

Bloodstream Infections

Surveillance Module for rural hospitals
and non-acute settings.

Version 1

Bloodstream infection - surveillance module for rural hospitals and non-acute settings.

Tasmanian Infection Prevention and Control Unit (TIPCU)

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Blood stream infection surveillance

This document provides guidance on how to use the TIPCU Bloodstream Infection (BSI) Surveillance module.

Accompanying tools include;

- BSI investigation flowchart
- BSI event sheet
- BSI investigation guide
- Fact sheet – intravascular catheter associated BSI

Background

Blood stream infections occur when bacteria enter the bloodstream from either a primary focus of infection in an organ, a wound or via an indwelling or implanted device. Health care associated (HCA) BSIs can occur as complications following medical and surgical procedures or the insertion of an intravascular or indwelling device and a patient may acquire a HCA BSI as a result of treatment in hospitals or as an outpatient. HCA BSI's are associated with increased morbidity and mortality and many are potentially preventable.

Aims

- To monitor and measure the incidence of blood stream infections within rural hospitals and non-acute healthcare settings
- Assessment of all laboratory detected blood stream infections to determine if the cause may be related to healthcare.

Inclusion criteria

- Laboratory detection of a recognised pathogen in a blood culture specimen.
- The first positive blood culture per patient is counted.

Exclusion criteria

- Organisms identified as contaminants.
- Subsequent positive blood culture/s with the same organism isolated within 14 days.

Definitions

Recognised Pathogen may include: Staphylococcus aureus Streptococcus pneumoniae, Escherichia coli, Klebsiella, Proteus, Salmonella species, Candida albicans.

Potential contaminant organisms may include: coryneforms (Corynebacterium spp., etc.), coagulase-negative staphylococci, micrococci, Propionibacterium, Bacillus, alpha haemolytic streptococci, environmental Gram-negative bacilli, non-pathogenic Neisseria.

Process for surveillance

The person chosen to undertake BSI Surveillance should be familiar with the BSI Surveillance Definition.

When a positive blood culture is reported to the facility, complete a BSI Event Sheet to assess the circumstances surrounding this event. The BSI flowchart summarises this process.

All healthcare associated BSIs warrant further investigation to establish the cause where possible and to identify infection prevention and control measures that may prevent further HCA BSI's. Refer to the BSI Investigation Guide to assist.

There are three basic steps to identifying a healthcare associated bloodstream infection (HCA BSI)

1. Identify if the positive blood culture is a bloodstream infection or is a contaminant.
2. If it is a bloodstream infection, where was it acquired?
3. If it was acquired as a result of healthcare, define the source of the infection.

The definition used for bloodstream infection surveillance is modified from The Health Care Associated Infection Advisory Committee, Australian Council for Safety and Quality in Health Care (2004), and the CDC/NHSN Surveillance HAI Criteria.

Step 1 - Is the positive blood culture a bloodstream infection or a contaminant?

A bloodstream infection must meet the conditions of Criterion 1 **OR** Criterion 2:

Criterion 1 - recognised pathogens:

- Isolation of one or more recognised bacterial or fungal pathogens from one or more blood cultures

Criterion 2 - potential contaminants:

- The patient has at least one of the following signs and symptoms within 24 hours of a positive blood culture being collected:
 - Fever (>38°C);
 - Chills or rigors; or
 - Hypotension
- For patients ≤1 year of age the signs and symptoms included
 - Fever (>38°C Core)
 - Hypothermia (<36°C Core)
 - Apnoea or bradycardia

AND at least one of the following:

- a. There is isolation of the same potential contaminant from two (2) or more blood cultures drawn on separate occasions within a 48 hour period (isolates identified by suitable microbiological techniques)
- b. There is isolation of a potential contaminant from a single blood culture drawn from a patient with an intravascular line (within 48 hours of the episode) and appropriate antimicrobial therapy against that isolate is commenced.

Items of note:

If you are unclear if the blood culture result represents a recognised pathogen or contaminant contact the microbiology laboratory.

A bloodstream infection due to the same organism(s) that recurs within 14 days of the original event is considered to be the same infection and is not counted as a new episode.

When mixed isolates are obtained with one being an accepted pathogen, the potential contaminant organism is to be disregarded.

A potential contaminant in a patient with an IVD who has been an inpatient for less than 48 hours could be a healthcare associated BSI. Discuss the patient's diagnosis with the treating medical team to determine if the BSI is related to the IVD.

Step 2 - Where was the bloodstream infection acquired?

The bloodstream infection place of acquisition is categorised as either healthcare associated or community associated as follows:

Healthcare associated event (HCA BSI)

- Events that occur >48 hours after admission and was not incubating on admission OR occurs within 48 hours of discharge.

OR

- Events that occur <48 hours after admission and meet **at least one** of the following key clinical criteria:
 - Is a complication of the presence of an indwelling medical device (e.g. IV catheter, urinary catheter);
 - Occurs within thirty days of a surgical procedure, where the bloodstream infection is related to the surgical site infection;
 - An invasive instrumentation or incision related to the bloodstream infection was performed within 48 hours before onset of the infection. If the time interval was longer than 48 hours, there must be compelling evidence that the infection was related to the invasive device or procedure; or
 - Associated with neutropenia ($<1 \times 10^9/L$) contributed to by cytotoxic therapy.

Community-associated

- The BSI is not healthcare associated and manifests <48 hours after admission unless an organism with a long incubation period (e.g., *Salmonella Typhi*) is isolated.

Items of note:

A potential contaminant in a patient with an IVD who has been an inpatient for less than 48 hours could be a healthcare associated BSI. Discuss the patient's diagnosis with the treating medical team to determine if the BSI is related to the IVD.

Step 3 - What is the source of infection of the HCA BSI?

Classify each healthcare associated BSI by the site or the focus of principal site of the infection.

Unknown focus

- A specific site cannot be identified; includes disseminated infections.

Indwelling medical device

- Classify as either intravascular or non intravascular device related BSI
 - Intravascular catheter-associated bloodstream infection - an intravascular catheter was present within 48 hours before the BSI AND the organism/s are not related to an infection at another site.
 - Non-intravascular device associated BSIs - when an indwelling device such a urinary catheter, a percutaneous endoscopic gastrostomy (PEG) tube, chest tube, peritoneal dialysis catheter was in place within 48 hours of the HCA BSI and there is clinical or microbiological evidence of the same causative organism/s associated with the site of device insertion or an organ connected to the device.

Secondary to a surgical site infection

- When the BSI occurs within 30 days of a surgical procedure where a surgical site infection with the same causative organism has been identified

OR

- When the BSI occurs within one year of a surgically implanted prosthesis or device where there is a proven prosthetic or device infection with the same causative organism as the BSI.

Procedure-associated BSIs

- Where an invasive medical, surgical or anaesthetic procedure occurred within 48 hours prior to the BSI.

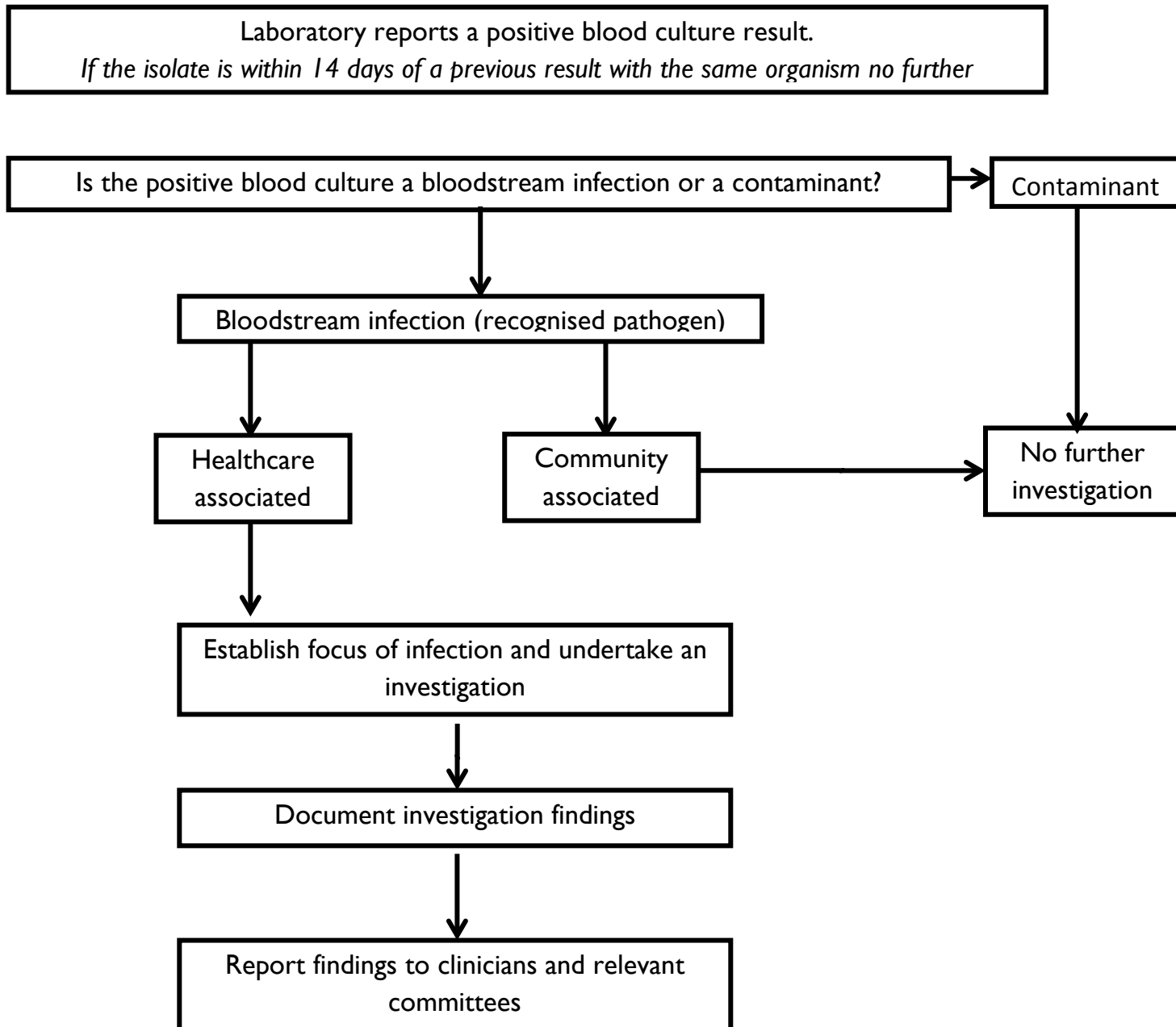
Organ site focus

- There is clinical or bacteriological evidence that the infection arose from a specific organ site.
- Categorise the organ sites into systems/ anatomical areas as listed.
 - Urinary tract
 - Hepatobiliary
 - Central nervous system
 - Gastrointestinal includes gastroenteritis, enterocolitis, peritonitis and other intra-abdominal sources other than liver and biliary tract
 - Respiratory tract
 - Skin and soft tissue
 - Head and neck
 - Cardiovascular includes endocarditis, arterial or venous infection, myocarditis, pericarditis and mediastinitis
 - Bone and joints
 - Genital tract
 - Other

Neutropaenic sepsis associated

- Neutropaenic sepsis is defined as a BSI occurring in a patient with a neutrophil count less than $1 \times 10^9/L$ (1000/mm³).

BSI investigation flowchart



Reporting

Provide feedback from the BSI Surveillance program using the Surveillance Investigation and Reporting Sheet to the relevant clinical staff and report results and findings to the Facility Infection Control Committee and or THO Infection Control Committee.

Blood stream infection event sheet

Patient Identification Details:

PID:

Name:

Date of Birth:

Admission Details:

Date admitted:

Date of discharge:

Ward:

Organism data	
Date of Blood Culture:	Specimen Lab Number:
Organism Name 1:	Organism Name 2:
Was this organism isolated within 14 days of this specimen? (If yes this is considered the same BSI and investigation not required)	<input type="checkbox"/> Yes <input type="checkbox"/> No
Was this organism also isolated from another site? Specify site:	<input type="checkbox"/> Yes <input type="checkbox"/> No
Does the result meet the definition for a bloodstream infection?	
<input type="checkbox"/> No Investigation not required	
<input type="checkbox"/> Yes Meets definition for BSI	
If yes - Criterion 1 (recognised pathogen) <input type="checkbox"/>	Criterion 2 (potential contaminant) <input type="checkbox"/>
Place of acquisition? – tick one category only	
<input type="checkbox"/> Healthcare associated Key clinical criteria a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> (Investigation required)	
<input type="checkbox"/> Community associated (Investigation not required)	
Source of bloodstream infection? - tick one category only	
<input type="checkbox"/> Unknown focus	
<input type="checkbox"/> Indwelling medical device (tick one)	
<input type="checkbox"/> Intravascular Device	
Device Type:	Inserted by: (staff type)
Date Inserted:	Date Removed:
Details documented?	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Non IV device includes implanted prosthesis and devices	
Device type:	
<input type="checkbox"/> Secondary to a surgical site infection	
Surgery type:	Procedure date:
<input type="checkbox"/> Procedure associated	
Procedure type:	Procedure date:
<input type="checkbox"/> Organ site focus	
Organ site:	
<input type="checkbox"/> Neutropaenic sepsis	
Comments:	

Blood stream infection investigation guide

Adapted from the CHRISP Investigation Guide: Bloodstream Infection Signal

Unknown Focus	Comments and findings:
Discuss with the treating doctor to decide on the most probably source.	
Indwelling medical device	
Do you have a policy/guideline/procedure that guides the choice, duration, insertion site, insertion technique, care and maintenance for each device type?	
Is this document current and based on the latest literature?	
Are the relevant staff aware of this document or recent changes?	
Was this policy adhered to in this instance?	
What type of indwelling device(s) did/does this patient have?	
Why was the device inserted?	
How long did this device remain insitu?	
Was the time in situ appropriate for this device type?	
Did regular review of its need take place?	
Was this documented?	
Does your facility participate in the HHA program to promote and improve hand hygiene compliance in clinical areas?	
Secondary to a surgical site infection	
Where was the surgical procedure performed?	
Is the facility where the procedure was performed aware of the infection and subsequent BSI?	
Is the surgeon aware of the surgical site infection and subsequent BSI?	
Has the patient's surgical site infection been treated?	

Blood stream infection investigation guide (continued)

Organ Site Focus	Comments and findings:
Had infection at this site been previously identified?	
Had this infection been treated?	
Non IV device associated	
Was this infection associated with a non IV device such as an implanted prosthesis or device?	
What was the device? (e.g. shunt, prosthetic joint)	
What circumstances surrounding this device may have contributed to this infection?	
Procedure Associated	
What was the procedure?	
What circumstances surrounding this procedure may have contributed to the infection?	
Neutropaenic Sepsis Associated	
White blood cell count of $<1 \times 10^9/L$ associated with neutropenia contributed to by cytotoxic therapy.	

Fact sheet - intravascular catheter associated BSI

The use of IV devices puts patients at risk of local and systemic infectious complications.

The CDC Guidelines for the Prevention of Intravascular Catheter-Related Infections (2011) details a large number of interventions to prevent healthcare associated intravascular device-related bloodstream infections.

Practices which have been identified as important for the management and insertion of IVDs include:

- Education for personnel required to insert and care for intravascular devices regarding indications for use, choice of device, insertion techniques, access care and maintenance.
- Use of appropriate aseptic technique for all aspects of intravascular device insertion and care.
- Hand hygiene practices
- Skin preparation with alcoholic chlorhexidine on insertion
- Scrubbing the access port with an appropriate antiseptic before accessing
- Daily assessment of the need for the device
- Prompt removal as soon as practical
- Daily evaluation of insertion site for tenderness and signs of local infection.
- Defined timeframe for routine replacement of catheters to reduce the risk of phlebitis.

Further information and resources

- NHMRC (2010) Australian Guidelines for the Prevention and Control of Infection in Healthcare. Commonwealth of Australia. <<http://www.nhmrc.gov.au/node/30290>>
- Centers for Disease Control and Prevention Guidelines for the Prevention of Intravascular Catheter-Related Infection; 2011.
http://www.cdc.gov/hicpac/BSI/BSI-guidelines-2011.html?s_cid=w_c_CustomRssWidget_frm_001
- Hand Hygiene Australia < www.hha.org.au >
- Australian Commission for Safety and Quality in Healthcare
<<http://www.safetyandquality.gov.au/>>

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