Australian Commission on **Safety and Quality** in Health Care

Implementation Guide for the Surveillance of Central Line-Associated Bloodstream Infection

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1 Introduction

1 Introduction

Central line-associated bloodstream infections (CLABSI) are serious infections that usually require significant treatment and increased lengths of stay in hospital; they lead to increased costs and risk of mortality. Most intensive care unit (ICU) patients have a central line (currently referred to as a central venous access device) inserted during their stay. CLABSIs can be prevented through proper insertion techniques and management of the central line.

This Guide was developed by the Australian Commission on Safety and Quality in Health Care (the Commission) to support standardised surveillance of CLABSIs and voluntary national reporting and benchmarking by Australian adult and paediatric ICUs. The Guide also supports CLABSI surveillance in specialty units and admitted care settings, other than ICUs, where central lines are regularly used for patient care. This Guide does not replace or inform clinical assessment of suspected infections. All suspected CLABSIs require appropriate clinical assessment and patient management, regardless of whether they are categorised as reportable.

This Guide supersedes the Commission's *2019 Implementation Guide: Surveillance of Central Line-Associated Bloodstream Infection*. The guide was updated in 2026 to expand best-practice specimen collection techniques, including collection of blood culture samples from a single venepuncture when a second sample is unlikely to be obtained. [1,2] The update also includes revisions to surveillance terminology. Following consultation with the Commission's Infection Prevention and Control Advisory Committee, the term **central line-associated bloodstream infection (CLABSI)** has been retained in preference to **central line-associated bacteraemia (CLAB)** to support consistency with national and international surveillance terminology. **The case definition for CLABSI surveillance has not changed, compared with the 2019 Guide**.

Continuous ongoing surveillance of infections, such as CLABSI, in hospitals is an important quality improvement activity that contributes to safer care for patients and informs strategies to improve practice and minimise preventable CLABSI. CLABSI surveillance is well established in Australian hospitals. Most states and territories have established either voluntary or mandatory reporting requirements for CLABSI and have published local resources to support surveillance and reporting.

The target audience for this Guide is health service organisation ICU clinicians, infection control practitioners and quality and safety managers who are responsible for CLABSI surveillance.

CLABSI are included in the suite of healthcare-associated infections in the Hospital-Acquired Complications (HACs) list that has been endorsed by all Australian Governments as part of a commitment to improving health outcomes for patients and decreasing potentially avoidable demand for public hospital services. HACs are included in the National Health Reform Agreement requirements to incorporate quality and safety into hospital pricing and funding.

The majority of adult and paediatric ICUs contribute to the Australian and New Zealand Intensive Care Society (ANZICS) CORE CLABSI Registry, either directly or via state and territory surveillance programs. Information on ANZICS CORE CLABSI Registry data collection and reporting processes is available from the ANZICS website. Neonatal ICUs participate in CLABSI surveillance as required by their state or territory, and report to the Australian and New Zealand Neonatal Network (ANZNN) using a specifically developed case definition.[3]

The CLABSI surveillance case definition used for this Guide is adapted from the 2026 United States Centers for Disease Control and Prevention (CDC) National Healthcare Safety Network (NHSN) Patient Safety Manual[4] for the Australian health system (Box 1).

Box 1: Central line-associated bloodstream infection case definition

A central line-associated bloodstream infection (CLABSI) is a laboratory-confirmed bloodstream infection in a patient where the central line was in place for >48 hours on the date of the event*

AND

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

CLABSI must meet one of the following criteria:

Criterion 1

A patient of any age 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

A patient of any age has at least one of the following signs or symptoms: fever (>38°C), chills or hypotension.

OR

A patient <1 year of age has at least one of the following signs or symptoms: fever (>38°C core), hypothermia (<36°C core), apnoea or bradycardia

AND

the organism cultured from blood is **not** related to an infection at another site

AND

the same (matching) potential contaminant organism[4] is cultured from **two** or more sets of blood cultures drawn on separate occasions within 24 hours.

Criterion elements, such as positive blood cultures and fever, must occur within a seven-day timeframe (the three days before and the three days after) the day on which the positive blood culture was drawn.

The same (matching) potential contaminant organisms† represent a single element of any of the criteria. The collection date of the first positive blood culture should be used to determine the date of the event.

Notes:

*The Centers for Disease Control (CDC)/National Hospital Safety Network (NHSN) and some Australian states and territories use calendar days (>2 calendar days) as the metric for the duration of central line placement, with device placement being Day 1. A consistent metric must be used, whether it is hours or days.

† Potential contaminant organisms (referred to as common commensals by the NHSN) include: diphtheroids (*Corynebacterium* spp. not *C. diphtheria*), *Bacillus* spp. (not *B. anthracis*), *Propionibacterium* spp., coagulase negative staphylococci (including *S. epidermidis*), viridans group streptococci, *Aerococcus* spp., *Micrococcus* spp., and *Rhodococcus* spp.

2 Classification of CLABSI

2 Classification of CLABSI

The classification of a CLABSI event requires strict application of the case definition by staff responsible for CLABSI surveillance. A clinical and microbiological review is required in collaboration with clinical teams and clinical microbiologists/ infectious diseases physicians where necessary. The methodology to assist with classification of CLABSI is summarised in the flow chart in Section 3.

It is recommended that data are collected on all positive blood cultures in hospitals to accurately determine whether these are healthcare-associated bloodstream infections (including CLABSI). A patient with a CLABSI attributed to ICU may have their first positive blood culture arise on an inpatient ward rather than in ICU. See **Section 3.4** for more information on attribution of the place of acquisition.

The Australian New Zealand Neonatal Network (ANZNN) definition for classification of significance for blood culture isolates is mostly used by neonatal ICUs.[3] In particular, this definition provides guidance on judging the significance of a single set culture that isolates a coagulase negative species of Staphylococcus in pure culture.

2.1 Date of CLABSI event

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

2.2 Repeat CLABSI timeframe

If the CLABSI criteria are met again within 14 days of a CLABSI having been reported, and the same organism(s) is identified, a review should be undertaken to confirm that the positive blood culture is the same event. The review should include consultation with a clinical microbiologist or infectious diseases physician with consideration of the following: the presence of a new line or existing central line, resolution of signs and symptoms of the original infection, negative blood cultures and completion of antimicrobial therapy.

If a new central line has been inserted and the CLABSI criteria are met within the 14-day repeat infection time period, the event should be classified as a new CLABSI. If the new CLABSI event occurs more than 14 days after the previous event, then the CLABSI is always classified as a new event.

2.3 CLABSI and healthcare-associated infections

Healthcare-associated infections (HAIs) are infections that develop at least 48 hours after admission to or contact with a health facility, or within 48 hours of discharge or transfer to another facility. The definition of a HAI underpins the CLABSI definition.

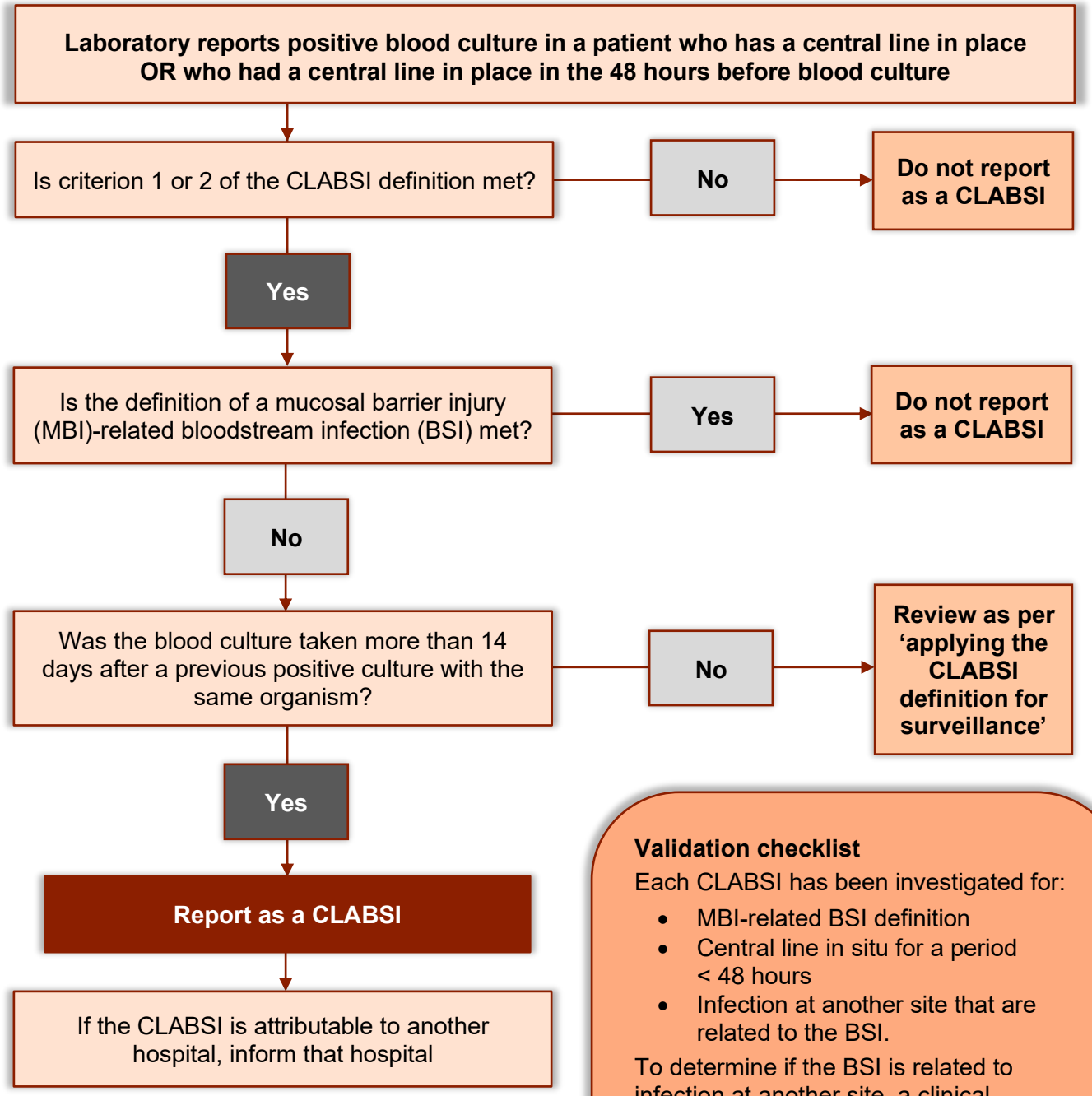
A HAI may be either an inpatient or non-inpatient event. In Australian hospitals, a 48-hour period following inpatient admission or discharge is used to define inpatient HAIs.

2.4 Non-inpatient healthcare-associated infections

Non-inpatient HAIs are infections that are associated with health care that was received as a non-inpatient; for example, emergency departments, outpatient clinics, community health services and home health care services other than hospital in the home. A HAI may also be classified as a non-inpatient healthcare-associated infection if the infection is present or incubating when a patient is admitted into the inpatient service after receiving health care in a non-inpatient service.

3 Applying the CLABSI definition in Surveillance

3 Applying the CLABSI definition in Surveillance



Validation checklist

Each CLABSI has been investigated for:

- MBI-related BSI definition
- Central line in situ for a period < 48 hours
- Infection at another site that are related to the BSI.

To determine if the BSI is related to infection at another site, a clinical assessment must be conducted, and the infection must fulfil definitions of infection specific to that site.

Case that are difficult to classify should be discussed with a microbiologist / infectious diseases physician.

3.1 Interpreting Criterion 1 and Criterion 2

Criterion 1 and 2 may be used for patients of any age, including patients 1 year of age or less.

In Criterion 1, the term “recognised pathogen” includes any organism that is not considered a potential contaminant organism. Examples of recognised pathogens associated with healthcare acquisition include, but are not limited to: *Staphylococcus aureus*, *Enterococcus* spp., *Enterobacter* spp., *Escherichia coli*, *Klebsiella* spp., *Proteus* spp., *Providencia* spp., *Pseudomonas aeruginosa*, *Streptococcus* spp. (excluding viridans streptococcus) and *Candida* spp.

In Criterion 2, the phrase “two or more blood cultures drawn on separate occasions” means that:

- blood from at least two blood draws were collected on the same day or consecutive calendar days (for example, blood draws on Monday and Tuesday would be acceptable, but blood draws on Monday and Wednesday would not meet this criterion)
- Blood cultures are collected as per **Section 4**.
- The blood draw site and culture bottles were decontaminated, and aseptic technique was used when drawing blood for culture.
- Blood was drawn from two separate sites. In the event a second venepuncture was not feasible, both sets should have been obtained from a single venepuncture with adequate blood volume.[1,2]
- at least one bottle from each blood draw is reported by the laboratory as having grown the same potential contaminant organism.

To determine if the bloodstream infection (BSI) is related to infection at another site, a clinical assessment must be conducted, and the infection must fulfil the definition of infection specific to that site. See **Appendix 1** (example 8).

3.2 Timing (application of the 48-hour rule)

To meet the surveillance definition for a CLABSI, a central line must have been in place within 48 hours of the first positive blood culture.

If a patient is admitted or transferred to a health facility with a central line in place, and that is the patient’s only central line, the line must have been accessed in the health facility within 48 hours of the first positive blood culture. Access includes line placement, infusion or withdrawal through the central line.

3.3 Interpreting sameness of potential contaminant organisms

If potential contaminant organisms are identified to the species level from one culture and a companion culture is identified with only a descriptive name (for example, to the genus level), then it is assumed that the organisms are the same (see examples in Table 1).

The local laboratory should be asked to report both positive sets at a species level if this does not initially occur. Most laboratories are now able to reliably speciate these potential contaminant organisms.

For the purposes of CLABSI surveillance, only genus and species identification is required to determine the sameness of organisms.

Table 1 Examples of how to report speciated and unspeciated common potential contaminant organisms identified from blood culture

Culture Report	Companion Culture Report	Report as
Staph. Epidermidis	Coagulase-negative *staphylococci*	*S. epidermidis*
Bacillus spp. (not anthracis)	*B. cereus*	*B. cereus*
Strep. Salivarius	*Strep. viridans*	*S. salivarius*

3.4 Determining location of attribution

The CLABSI is attributed to the location where the patient was assigned on the date of the CLABSI event, unless the Transfer Rule is applicable.

The Transfer Rule is applicable if the date of event occurred within 48 hours of transfer from one location to another in the same facility or a new facility; the CLABSI is attributed to the location from which the patient was transferred. If the patient was in multiple locations within the Transfer Rule time frame, the CLABSI should be attributed to the first location to which the patient was admitted the day before the CLABSI event occurred. Receiving facilities should share information about CLABSIs with the transferring facility to enable all CLABSIs to be reported. Examples of the Transfer Rule are included in **Appendix 1** (examples 6 and 7).

Accurate attribution of location is necessary to inform targeted review and improvement activity at both the clinical unit and health service levels.

3.5 Mucosal barrier injury

Gastrointestinal mucosal barriers may break down as a result of chemotherapy and radiation treatment regimens. This mucosal barrier injury (MBI) can range from inflammation to ulceration and enables translocation of bacteria from the oral cavity or intestinal tract into the bloodstream and may cause a bloodstream infection. See **Appendix 2** for more detail.

A BSI that is caused by an MBI-related organism (where no other organism is isolated and it is not related to an infection at another site) in a neutropenic or allogeneic haemopoietic stem cell transplant patient, with a central line and gastrointestinal graft versus host disease (GI GVHD) or diarrhoea, should not be reported as a CLABSI. However, some states and territories require reporting of these incidents with MBI recorded. See **Appendix 3** for examples of application of MBI-related criteria to neutropenic patients.

3.6 Other considerations

Catheter tip cultures are not a substitute for blood cultures in the determination of CLABSI. The presence or absence of a positive tip culture does not affect the surveillance definition. Catheters can become colonised by an organism that originates from a different body site.

Catheters may have luminal colonisation which may not be detected by usual laboratory culture procedures. In addition, catheters may be contaminated at the time of removal.

Purulent phlebitis confirmed with a positive semi-quantitative culture of a catheter tip, but with either negative blood culture or no blood culture taken, is not a BSI and should not be reported as such.

If there are only clinical signs or symptoms of localised infection at a vascular access site, but no positive culture from the site, and there is a positive blood culture and no other infection can be found, the infection is considered a BSI.

3.7 Scenarios where CLABSI criteria are met, but the infection is excluded from central line association

If CLABSI criteria are met in the following scenarios, the event will not be central line associated and should not be reported as a CLABSI:

a. Presence of extracorporeal life support

Extracorporeal membrane oxygenation (ECMO) or ventricular assist devices (VADs) are present for more than two days on the date of the first positive blood culture, and still in place on the date of the first positive blood culture or the day before.

b. Pus at another vascular access site

Occasionally, a patient with both a central line and another vascular access device will have pus at the other access site. If there is pus at the site of one of the following vascular access devices, and a specimen collected from that site has at least one matching organism to an organism identified in blood, this should not be reported as a CLABSI. Vascular access devices included in the exception are limited to:

- arterial catheters
- arteriovenous fistulae
- arteriovenous grafts
- atrial catheters (also known as transthoracic intra cardiac catheters, those catheters inserted directly into the right or left atrium via the heart wall)
- haemodialysis reliable outflow (HERO) dialysis catheters
- intra-aortic balloon pump (IABP) devices
- non-accessed central line (those neither inserted nor used during current admission)
- peripheral intravenous catheters or midlines.

4 Specimen collection considerations

4 Specimen collection considerations

Blood cultures are required to confirm a CLABSI. Best practice recommends:

- Adults:
  - collect two sets of blood cultures – each set must include one aerobic and one anaerobic bottle
  - collect 8–10 mL per bottle
  - obtain samples from two separate venepuncture sites where possible
  - if a second venepuncture is not possible, both sets may be collected from a single site.[1,2]
- Paediatrics:
  - collect based on local guidelines and clinical indication
  - should not exceed 4% of total blood volume[5-7]
- Obtain samples aseptically:
  - use hand hygiene and gloves (blood exposure is anticipated)
  - ensure the skin or device hub and culture bottle top are disinfected with an appropriate solution and allowed to dry before access
  - if key parts/sites are to likely be touched, sterile gloves should be worn.
- Clinical assessment and local guidance should be considered where venous access or blood volume is a limiting factor.
- The specimen bottles need to be labelled with the site of collection (for example, left cubital fossa).
- Avoid sampling from intravascular devices:
  - blood cultures drawn through intravascular devices can have a higher rate of contamination than blood culture collected through peripheral venepuncture, however all positive blood cultures, regardless of the sites from which they were collected, must be included when conducting CLABSI surveillance[8]
  - if collection from a peripheral cannula is unavoidable, blood collection should be taken at the time of cannula insertion and not afterwards.

5 Surveillance settings

5 Surveillance settings

CLABSI surveillance can be conducted in any healthcare setting.

5.1 Intensive care units

Surveillance of CLABSIs can be stratified by the type of ICU; for example, adult, paediatric or neonatal. This Guide is specific to adult and paediatric ICUs. Some states and territories have surveillance programs that require mandatory reporting of CLABSI from all ICUs.

Where a paediatric ICU (PICU) is co-located with an adult ICU (that is, there are dedicated PICU beds), the paediatric cohort (aged less than 16 years) should be reported separately. Where paediatric patients are admitted to an adult ICU on an ad-hoc basis, data from these patients should be reported with the data from adult patients.

5.2 High dependency/close observation units

Patients cared for in a high dependency/close observation setting co-located with an ICU should be included in ICU surveillance if they are being treated by the same nursing and medical staff within the same physical location.[9]

5.3 Haemodialysis units

Inpatients receiving haemodialysis through a central line should be included in CLABSI surveillance if they are admitted to the ICU or any other patient location where CLABSI surveillance is conducted.

Additional surveillance of haemodialysis access associated bloodstream infections (BSIs) in haemodialysis units may be informed by the definitions and denominator requirements outlined in the CDC/NHSN Dialysis Event Surveillance Protocol.[10]

5.4 Haematology and oncology units

Central lines are essential for the care of haematology and oncology patients who are also at high-risk for CLABSI. These patients are regularly discharged home with central lines in situ and the CLABSI definition used in this Guide is applicable to the surveillance of both inpatient and non-inpatient CLABSI events.

If a patient is admitted with a central line already in place, and it is the patient's only central line, the day of first access in an inpatient location begins the central line day count (Day 1).

If a patient is admitted or transferred to a health facility with a central line in place, and that is the patient's only central line, the line must have been accessed in the health facility within 48 hours of the first positive blood culture to classify a CLABSI.

5.5 Hospital-wide bloodstream infection surveillance

The CLABSI definitions should also be used by states and territories and health service organisations that undertake hospital-wide BSI surveillance to enable standard categorisation of the source of BSI.

6 Calculation of CLABSI rate

6 Calculation of CLABSI rate

CLABSI rate calculation

$$\text{Numerator: number of CLABSI} \quad \text{Denominator: number of central line days} \times 1{,}000$$

6.1 Denominator

The denominator that is used for CLABSI surveillance is central line days; these can be calculated either by tally or tracking methodologies, depending on the population under surveillance.

The count of central line days should include line days related to the exclusion scenarios described in **Section 3.5** (Mucosal barrier injury).

Due to the difficulty in collecting central line days in non-ICU areas, some health services use population-based denominators (for example, patient days or occupied bed days) for local CLABSI surveillance. These denominators should only be used at a local level; they cannot be used for reporting to the ANZICS CORE Registry.

6.2 Collection of line day denominator data

The same time period should be used for the collection of denominator (line day) and numerator (number of CLABSI) data.

Central line days may be calculated by either the tracking or tally method.

6.3 Tracking method

This method is useful for patient groups that have central lines in situ as both inpatients and non-inpatients, such as haematology and oncology patients, and is performed as follows:

- track each patient 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. The day of insertion is Day 1.

6.4 Tally method

This method is useful for inpatient settings where central lines are typically put in during the admission, such as ICU settings, and is performed as follows:

- Count the number of patients that have a central line in situ at approximately the same time each day
- For patients with two or more central lines, count as one central line. For example, only one line day is counted for:
    - a patient with both a subclavian central line for infusions and a femoral dialysis catheter
    - a patient with a centrally inserted central line and a peripherally inserted central catheter.

If a facility is unable to do the tally count every day due to limited resources, a monthly calculation extrapolated from sampling allows for a reasonable estimate of monthly line day data. This may be done as follows:

- **Step 1:** Count the number of patients with one or more central lines in place on a minimum of three non-consecutive days per week
- **Step 2:** Calculate a daily average line day count by dividing the total central line days counted for the month by the number of days on which the count was done within that month
- **Step 3:** Multiply the daily average central line day count by the number of days in the month (for example, 28, 30, 31).

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

In addition to overall CLABSI rates, health service organisations and states and territories may elect to report device-specific CLABSI (for example, tunnelled/non-tunnelled or implanted) or centrally-inserted and peripherally-inserted central lines.

7 Validation of data

7 Validation of data

Quality assurance processes should be implemented to validate CLABSI data prior to submission to the ANZICS CORE CLABSI Registry and for local surveillance programs.

There are a number of resources that may be useful in relation to data validation and HAI surveillance. These include:

- The Commission's Validating Infection Surveillance Data[11] (which includes generic information regarding data validation)
- The Commission's Principles of Healthcare-Associated Infection Surveillance Fact Sheet[12]
- The Commission's infection surveillance and monitoring webpage
- The CDC/NHSN 2024 Toolkit for Data Quality Checks for Reporting Facilities.[13]

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Appendix 1: Examples of application of case definitions for CLABSI surveillance

Appendix 1: Examples of application of case definitions for CLABSI surveillance

This section presents simple scenarios that demonstrate the application of CLABSI surveillance definitions. Complex cases and potentially contentious classifications are not included here, and these should always be discussed with clinical staff and a clinical microbiologist/infectious diseases physician or the state or territory surveillance unit.

To assist with determining if the BSI is related to an infection at another site, the *CDC/NHSN Patient Safety Component Manual Chapter 17: Surveillance Definitions for Specific Types of Infections*[4] may be a useful reference.

If a CLABSI develops on the day of transfer or on the next day (within 48 hours of transfer) from a unit or facility to another unit or facility, the CLABSI should be investigated. If it fits the criteria for a CLABSI, it will be attributed to the transferring unit or facility. Surveillance personnel should inform any transferring facility of a CLABSI that has developed within 48 hours of transfer. Refer to **Section 3.4** for information on the Transfer Rule.

Examples

1. After four days in ICU with a central line in place, a patient is transferred to the surgical ward. On the next day, the patient meets the criteria for a CLABSI. This is reported as a CLABSI for the ICU.
2. Patient in ICU has central line inserted/accessed on 1 June (0700 hours). On 3 June (1100 hours) the central line is still in place, and the patient has blood culture collected that is positive for *S. aureus*. This is a CLABSI because the central line was in place for >48 hours on the date of event.
3. Patient has a central line inserted on 1 June (0700 hours). On 3 June (1100 hours), the central line is removed and on 4 June (0900 hours) the patient has a blood culture collected that is positive for *S. aureus*. This is a CLABSI because the central line was in place for >48 hours (1, 2 and 3 June) and was in place on the day before the date of event.
4. After 15 days in a ward a patient with a central line in place for 10 days is febrile (39°C) and has a blood culture collected that is positive for *S. epidermidis*. The next day, coagulase-negative staphylococcus (CNS) is identified in another blood culture and from a swab of the central line insertion site. *S. epidermidis* is a common skin contaminant, which was isolated in two blood cultures (from separate blood draws) on the same or consecutive days, and meets the criteria for the same organism – that is, identified to species (*S. epidermidis*) and genus (CNS) levels. This is a CLABSI and attributed to the ward where the patient is admitted.
5. On day 3 of a hospital admission, a patient without a central line is transferred from the medical ward to ICU. Later that day, a central line is inserted. The next day, blood cultures are collected and a recognised pathogen is cultured. This would be considered a BSI and attributed to the medical ward. This does not fit the criteria for a CLABSI because the central line was not in place for >48 hours on the date of the event.

6. A patient with a central line is transferred from the medical ward to the ICU. After four days in the ICU, and with the central line still in place, all elements of the criteria for a CLABSI are met. This is reported as a CLABSI for the ICU.
7. After a two-week hospital stay, a patient on a urology ward of Hospital A has a central line removed and is discharged home. The patient is admitted to Hospital B the next day with sepsis and meets the CLABSI criteria. Hospital B should contact Hospital A to notify the hospital of the CLABSI event. The CLABSI should be reported by Hospital A and attributed to the urology ward of Hospital A.
8. A patient with both peripheral and central lines develops a BSI that can clearly be attributed to the peripheral line (for example, pus at the insertion site and matching pathogen from pus and blood). This does not meet the criteria for a CLABSI and should not be reported as such.
9. A patient who is suspected or known to have accessed their own central line develops a BSI. If the infection meets the criteria for a CLABSI, it should be reported as a CLABSI.

Appendix 2: Definition of mucosal barrier injury-related bloodstream infections

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Term	Definition
MBI-related BSI Criterion 1	Patient of any age meets Criterion 1 for CLABSI, with at least one blood culture with only intestinal organisms from the CDC/NHSN MBI organism list with **no other organisms isolated**. **AND** patient meets at least one of the following: 1. Is an allogeneic hematopoietic stem cell transplant recipient within the past year with one of the following documented during same hospitalisation as positive blood culture: a. Grade III or IV Gastrointestinal Graft Versus Host Disease (GI GVHD) b. ≥1 litre diarrhoea in a 24-hour period (or ≥20 mL/kg in a 24-hour period for patients <18 years or age) with onset on or within 7 calendar days before the date the positive blood culture was collected. 2. Is neutropenic, defined as at least two separate calendar days with values of absolute neutrophil count or total white blood cell count (WBC) <500 cells/mm^3 (<0.5 × 10^9/L) on or within a seven-day time period which includes the date the positive blood specimen was collected (Day 1), the three calendar days before and the three calendar days after.[14]
MBI-related BSI Criterion 2	Patient of any age meets Criterion 2 for CLABSI when the blood cultures with only viridans group *Streptococcus* or *Rothia* spp. with **no other organisms isolated** **AND** patient meets as least one of the following: 1. Is an allogeneic hematopoietic stem cell transplant recipient within the past year with one of the following documented during same hospitalisation as positive blood culture: a. Grade III or IV Gastrointestinal Graft Versus Host Disease (GI GVHD) b. ≥1 litre diarrhoea in a 24-hour period (or ≥20 mL/kg in a 24-hour period for patients <18 years of age) with onset on or within seven calendar days before the date the positive blood culture was collected. 2. Is neutropenic, defined as at least two separate calendar days with values of absolute neutrophil count or total white blood cell count (WBC) <500 cells/mm^3 (<0.5 × 10^9/L) on or within a seven-day time period which includes the date the positive blood specimen was collected (Day 1), the three calendar days before and the three calendar days after.[14]

Comments	1. In MBI-related BSI criteria 1 and 2, “no other organism isolated” means there is no isolation in a blood culture of another recognised pathogen (for example, *Staphylococcus aureus*) or two matching common commensals (such as coagulase-negative staphylococci) collected from the blood on separate occasions that would otherwise meet the CLABSI criteria. If this occurs, the infection should not be classified as an MBI-related BSI. 2. Grade III/IV GI GVHD is defined as follows: • In adults: ≥1 L diarrhoea/day or ileus with abdominal pain • In patients <18 years of age: ≥20 m/kg/day of diarrhoea 3. Any combination of absolute neutrophil count (ANC) and/or WBC values can be used to meet neutropenic criteria provided they are collected on separate days within the seven-day period that includes the date of the positive blood specimen (Day 1), the three calendar days before and the three calendar days after.

Adapted from CDC/NHSN Patient Safety Component Manual Chapter 4: Bloodstream Infection Event (Central Line-Associated Bloodstream Infection and Non-Central Line-Associated Bloodstream Infection)[4]

Appendix 3: Examples illustrating the MBI-related criteria for neutropenia

Appendix 3: Examples illustrating the MBI-related criteria for neutropenia

		Day -7	Day -6	Day -5	Day -4	Day -3	Day -2	Day -1	Day 1 †	Day 2	Day 3	Day 4
Pt. A	WBC	100	800	400	300	ND	ND	**320**	**400** +BC* × 1 Candida spp.	ND	550	600
Pt. B	ANC	ND	410	130	ND	ND	**120**	**110**	ND +BC* × 2 viridans strep and fever >38°C	110	300	320
Pt. C	WBC	100	800	400	300	ND	ND	ND	600 +BC* × 1 Candida spp.	**230**	ND	**400**

ND = not done

BC= blood culture

WBC = total white blood cell count

ANC = absolute neutrophil count

Highlight = ANC/WBC <500 cells/mm^3

Bold font = ANC/WBC value used to meet neutropenic criteria

* The definition for neutropenia is included in **Appendix 2** (Definition of mucosal barrier injury-related bloodstream infections) and the **Glossary**

† Day the positive blood specimen was collected

Patient A meets MBI-related BSI Criterion 1 with neutropenia*: Positive blood culture with intestinal organism (*Candida* spp.) and neutropenia. In this case, the WBC values on Day 1 value = 400, and Day -1 value = 320.

Patient B meets MBI-related BSI Criterion 2 with neutropenia*: At least 2 positive blood cultures with viridans group streptococci (in this case, 2 positive), and fever >38°C and neutropenia.* In this case, the ANC values on Day -1 value =110 and Day -2 value = 120. **Note**: Any two of Days -2, -1, 2, 3 and 4 could be used to meet this requirement since WBC or ANC under 500 were present on those days.

Patient C meets MBI-related BSI Criterion 1 with neutropenia*: Positive blood culture with intestinal organism (*Candida* spp.) and neutropenia. In this case, the WBC values on Day 2 = 230 and Day 4 = 400 are used.

Glossary

Glossary

Term	Definition
Blood culture	A laboratory test in which a blood sample is drawn and placed into specialised culture bottles to check for the presence of infection-causing bacteria or fungi.
Bloodstream infection (BSI)	An episode of BSI is a positive blood culture where either: 1. one or more recognised bacterial or fungal pathogens are cultured from one or more blood samples OR 2. if a potential skin contaminant is cultured (for example, coagulase negative staphylococcus, diphtheroid etc.), the patient must have at least one of the following signs and symptoms within 24 hours of the first blood culture being collected: • patient of any age: fever (>38°C), chills, hypotension • patient <1 year of age: fever (>38°C core), hypothermia (<36°C core), apnoea or bradycardia and the same organism(s) is isolated from two or more blood cultures drawn on separate occasions within a 48-hour period.
Central line	An intravascular access device or catheter (now commonly referred to as a central venous access device), which terminates at or close to the heart or in one of the great vessels. The line may be used for infusion, withdrawal of blood, or haemodynamic monitoring. A central line may be inserted centrally or peripherally in the patient; it terminates in one of the great vessels (listed below) or in or near the heart. The following are considered great vessels for the purpose of CLABSI: aorta, pulmonary artery, superior vena cava, inferior vena cava, brachiocephalic veins, internal jugular veins, subclavian veins, external iliac veins, common iliac veins, femoral veins. **Examples of central lines** Tunnelled and non-tunnelled central venous catheters, implanted ports, pulmonary artery catheters, dialysis or haemofiltration catheters in a great vessel and peripherally inserted central catheters. An introducer is considered a central line if the tip is situated in a great vessel. **Examples of devices that are not considered to be central lines for the purpose of CLABSI surveillance** Arterial catheters, arteriovenous fistulas, arteriovenous grafts, atrial catheters (also known as transthoracic intra-cardiac catheters, those catheters inserted directly into the right or left atrium via the heart wall), extracorporeal membrane oxygenation (ECMO), femoral arterial catheters, intra-aortic balloon pump (IABP) devices, haemodialysis reliable outflow (HeRO) dialysis catheters, peripheral intravenous cannulae or midline catheters, and ventricular assist devices (VAD). Pacemaker wires and other solid or non-lumen devices inserted into central blood vessels or the heart are not considered central lines, because fluids are not infused, pushed, or withdrawn through such devices.

	As new devices are introduced into clinical practice, local decisions may be required regarding whether they should be categorised as a central line for the purpose of CLABSI surveillance.
Date of event	The date of the first positive blood culture.
Element	For CLABSI surveillance purposes an element refers to a specific component of the infection definition and includes positive blood culture(s), fever (>38°C), chills and hypotension, hypothermia, apnoea and bradycardia. To meet Criterion 2, the matching (same) potential contaminant blood cultures represent a single element.
Healthcare-associated infection	Healthcare-associated infections (HAIs) are infections that develop at least 48 hours after admission to or contact with a health facility or within 48 hours of discharge or transfer to another facility.
Infection at another site	An infection at a site other than the central line, which is considered the likely source of the BSI. The clinical assessment and/or diagnostic investigation must fulfil the surveillance definitions for "infection at another site" as per the *CDC National Healthcare Safety Network (NHSN) Surveillance Definitions for Specific Types of Infections, Appendix B: Secondary Bloodstream Infection Guide*.[4]
Infusion	Introduction of a solution into a blood vessel via a catheter lumen. Examples include continuous infusions such as hydration or nutritional fluids or medications and intermittent infusions such as flushes or antimicrobial administration or blood in the case of transfusion or haemodialysis.
Mucosal barrier injury	Gastrointestinal mucosal barriers may break down as a result of chemotherapy and radiation treatment regimens. This mucosal barrier injury (MBI) can range from inflammation to ulceration and enables translocation of bacteria from the oral cavity or intestinal tract into the bloodstream and may cause a bloodstream infection. See **Appendix 2** for more detail. A BSI that is caused by an MBI-related organism (where no other organism is isolated and it is not related to an infection at another site) in a neutropenic or allogeneic haemopoietic stem cell transplant patient with a central line and gastrointestinal graft versus host disease or diarrhoea, should not be reported as a CLABSI.
Neutropenia	Neutropenia is defined as at least two separate calendar days with values of absolute neutrophil count or total white blood cell count (WBC) <500 cells/mm^3 (<0.5 × 10^9/L) on or within a seven-day time period which includes the date the positive blood specimen was collected (Day 1), the three calendar days before and the three calendar days after.[14]
Permanent central lines	Examples include: • tunnelled catheters, including certain dialysis catheters; these central lines have a short length of the central line tunnelled subcutaneously between the skin insertion site and the point where the catheter enters the blood vessel • implanted catheters (including ports); these are tunnelled beneath the skin and have a subcutaneous port accessed with a needle.
Potential contaminant organisms	Potential contaminant (or common commensal) organisms of blood cultures include species that are part of the normal skin flora, such as diphtheroids (*Corynebacterium* spp. not including *C. diphtheriae*), *Propionibacterium*

	spp., coagulase-negative staphylococci (including *S. epidermidis*), viridans group streptococci, *Aerococcus* spp., *Micrococcus* spp., and *Rhodococcus* spp., and may include other bacteria that can be found transiently on the skin such as *Bacillus* spp.(not *B. anthracis*), *Pseudomonas* spp. (other than *P. aeruginosa*), *Xanthomonas* spp., *Ralstonia* spp. The CDC NHSN organism lists, including a complete list of common commensals, are at: CDC/NHSN Common Commensals 2024. Some states and territories have developed modified lists of potential contaminant organisms for local use. An organism that is considered a potential contaminant, which is not on the NHSN or local commensal list, should be reviewed in liaison with a clinical microbiologist/infectious diseases physician.
Seven-day time frame	This refers to the three days before and three days after the day on which the positive blood culture was drawn.
Temporary central lines	Non-tunnelled, non-implanted intravascular access catheters. These intravascular devices are usually short term.

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