE- BSI Validation Check List – Adults (sample only)

Organism identified: _____
Carbapenem resistant: Yes ☐ No ☐

Patient Identification Details:

If CPE please complete: IMP ☐ KPC ☐ NDM ☐ OXA ☐ VIM ☐ unknown/other ☐

Date of first positive blood culture: Click here to enter a date.

Instructions: To meet the case definition, events must fulfil either *criterion 1* or *2*

Criterion 1: The patient's first CPE blood culture was collected more than 48 hours after hospital admission or less than 48 hours after discharge from hospital			
	Please tick		**Initials**
Patient meets this criterion	Y ☐	N ☐	

OR

Criteria 2: The patient's first positive CPE blood culture was collected less than or equal to 48 hours after hospital admission and one or more of the following key clinical criteria was met for the patient-episode of CPE-BSI			
	Please tick		**Initials**
CPE-BSI is a complication of the presence of an indwelling medical device (e.g. intravascular line, haemodialysis vascular access, CSF shunt, urinary catheter)	Y ☐	N ☐	
CPE-BSI occurs within 30 days of a surgical procedure where the BSI is related to the surgical site or 90 days for deep incisional/organ space infections related to a surgically implanted device	Y ☐	N ☐	
CPE-BSI was diagnosed within 48 hours of a related invasive instrumentation or incision	Y ☐	N ☐	
CPE-BSI is associated with neutropenia (neutrophils less 0.5 x 10^9/L) on two occasions contributed to by cytotoxic therapy	Y ☐	N ☐	

If any of these are NO, this DOES NOT fit the criteria for a VRE-BSI

Does this CPE-BSI meet surveillance criteria Y ☐ N ☐
Is this attributable to your organisation Y ☐ N ☐
(If NO, please ensure you contact the relevant facility to ensure this is reported)

Name _____
Date Completed. [Click here to enter a date.]
Notes:

SECTION 6

Clostridioides difficile infection (CDI) – Hospital Identified (CI 9)

CI 9.1 ***CDI* rates**		
9.1 Numerator	Healthcare associated hospital onset CDI	x 10,000
9.2 Numerator	Healthcare associated community onset CDI	x 10,000
Denominator	Number of occupied bed days for the reporting month	

Severe C. difficile (*not mandatory)* (%)

9.3 Numerator	Healthcare associated hospital onset severe CDI	x 100
Denominator	Number of cases of hospital onset CDI for the reporting month	

See also Surveillance for *Clostridium difficile* infection Australian Commission on Safety and Quality in Healthcare

6.1 Rationale

Clostridioides (*Clostridium*) *difficile* infection (CDI) is the most common cause of healthcare associated and antibiotic-associated diarrhoea. Although mild forms of CDI are common, CDI can also be accompanied by severe illness and death. The organism can be transmitted between patients in a hospital or healthcare setting. The occurrence of *C. difficile* may represent the effectiveness of both IPAC and antimicrobial stewardship. Although there are difficulties in accurately identifying healthcare associated CDI, the McDonald classification will be used to report healthcare associated CDI that is either healthcare facility onset or community onset[3].

6.2 Methodology

Surveillance of healthcare associated CDI is the minimum required for national and NSW surveillance. Surveillance personnel are required to:

- Implement processes to ensure they receive all laboratory notifications of CDI from their facility including outpatients and the emergency department.
- Implement processes to facilitate testing for *C. difficile* in patients with relevant symptoms who have been hospitalised for more than 48hours.

[3] L. Clifford McDonald, MD and the Ad Hoc *Clostridium difficile* Surveillance Working Group. Recommendations for Surveillance of *Clostridium* Note: this form could be used for validating all HAI CPE bacteraemia episodes

- Identify whether CDI is healthcare associated and whether the onset is in hospital or in the community.
- There is no separate formal notification for severe CDI, but identification and further investigation of severe CDI is strongly recommended.

Case definitions

A CDI case is defined as a case of diarrhoea that meets the following criteria:

- The stool sample yields a positive result in a laboratory assay for *C. difficile* toxin A and/or B, OR
- A toxin-producing *C. difficile* organism is detected in the stool sample by culture or other means.

Healthcare associated CDI cases will be stratified into those that are healthcare organisation onset or healthcare associated community onset.

Hospital onset

Healthcare associated hospital onset CDI is a patient with CDI symptom onset (or date and time of stool specimen collection if a laboratory system is used) more than 48 hours after admission to a healthcare organisation.

OR

Community onset

Healthcare associated community-onset CDI is defined as a patient with CDI symptom onset (or date and time of stool specimen collection if a laboratory system is used) in the community or within 48 hours of admission to a healthcare facility AND that symptom onset was less than 4 weeks after the last discharge from a healthcare facility.

Exclusions

- Cases where a known previous positive test has been obtained within the last 8 weeks (that is, only include cases once in an 8-week period).

Patients less than two years old at date of admission

Surveillance for and definition of severe *C. difficile*

For surveillance, a severe case is defined as a CDI case patient who has two or more features in the “Severe CDI” section of the table below or who meets any of the following criteria within 30 days of symptom onset:

- History of admission to an ICU for complications associated with CDI (e.g. for shock that requires vasopressor therapy)
- History of surgery (e.g. colectomy) for toxic megacolon, perforation or refractory colitis
- Death caused by CDI within 30 days after symptom onset.

Implementation of such surveillance will require individual case review at 30 days and / or reliable linkages with ICU and data regarding surgical procedures.

See also section 6.5 for a tool to assist assessment of severity.

Clinical assessment of CDI

CDI	Clinical features of CDI (diarrhoea, ileus, toxic megacolon) AND Microbiological evidence of toxin-producing *C. difficile* - toxin positive or culture positive OR Pseudomembranous colitis on colonoscopy
Severe CDI	Any two of the following features are suggestive of severe CDI if no other clinical explanation can be provided **Clinical** • Fever (>38.5°C), rigors • Haemodynamic instability • Peritonitis or evidence of bowel perforation • Ileus or toxic megacolon **Laboratory** • White blood cell count >15× 10^9/L • Elevated lactate level • Rise in creatinine level (>50% above baseline) • Albumin level <25mg/L **Other investigations** • Large intestine distension, colonic wall thickening, fat stranding, unexplained ascites (imaging) • Pseudomembranous colitis (colonoscopy)

6.3 NSW Data Set

Numerator fields

The following will be reported:

- Healthcare associated CDI hospital onset
- Healthcare associated CDI community onset.
- Severe C. difficile (not mandatory)

Denominator data

The denominator is bed days and includes HITH, rehabilitation, aged care and psychiatric wards in facilities providing inpatient as well as same-day procedures such as dialysis, and same-day surgery or procedure units.

6.4 Further Reading

Eyre DW, Cule ML, Wilson DJ, Griffiths D, Vaughan A, O'Connor L, et al. Diverse sources of C. difficile infection identified on whole-genome sequencing. N Engl J Med 2013; 369:1195-205

Guidelines for Diagnosis, Treatment, and Prevention of *Clostridium difficile* Infections. The American Journal of Gastroenterology 108(4). February 2013

Clostridium difficile Infection. Monitoring the national burden of *Clostridium difficile.* Australian commission on Safety and Quality in Healthcare. March 2018.

Surveillance for *Clostridium difficile* infection Australian commission on Safety and Quality in Healthcare 2020

6.5 Tool to Assess Severity of *C. difficile* Infection

Patient has confirmed *C. difficile* infection

☐ Toxin positive

☐ Culture positive

Severe Infection

Any two of the following are associated with severe infection (if no other explanation can be provided):

☐ Fever (> 38.5°C), rigors

☐ Haemodynamic instability

☐ Peritonitis or evidence of bowel perforation

☐ Ileus or toxic megacolon

☐ White blood cell count >15 × 10^9/L

☐ Elevated lactate level

☐ Rise in creatinine level (> 50% above baseline)

☐ Albumin level < 25 mg/L

☐ Large intestine distension, colonic wall thickening, fat stranding, unexplained ascites (imaging)

☐ Pseudomembranous colitis (colonoscopy)

Or any one of the following within 30 days of symptom onset:

☐ Admission to ICU for complications associated with CDI

☐ History of surgery for toxic megacolon, perforation or refractory colitis

☐ Death caused by CDI within 30 days after symptom onset

SECTION 7

Surgical Site Infection (SSI) (CI 3)

CI 3.1 **Rate of superficial incisional SSI following primary hip arthroplasty**		
Numerator	The total number of superficial incisional SSIs in primary hip arthroplasty procedures for the reporting month	
Denominator	The number of primary hip arthroplasty procedures performed for the reporting month	
CI 3.2 **Rate of deep incisional/organ space SSI following primary hip arthroplasty**		
Numerator	The total number of deep incisional/organ space SSIs in primary hip arthroplasty procedures in reporting month	
Denominator	The number of primary hip arthroplasty procedures performed for reporting month	
CI 3.1.1 **Rate of superficial incisional SSI following revision hip arthroplasty**		
Numerator	The total number of superficial incisional SSIs in revision hip arthroplasty procedures for the reporting month	
Denominator	The number of revision hip arthroplasty procedures performed for the reporting month	
CI 3.2.1 **Rate of deep incisional/organ space SSI following revision hip arthroplasty**		
Numerator	The total number of deep incisional/organ space SSIs in revision hip arthroplasty procedures in reporting month	
Denominator	The number of revision hip arthroplasty procedures performed for reporting month	

CI 3.3 **Rate of superficial incisional SSI following primary knee arthroplasty**		
Numerator	The total number of superficial incisional SSIs in primary knee arthroplasty procedures for the reporting month	
Denominator	The number of primary knee arthroplasty procedures performed for the reporting month	
CI 3.4 **Rate of deep incisional/organ space SSI following primary knee arthroplasty**		

Numerator	The total number of deep/organ space SSIs in primary knee arthroplasty procedures in reporting month	
Denominator	The number of primary knee arthroplasty procedures performed for the reporting month	
CI 3.3.1 **Rate of superficial incisional SSI following revision knee arthroplasty**		
Numerator	The total number of superficial incisional SSIs in revision knee arthroplasty procedures for the reporting month	
Denominator	The number of revision knee arthroplasty procedures performed for the reporting month	
CI 3.4.1 **Rate of deep incisional/organ space SSI following revision knee arthroplasty**		
Numerator	The total number of deep/organ space SSIs in revision knee arthroplasty procedures in reporting month	
Denominator	The number of revision knee arthroplasty procedures performed for the reporting month	

CI 3.5 **Rate of superficial incisional sternal site SSI following Cardiac Surgery**		
Numerator	The total number of superficial incisional sternal site SSI in Cardiac surgery procedures for the reporting month	
Denominator	The total number of Cardiac surgery procedures performed for the reporting month	
CI 3.6 **Rate of deep incisional sternal site/ organ space SSI following Cardiac Surgery**		
Numerator	The total number of deep incisional sternal site/organ space SSI in Cardiac surgery procedures for the reporting month	
Denominator	The total number of Cardiac surgery procedures performed for the reporting month	

7.1 Rationale

A surgical site infection (SSI) is an infection that develops as a result of an operative procedure. SSIs are one of the most common complications of surgery and are associated with morbidity, mortality and increased length of stay in a healthcare facility. Surveillance of SSIs with prompt feedback of information to relevant stakeholders is of value in reducing future SSIs. Although risk stratification is not a requirement for NSW Health reporting, health facilities are encouraged to collect risk stratification information from existing electronic records where possible. See 7.10 – Guide to Risk Index Score Calculation for SSI for a suggested list of stratification criteria.

7.2 Operative Procedures for Surveillance

The following operative procedures are to be included in surveillance: The previous manual only included elective operations; from 2020/2021 elective and emergency procedures (see Glossary and 7.4 Case Definitions section below for definitions) are to be included.

- Total or partial hip arthroplasty
- Total or partial knee arthroplasty
- Cardiac surgery (both emergency and elective procedures) including
  - Coronary artery bypass surgery with or without venous graft donor site incisions
  - Open Procedures including valves or septum

Practice point: Cardiac surgery procedures exclude heart transplantation, pacemaker or AICD

7.3 Methodology

For healthcare facilities to be able to compare their SSI rates, the methodology must be similar and infection definitions consistently applied. Active prospective case finding is required and needs to be carried out by appropriately trained personnel.

Denominator data for SSI surveillance

Accurately reporting the denominator surveillance of SSIs requires identification and follow-up of all eligible patients undergoing the selected procedure. This may require interrogation of the following data sources:

- operative lists
- theatre management systems
- theatre bookings
- medical records
- theatre coding

Processes are required to be able to identify readmissions and revision of procedures during the surveillance period to see if infection has occurred. Refer to sections below including “Information for operative procedures” for exclusions.

Numerator data for SSI surveillance

Patient-based surveillance requires monitoring of all patients undergoing the selected procedures for the period of follow-up indicated for that procedure.

Processes are required to be able to detect patients who are readmitted to hospital for the treatment of SSIs. Refer to sections below including “Information for operative procedures” for exclusions.

Surveillance period

All patients under surveillance for SSI must be followed during the whole of the initial admission and monitored for readmission.

Patients are monitored for 30 days for superficial SSIs and for 90 days for deep or organ/space infections for hip and knee joint arthroplasty.

Patients are monitored for 30 days for superficial and 90 days for deep infections after Coronary Artery Bypass Graft (CABG) or cardiac surgery.

7.4 Case Definitions

Types of SSI

A surgical site infection is classified as superficial, deep or an organ/space infection. For surveillance purposes, deep and organ/space infections are combined. See for 7.5 - Surveillance Criteria for SSI for more information.

Superficial SSI

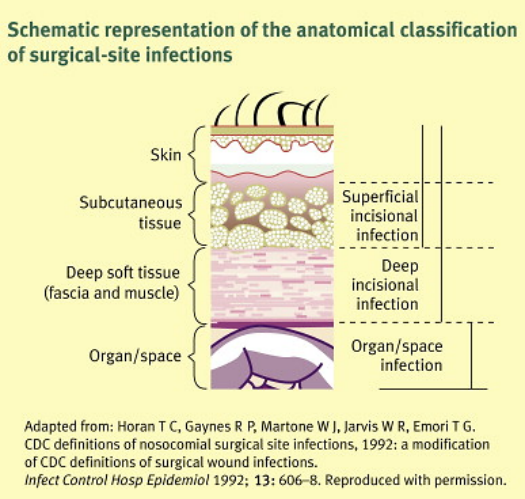
A superficial incisional SSI involves only the skin and subcutaneous tissue of the incision.

Deep SSI

A deep incisional SSI involves deep soft tissues, for example, fascia, muscle layers, or joint, in the case of arthroplasty.

Organ/Space SSI

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



Elective or emergency procedures

Elective procedure

Surgery that is deemed necessary by the treating clinician, but which can be delayed for at least 24 hours. These patients are generally booked onto the elective surgery waiting list. Elective surgery patients may also be described as planned or booked patients.

Emergency procedure

A surgical intervention to treat acute trauma or illness whereby the patients' clinical acuity is assessed by the clinician as requiring surgery within 24 hours. The patient may require immediate surgery, or present for surgery at a later time following this assessment. Emergency surgery patients may also be described as unplanned, unbooked, acute or urgent patients.

Exclusions

Orthopaedic procedures exclude hemiarthroplasty of femur (Austin Moore arthroplasty) performed for fractures of the neck of femur.

Cardiac surgery procedures exclude heart transplantation, pacemaker or Automatic Implantable Cardioverter Defibrillator (AICD) insertion.

SSIs that occur after a defined time period are excluded:

- Superficial SSIs with symptom onset occurring more than 30 days after the operation are not included
- Deep/organ space infections with symptom onset occurring more than 90 days after the operation are not included

1. Superficial Incisional Primary (SIP) – a superficial incisional SSI that is identified in the primary incision in a patient that has had an operation with one or more incisions (for example, knee incision or chest incision for CABG

2. Superficial Incisional Secondary (SIS) – a superficial incisional SSI that is identified in the secondary incision in a patient that has had an operation with more than one incision (for example, donor site incision for CABG

Practice point:
Where an infection occurs, this should be attributable to the month that surgery took place

Where validation has already occurred and there is no ability to correct data, the infection is then only allocated to the month of acquisitions

Multiple SSI after one operation

Dual 'superficial + deep' infections are recorded as 'deep' and organ/space infections. It is unusual for multiple SSIs of the same type to occur in one patient within a 30-day period – normally this will represent incomplete treatment of the first infection.

If an infection is initially judged to be one type of infection and later felt to be an anatomically deeper type of infection (that is, progression of infection), it should be recorded as the deeper of the different types. One operation may result in multiple incisional sites (for example, donor and graft sites), which may develop separate complications. In this situation, the most severe occurrence of SSI at any of the operation sites should be considered as the outcome.

Two separate operations performed under the same anaesthetic should be recorded separately.

7.5 Surveillance Criteria for SSI

Superficial Incisional SSI

Definition - must meet these criteria:
Infection occurs within 30 days of the operative procedure (where the day of operation is day 1) **AND only** involves the skin or subcutaneous tissue of the incision
AND the patient has at least one of the following:
• Purulent discharge from the superficial incision • Organisms isolated from an aseptically obtained culture of fluid and/or tissue from the superficial incision • A superficial incision that is intentionally opened by a surgeon or other qualified person resulting in a positive specimen culture or a specimen is not obtained for culture • Diagnosis of a superficial incisional SSI by a surgeon or other qualified person
AND the patient has at least <u>one</u> of the following signs or symptoms
Pain and/or tenderness; localised swelling; redness and/or heat
Comments and exclusions
Do not report these as an SSI: • Stitch abscess • Cellulitis* • Localised stab wound infection • Superficial incisions that are found to be colonised with organisms and don't have signs/symptoms of infection If deep infection exists as well, report only as deep infection.

*an incision that is draining or that has organisms identified by culture or non-culture-based testing is not considered a cellulitis

Deep Incisional SSI

Definition - must meet these criteria:
Infection occurs within 30 or 90 days of the operative procedure (where the day of operation is day 1) **AND** involves deep soft tissues of the incision (e.g. muscle or fascia)
AND the patient has at least one of the following:
• Purulent discharge from the deep incision • A deep incision that spontaneously dehisces or is intentionally opened by a surgeon or other qualified person resulting in a positive specimen culture or a specimen is not obtained for culture • An abscess or other evidence of infection involving the deep incision that is detected on direct examination, or imaging or histopathology.
AND the patient has at least one of the following signs or symptoms:
Fever (>38^{0}C); localised pain or tenderness.
Comments
If both deep and superficial infections exist, report only as deep incisional infection.

Organ/space SSI

Definition - must meet these criteria:
Infection occurs within 90 days of the relevant operative procedure (where the day of operation is day 1) **AND** involves any part of the body excluding the skin incision, fascia or muscle layers, that is manipulated during the operative procedure
AND the patient has at least one of the following:
• Purulent discharge from a drain that is placed into the organ/space • Organisms isolated from an aseptically obtained culture of fluid/tissue in the organ/space • An abscess or other evidence of infection involving the organ/space incision that is detected on direct examination, or imaging or histopathology.
AND:
Meets at least one criterion for organ/space infection as outlined in Section 7.6.

7.6 Specific Classification of Organ/Space Infection

The full listing of site specific, organ/space infections is outlined in the CDC/NHSN Surveillance Definitions for Specific Types of Infections

Osteomyelitis (including sternal osteomyelitis) must meet at least one of the following criteria:

1. Patient has organisms cultured from bone
2. Patient has evidence of osteomyelitis on gross anatomic or histopathologic exam
3. Patient has at least two of the following localised signs or symptoms: fever (>38.0°C±), swelling, pain or tenderness, heat, or drainage

   AND at least one of the following:

   a. Organisms cultured from blood in a patient with imaging evidence suggestive of infection (e.g. x-ray, CT scan, MRI, radiolabel scan [gallium, technetium, etc.]), which if equivocal is supported by clinical correlation

   b. Positive non-culture diagnostic lab test on blood (e.g. antigen test, PCR)

   c. Imaging evidence suggestive of infection (e.g. x-ray, CT scan, MRI, radiolabel scan [gallium, technetium, etc.]), which if equivocal is supported by clinical correlation.

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

1. Two positive peri-prosthetic (tissue or fluid) cultures with matching organisms (see below) or cultures of hardware
2. A sinus tract communicating with the joint
3. Having three of the following minor criteria:

   a. Elevated serum C-reactive protein (CRP; >100 mg/L) and erythrocyte sedimentation rate (ESR; >30 mm/hr)

   b. Elevated synovial fluid white blood cell (WBC; >10,000 cells/μL) count OR ++ (or greater) change on leukocyte esterase test strip of synovial fluid

   c. Elevated synovial fluid polymorphonuclear neutrophil percentage (PMN% >90%)

   d. Positive histological analysis of periprosthetic tissue (>5 neutrophils (PMNs) per high power field)

   e. A single positive periprosthetic (tissue or fluid) culture.

Mediastinitis must meet at least one of the following criteria:

1. Patient has organisms cultured from mediastinal tissue or fluid
2. Patient has evidence of mediastinitis on gross anatomic or histopathologic exam
3. Patient has at least one of the following signs or symptoms:

   a. Fever (>38.0°C±)

   b. Chest pain

   c. Sternal instability

   AND at least one of the following:

a. Purulent drainage from mediastinal area

b. Mediastinal widening on imaging test.

Comments

A matching organism is defined as one of the following:

- If genus and species are identified in both cultures, they must be the same.

  Example 1: Two joint fluid cultures reported as *Enterobacter cloacae* is a match.

  Example 2: A joint tissue culture reported as *Enterobacter cloacae* and a synovial fluid culture reported as *Enterobacter aerogenes* are NOT matching organisms, as the species are different.

  Example 3: Two joint fluid cultures reported as Enterococcus species are considered matching organisms. If the organism is less definitively identified in one culture than the other, the identifications must be complementary. For example, coagulase-negative staphylococcus and *Staphylococcus epidermidis* are complementary.

  Example 4: A joint fluid culture reported as *Pseudomonas* spp. and a joint tissue culture reported as *Pseudomonas aeruginosa* are considered a match at the genus level and therefore can be considered matching organisms.

  Note: Organisms do not have to have matching antibiograms (i.e. antimicrobial susceptibilities).

7.7 Surgical Site Infection – Active Case Finding Checklist

In order to standardise the identification of cases of surgical site infection, the following processes are recommended:

1. Identification of all patients having relevant operative procedures
   - Access to operating theatre lists for hip and knee arthroplasty, revisions or washouts
   - Access to operating theatre lists for all cardiac surgery including emergency surgery, including revisions
   - Access to theatre management systems
   - Access to coding information
2. Liaison with surgical inpatient team prior to patient discharge
   - Liaise with surgical teams regularly, but suggested twice weekly
   - Review all microbiology specimens for patients who have had relevant surgical procedures
   - Review surgical wounds if relevant
3. Have processes in place to identify patients with relevant procedures at the time of re-admission
4. Access microbiology results from relevant samples (e.g. joint fluid, wound swabs)
   - Review all joint fluid samples and cross-check against operating theatre lists

- Cross check wound swabs against relevant surgical lists

5. Chart review for patients who may have a reportable HAI – including pharmacy records, nursing charts and discharge summaries
6. Review of Incident Management System for relevant events.

7.8 Surgical Site Infection Reporting Instructions

If a patient has several procedures performed on different dates, attribute the SSI to the most recent operation unless there is evidence that it is related to a different operation.

If during the post-operative period, the surgical site has an invasive manipulation for diagnostic or therapeutic purposes (e.g. needle aspiration) and an SSI develops after this, the infection is not attributed to the operation.

Infections occurring after wound packing or closed reduction of a dislocated hip would be counted as per the surveillance criteria.

If the SSI is identified at a facility that did not perform the operative procedure, the contributors must inform the CEC and the site where the operation was performed.

Denominator data fields (If risk scoring is performed)

All patients undergoing the relevant operation(s) are included and require a risk score. The total number of patients meeting each risk index score for each type of procedure is required. An example is given below:

Name of procedure	Risk 0	Risk 1	Risk 2	Risk 3	Risk 4	Risk 5
Hip Arthroplasty number of patients	*10*	*2*	*1*	*0*	*1*	*0*

Reporting instructions

If the patient returns to the operating theatre within 24 hours of the original operation for a second procedure through the same incision, only one procedure is counted. The total operative time is the combined time for each of these operations.

Bilateral procedures occurring at the same visit to the operating theatre are counted as two separate procedures.

If the patient dies during the operation, they are not included in the denominator.

Information for Operative Procedures

1. Hip and knee arthroplasty:
    - All total, partial, primary and revision procedures that have ICD-10 codes listed in the NSW operative procedures list or similar (e.g. SurgiNet)
    - Primary and revision procedures will be reported separately
    - Revisions for infective reasons are excluded with regards to surveillance for the revision procedure, but should be counted in the surveillance data for the original procedure during which the prosthesis was inserted (primary or revision performed for mechanical reasons) if the infection has occurred within 90 days of the original

procedure. See the Flowchart: Surveillance for SSIs Following Hip or Knee Arthroplasty for further details.

- Bilateral procedures occurring during the same operative session are counted as two separate procedures.

2. Cardiac surgical procedures:
    - Cardiac surgery (both emergency and elective procedures) including:
        - All coronary artery bypass surgery with or without venous graft donor site incisions
        - Open procedures including valves or septum
        - Emergency and elective procedures are included
        - Re-do surgery is included.

Exclusions

SSIs that occur after a defined time period are excluded:

- Superficial SSIs with symptom onset occurring more than 30 days after the operation are not included
- Deep/organ space infections with symptom onset occurring more than 90 days after the operation are not included.

SSI risk index

See 7.10 – Guide to Risk Index Score Calculation for Surgical Site Infection.

Length of surgery

The current duration cut point is 120 minutes for hip arthroplasty and 103 minutes for knee arthroplasty based on information from VICNISS.

If bilateral procedures are performed concurrently, calculate the duration for the whole procedure. If performed sequentially, calculate using the procedure with the longest duration.

Wound class

Wound classification for primary and revision arthroplasty for mechanical reasons is “clean” unless other factors are present – e.g. major breach of sterile field during the operation.

Wound classification for revision arthroplasty for infective reasons is classified as “dirty or infected”.

7.9 SSI Case Validation Check List (sample only)

PATIENT INFORMATION	
Patient Name (last, first)	Medical Record Number:
Date of Birth: Click here to enter a date.	Gender: ☐ M ☐ F ☐ Other
Height: cm	Weight: kg
PROCEDURE DETAILS	
Hospital Name:	
Procedure date: Click here to enter a date.	Surgeon:
Procedure Group*: ☐ CARD ☐ HPRO-P ☐ HPRO-R ☐ KPRO-P ☐ KPRO-R	
Duration of Procedure (min)	ASA score: ☐ 1 ☐2 ☐ 3 ☐ 4 ☐ 5
Wound Class: ☐ 1 ☐ 2	
Anaesthesia Type: ☐ General ☐ Spinal	Surgery Type: ☐ Elective ☐ Emergency
BUNDLE COMPONENTS	
Appropriate antibiotic timing**	☐ Y ☐ N ☐ U/K ☐ N/A
Appropriate antiseptic skin preparation	☐ Y ☐ N ☐ U/K
Appropriate hair removal***	☐ Y ☐ N ☐ U/K ☐ N/A
Maintaining normothermia	☐ Y ☐ N ☐ U/K
Appropriate glucose control	☐ Y ☐ N ☐ U/K ☐ N/A
INFECTION DETAILS	
When infection detected ☐ During initial admission ☐ During readmission ☐ Post discharge surveillance	Type of SSI ☐ Superficial ☐ Deep ☐ Organ/Space
Date of symptom onset (if known) Click here to enter a date.	Culture obtained ☐ Y ☐ N
Organism(s) isolated:	Treatment (optional):
Notes/Comments Reported By: Notified date:Click here to enter a date.	

***** CARD=Cardiac Surgery, HPRO-P=Primary Hip Arthroplasty, HPRO-R=Revision Hip Arthroplasty, KPRO-P=Primary Knee Arthroplasty, KPRO-R=Revision Knee Arthroplasty

NOTE: See figure on page 53 for surveillance of revision procedures performed for infective reasons.

** Within 60 minutes of surgical incision for most antibiotics, or 120 minutes for antibiotics that are not short acting (e.g. vancomycin).
*** Use of clippers and hair removal close to time of surgery

Indicate the criteria met for a surgical site infection by checking the appropriate boxes

Superficial SSI ☐ **Y** ☐ **N**

Infection occurs within 30 days of the operative procedure (where the day of operation is day 1) **AND** only involves the skin or subcutaneous tissue of the incision
AND the patient has at least **one** of the following:
☐ 1) Purulent discharge from the superficial incision ☐ 2) Organisms isolated from an aseptically obtained culture of fluid and/or tissue from the superficial incision ☐ 3) A superficial incision that is intentionally opened by a surgeon or other qualified person resulting in a positive specimen culture or a specimen is not obtained for culture ☐ 4) Diagnosis of a superficial incisional SSI by a surgeon or other qualified person AND The patient has at least one of the following signs or symptoms ☐ Pain and/or tenderness ☐ localised swelling ☐ redness ☐ heat
Comments and exclusions
Do not report the following as SSI: Stitch abscess; Localised stab wound infection; Superficial incisions that are found to be colonised with organisms and don't have signs/symptoms of infection If deep infection exists as well, report only as deep infection.

Deep Surgical Site Infection: ☐ **Y** ☐ **N**

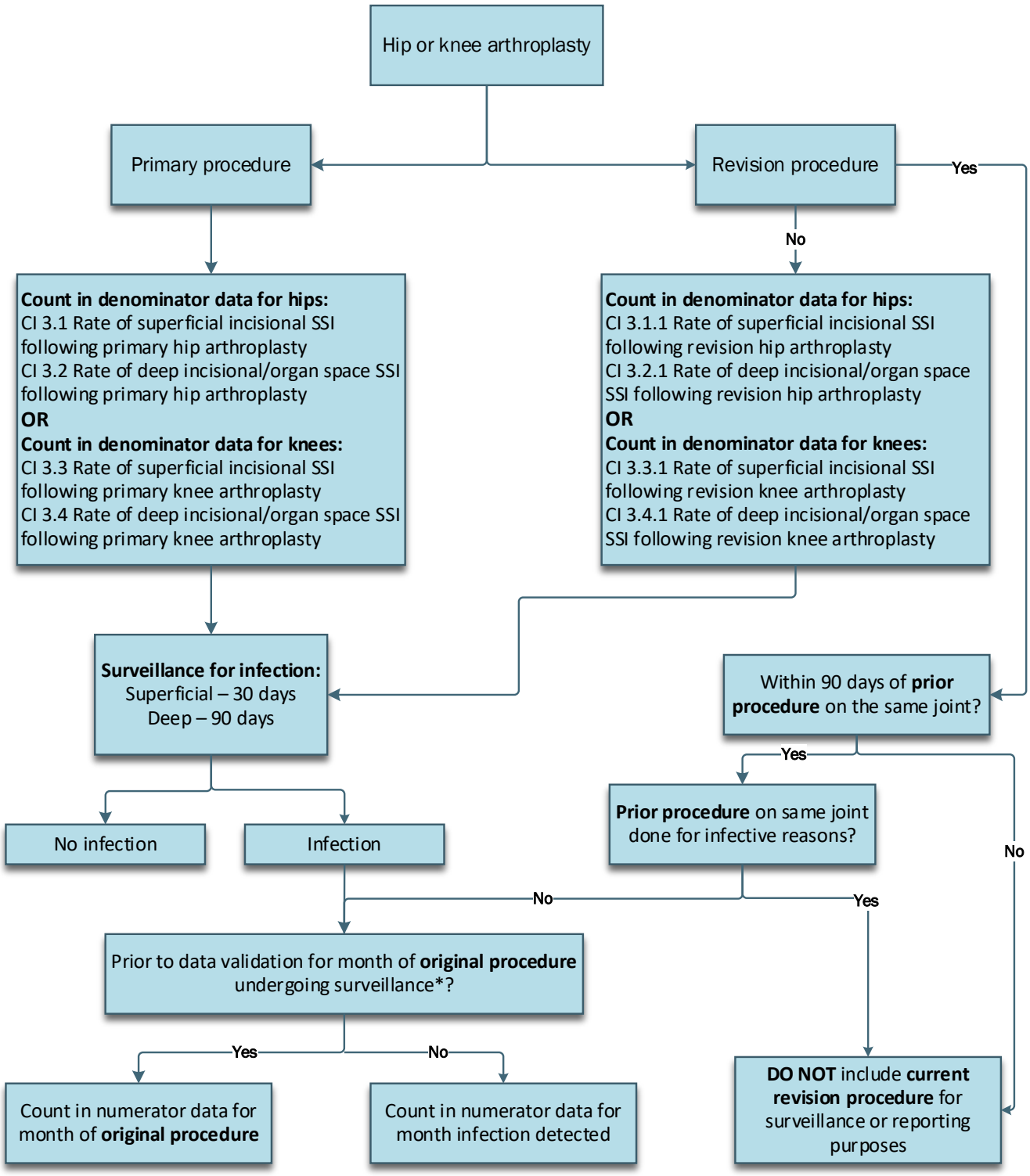
Infection occurs within 90 days of the operative procedure (where the day of operation is day 1) **AND** involves deep soft tissues of the incision (e.g. muscle or fascia)
AND the patient has at least one of the following
☐ Purulent discharge from the deep incision ☐ A deep incision that spontaneously dehisces or is intentionally opened by a surgeon or other qualified person resulting in a positive specimen culture or a specimen is not obtained for culture ☐ An abscess or other evidence of infection involving the deep incision that is detected on direct examination, imaging or histopathology. **AND** the patient has at least <u>one</u> of the following signs or symptoms: ☐ fever (>38^{0}C) ☐ localised pain or tenderness.
Comments: If both deep and superficial infections exist, report only as deep incisional infection

Organ/Space Infection: ☐ **Y** ☐ **N**

☐ Infection occurs within 90 days of the relevant operative procedure (where the day of operation is day 1) **AND** ☐ involves any part of the body **excluding** the skin incision, fascia or muscle layers, that is manipulated during the operative procedure **AND** the patient has at least one of the following:

☐ Purulent discharge from a drain that is placed into the organ/space
☐ Organisms isolated from an aseptically obtained culture of fluid/tissue in the organ/space
☐ An abscess or other evidence of infection involving the organ/space incision that is detected on direct examination, imaging or histopathology

Flowchart: Surveillance for SSIs Following Hip or Knee Arthroplasty



*Revision procedures done for infective reasons, this refers to the prior procedure on the same joint

7.10 Guide to Risk Index Score Calculation for SSI

In order to make valid comparisons of surgical site infection rates, data needs to be stratified by risk for infection. The best method of stratification is uncertain; however, the following items are widely used to develop a risk index which is recommended by the NHSN and has been adopted in Western Australia and Victoria. There is published evidence that diabetes and obesity (BMI > 35 kg/m^2) are associated with an increased risk of SSI. The following are guidelines which may assist sites in collection of appropriate risk stratification information.

The risk index consists of the following items:

1) ASA (American Society of Anesthesiologists) class
2) Duration of surgery
3) Surgical wound classification
4) Presence of diabetes mellitus
5) BMI > 35 kg/m^2

1. ASA class

The ASA physical status classification system refers to the American Society of Anaesthesiology class and is a numerical quantification of disease severity in patients undergoing general anaesthesia. This classification is a relatively standardised scoring scheme developed to stratify anaesthesia risk. 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	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 greater than expected

The NNIS duration of surgery data, lists duration cut points (time between skin incision and completion of skin closure) for surgical procedures which approximate the 75th percentile of the duration of surgery (NNIS 2004). Thus, if a procedure is longer than the reported duration cut point then 1 risk point is scored.

Procedure	Duration cut point	Risk index
Hip arthroplasty /knee arthroplasty	> 120 minutes	1
Knee arthroplasty	> 103 minutes	1
Coronary artery bypass grafts	> 240 minutes	1

3. Wound class		
Surgical Wound classification	**Description**	**Risk index score**
Clean	An operative wound in which no inflammation is encountered and the respiratory, alimentary, genital, or 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 these criteria.	0
Clean-contaminated	An operative wound in which the respiratory, alimentary, genital, or urinary tract 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	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
4. Other factors		
Factor	**Description**	**Risk index score**
Diabetes	Exclude patients who need insulin for peri-operative blood glucose control who have not been diagnosed with diabetes.	1
Body Mass Index	If BMI $\geq$ 35 kg/m^2	1

For example:

Procedure/comment	Wound class score	Reason
Primary arthroplasty procedures	0	Wound meets classification for 'clean'
Major break in sterile technique during surgery	1	Wound meets criteria for contaminated
Revision arthroplasty procedures for mechanical reasons	0	Wound meets classification for 'clean'
Revision arthroplasty for infective reasons	1	Wound meets criteria for dirty/infected

Practice point: Body mass index (BMI) = weight (kg) ÷ height (m)^2 ***e.g. A patient with a weight of 75kg and a height of 1.5m has a BMI as follows:***

BMI = 75 ÷ (1.5m x 1.5m)

BMI = 75 ÷ 2.25

BMI = 33.3 kg/m^2

Appendix A: Definition of a Laboratory Confirmed Blood Stream Infection

For the purposes of HAI surveillance, a laboratory confirmed blood stream infection must meet **either** Criterion 1 or 2.

Criterion 1: Recognised pathogen
o The patient has a recognised pathogen isolated from one or more blood cultures Examples of recognised pathogens include *Staphylococcus aureus, Escherichia coli, Klebsiella pneumoniae, Pseudomonas aeruginosa, Enterobacter* spp.*, Proteus* spp.*, Candida* spp.
Criterion 2: Potential contaminant organisms
o The same (matching) organism is cultured from **two or more** sets of blood cultures drawn on separate occasions within a 48-hour period (see below for more clarification) AND o The patient has at least one of the following signs or symptoms: fever > 38 degrees C, chills, hypotension (within 24 hours of the date of the blood stream infection event)
Comments
Contaminants commonly include those species which are part of the normal skin flora such as diphtheroids *(Corynebacterium* spp.*), Cutibacterium* spp., coagulase negative staphylococci, viridans group streptococci, *Aerococcus* spp., *Micrococcus* spp.. For a more complete list, see the CDC/NSHN common commensal list. If other organisms thought to be contaminants are identified, discuss with your microbiologist for clarification. An **element** refers to each specific event: positive blood cultures; fever; hypotension and chills. Criterion elements must occur in a time frame of not more than 24 hours. For example, positive blood cultures and fever must be present within the same 24-hour period. The same (matching) potential contaminant blood cultures represent a single element. If there are matching organisms in two or more blood cultures, the collection date of the first potential contaminant is be used to determine the date of the blood stream infection event.

Determining the "same" potential contaminant organisms

If potential contaminant organisms are identified to the species level from one culture and a second culture is identified with only a descriptive name (to the genus level) then it is assumed that the organisms are "matching".

Only genus and species identification are required to determine the sameness of organisms, e.g. first culture *Staphylococcus epidermidis*, second culture coagulase-negative staphylococci. These would be considered the same organism. Table 1 below provides some common examples.

Table 1: Examples of the same potential contaminant organism

Culture (species)	Second culture (genus)	Report as
Staphylococcus epidermidis	coagulase-negative staphylococci	*Staphylococcus epidermidis*
Bacillus cereus	*Bacillus* spp.	*Bacillus cereus*
Micrococcus luteus	*Micrococcus* spp.	*Micrococcus luteus*
Streptococcus salivarius	Viridans group streptococci	*Streptococcus salivarius*

Two or more blood cultures on separate occasions

Two or more blood cultures on separate occasions means:

- Blood from at least two blood draws must be collected on the same day **or** within a 48-hour period or two consecutive calendar days (e.g. Monday and Tuesday would be acceptable, but Monday and Wednesday would not if the blood cultures were collected more than 48 hours apart)
- For paediatric patients, a blood culture may consist of a single bottle due to volume constraints. Therefore, to meet Criterion 2, each bottle from two single bottle blood draws would have to be culture positive for the same potential contaminant in the same timeframe as above.

Practice point: Catheter tip cultures are not a substitute for blood cultures for the determination of a blood stream infection. Blood cultures drawn through a central line are included if they are positive.

Appendix B: Central Line Days tally tool

Central Line Days Tally tool		
Month:	**Year:**	**ICU:**
Day of the month	**Centrally Inserted CVC**	**Peripherally Inserted CVC**
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
30		
31		
Total number of lines counted		
At the same time each nominated day, record the number of patients in ICU who have a centrally and peripherally inserted CVC (including VASCATHs). Each patient is counted once irrespective of the number of lines, and preference is given to centrally inserted CVCs.		

Appendix C: References

ACHS: http://www.achs.org.au/

ACHS 2019 Infection control Version 5 Clinical indicator manual

ACI Emergency surgery guidelines CONSULTATION DRAFT October 2019 https://www.aci.health.nsw.gov.au/__data/assets/pdf_file/0005/553244/ACI-Draft-Emergency-Surgery-Guidelines-consultation-draft-October-2019.pdf

ACI Clinical Guidelines (nsw.gov.au)

CDC/NHSN Definitions: http://www.cdc.gov/nhsn/PDFs/pscManual/17pscNosInfDef_current.pdf

CDC Surgical Site Infection (SSI) Event: http://www.cdc.gov/nhsn/PDFs/pscManual/9pscSSIcurrent.pdf?agree=yes&next=Accept

Central Line Associated Blood stream infection in NSW Intensive Care Units (CLABSI ICU) Collaborative: Burrell AR, McLaws ML, Murgo M, Calabria E, Pantle AC, Herkes R. Aseptic insertion of central venous lines to reduce blood stream infection. Med J Aust 2011; 194: 583-587

HISWA: Surveillance Manual - Healthcare Infection Surveillance Western Australia https://ww2.health.wa.gov.au/~/media/Files/Corporate/general%20documents/Infectious%20diseases/PDF/HISWA/surveillance-manual-version-6-oct-2014.pdf

VICNISS: https://www.vicniss.org.au/

Protocol for surgical site infection surveillance with a focus on settings with limited resources. Geneva: World Health Organization; 2018. Licence: CC BY-NC-SA 3.0 IGO

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