Blood Culture Collection Guideline

1. Purpose

Blood cultures enable detection of bacteria or fungi in the blood and guide the appropriate selection of antimicrobials.[1] The purpose of this guideline is to provide WA Country Health Service (WACHS) staff with guidance on blood culture collection to optimise patient outcomes and stewardship of pathology testing.

This guideline should be read in conjunction with the following WACHS policy documents:

- Aseptic Technique Policy
- Hand Hygiene Policy
- Medical Management of Neutropenic Sepsis - Febrile Neutropenia in Adult Oncology - Haematology Patients Procedure
- Peripheral Intravenous Cannula (PIVC) Guideline
- Specimen Collection and Transport Procedure
- WACHS Sepsis Pathways.

2. Guideline

ATTENTION

When assessing a patient with signs and symtpoms of infection, determine if blood cultures are indicated and if so:

- collect the correct volume and sets (i.e. two sets for an adult).
- use aseptic collection technique.
- minimise delay in transport to the laboratory.
- ensure results are monitored and acted on appropriately.

Bloodstream infections (BSIs) may range in severity from relatively minor to life-threatening with consequences dependent on factors such as pathogen virulence, load, and host factors such as age, comorbidities and genetic susceptibility.

BSIs are commonly associated with sepsis, where the host response to infection results in life-threatening organ dysfunction and shock. Identifying the causative organism is important for optimal patient management and antimicrobial stewardship.

Accurate detection of BSIs utilising blood cultures depends on:

- patient selection.
- collection of sufficient volume and sets.
- aseptic collection technique.

Patients, family and carers should have access to an Aboriginal staff member or a language interpreter to facilitate appropriate communication. Refer to MP 0051/17 - Language Services Policy for further guidance.

2.1 Patient selection

Deciding when to collect blood cultures involves assessing pre-test probability. Collection of blood cultures in patients with a low likelihood of BSI increases the risk of a false-positive (contaminated) result. This leads to additional costs and potential harm from unnecessary treatment.

Adults (≥ 16 years)

The following criteria should be applied when considering whether to collect blood cultures in adults with clinical signs and symptoms of infection.[2,3]

a. Blood cultures indicated

- neutropenia/immunosuppression and fever (refer to the WACHS Medical Management of Neutropenic Sepsis - Febrile Neutropenia in Adult Oncology - Haematology Patients Procedure)
- suspected intravascular source of infection, e.g. valvular heart disease, indwelling vascular device, intravenous (IV) drug use, recent invasive procedure
- suspected osteomyelitis/septic arthritis, discitis, epidural abscess, meningitis
- organ dysfunction, i.e. sepsis, denoted by one or more of the following:
  - acute confusional state
  - tachypnoea
  - acute renal impairment
  - acute thrombocytopenia
  - acute elevated bilirubin (in absence of liver/biliary disease)
  - blood lactate > 2 mmol/L
  - shock.

b. Blood cultures less useful

- fever alone in the absence of signs or symptoms of organ dysfunction or other risk factors (as above)
- uncomplicated pneumonia, cellulitis or urinary tract infection
- clinically likely viral aetiology e.g. coryzal symptoms/signs.

c. Blood cultures are usually not indicated when

- the patient is unlikely to require admission
- the patient is already on IV antibiotics and adequate blood cultures have already been collected in past 48 hours.

Children (<16 years)

In children, the threshold for collecting bloods is higher than in adults. Serious infection is a frequent differential diagnosis in the unwell infant or child and it is therefore appropriate that blood cultures are collected at the time of obtaining intravenous access in the majority of instances.

2.2 Collection of sufficient volume and site selection

Accurate detection of BSI requires the right volume to be collected from the right patient site. Sensitivity and time to obtain a result are optimised by collecting the recommended volume.[4]

Adults

A blood culture set consists of a pair of BD BACTEC™ bottles - one aerobic (blue top) and one anaerobic (purple top) bottle. Each should be filled with 8–10 mL of blood, with the aerobic (blue top) bottle filled first. Bottles should not be overfilled.

A minimum of 30–40 mL is recommended – i.e. **two** anaerobic/aerobic sets.

Collecting two blood culture samples from separate sites may assist with differentiating a contaminated result from a true positive result. However, in one study, a single-site sampling protocol led to a significant reduction in solitary sets and increased diagnostic yield, with no increase in the rate of contaminated samples.[5] It may therefore be acceptable to collect the recommended volume in a single draw. The exception is suspected indwelling line infection - blood cultures should be drawn from the device, as well as a set from a peripheral site.

Children

A single BACTEC Peds Plus™ aerobic blood culture bottle is used for small children. It is optimised for a sample volume of 1-3mls. For older children, standard paired aerobic/anaerobic bottles are preferred. Table 1 describes the optimal volume and bottles to collect based on weight.[6]

Table 1: Optimal collection volumes[6]

Patient weight	Paired BACTEC™ aerobic/anaerobic blood cultures	BACTEC Peds Plus™ blood cultures
Neonates	Not recommended	**Preferred:** < 28 weeks 0.5 mL > 28 weeks 1 mL
< 10 kg	Not recommended	**Preferred:** 1–3 mL
10 – 20 kg	Not recommended	**Preferred:** 3 mL (max 5 mL per bottle)
20 – 40 kg	**Preferred:** 10–16 mL (5–8 mL per bottle)	Alternative: Divide between multiple bottles (max 5 mL per bottle)
> 40 kg	**Preferred:** 20 mL (10 mL per bottle)	Alternative: Divide between multiple bottles (maximum 5 mL per bottle)

Alternatively, for **children** 1 year or over a useful rule of thumb is to collect 1 mL per year of life, i.e. for a 5 year old collect 5 mL.[7]

For both adults and children, **specialist advice** may suggest variation from this general guidance. For example,

- suspected endocarditis: at least three sets of blood cultures should be collected, with additional samples often required over a period of days
- suspected anaerobic infection in a young child, anaerobic bottles are collected.
- in some situations, blood cultures are used to determine 'clearance' of a known BSI.

2.3 Transporting blood culture bottles to the lab

Once collected, blood culture bottles should be transferred promptly for processing in the laboratory - ideally within four hours of collection. Both the sensitivity of the test and the time to detection of a positive sample are adversely affected by delays in being placed in an incubator. Local arrangements to minimise delay should be developed. For example, if a patient is to be transferred from a site without an on-site laboratory, send collected blood culture bottles with them for processing at the destination hospital.

Blood cultures **should not** be refrigerated while awaiting or during transfer to the laboratory. Refer to the PathWest Test Directory (Search 'blood culture').

2.4 Minimising contamination through appropriate collection technique

Contaminated or 'false-positive' blood culture results occur when a non-pathogenic organism, such as a skin commensal, is introduced during the collection process.

The initial detection of an organism by the automated blood culture processing system prompts a Gram stain to start the preliminary identification process. It can take a further 24 hours or more for definitive testing to identify the specific organism completely. Depending on the clinical situation, this can require continued parenteral antimicrobial treatment because it is unknown whether or not the organism is pathogenic. This involves additional time and cost.

Reducing the rate of contaminated cultures depends upon **aseptic technique** during the collection and handling of blood cultures. WACHS provides an aseptic technique training program with practical assessment. Refer to the WACHS Aseptic Technique Policy for full details and requirements.

Blood cultures should be collected using aseptic technique from a fresh venepuncture (including at the time of insertion of an intravenous cannula or arterial line).

2.5 Timing of blood culture collection

Whenever possible, blood cultures should be collected before antimicrobial treatment. There is minimal evidence to support the practice of 'timing' blood culture collection with the presence of pyrexia. When indicated, blood cultures should be collected at the time of assessment and not deferred, for example, to a phlebotomy blood round.

3. References

1. Cheng MP, Stenstrom R, Paquette K, et al. Blood Culture Results Before and After Antimicrobial Administration in Patients with Severe Manifestations of Sepsis: A Diagnostic Study. Ann Intern Med 2019; 171:547
2. Fabre V, Sharara SL, Salinas AB, et al. Does This Patient Need Blood Cultures? A Scoping Review of Indications for Blood Cultures in Adult Nonneutropenic Inpatients. Clin Infect Dis 2020; 71:1339.
3. Shapiro N, Wolfe R, Wright S, Moore R, Bates D. Who needs a blood culture? A prospectively derived and validated prediction rule. J Emerg Med 2008;35:255-64
4. Lee A, Mirrett S, Reller LB, Weinstein MP. Detection of bloodstream infection in adults: how many blood cultures are needed? J Clin Micro 2007;45(11):3546-3548
5. Ekwall-Larson A, Yu D, Dinnetx P, et al. Single-site sampling versus multisite sampling for blood cultures: a retrospective clinical study. J Clin Microbiol 2022;60(2):e01935-21
6. Government of Western Australia, Child and Adolescent Health Service. Blood Culture Collection Clinical Practice Guideline. Perth WA; Perth Childrens Hospital. Dec 2022 [Accessed 04 September 2025]
7. Therapeutic Guidelines [Internet]. Melbourne: Therapeutic Guideline Limited; 2023 March. Principles of obtaining blood for culture; Marh 2025 [Accessed 1 July 2025]
8. Clinical and Laboratory Standards Institute. 2022. Principles and Procedures for Blood Cultures; 2nd Edition. CLSI Document M47-E2. Clinical and Laboratory Standards Institute
9. Garcia RA, Spitzer ED, Beudry J, et al. Multidisciplinary team review of best practices for collection and handling of blood cultures to determine effective interventions for increasing the yield of true positive bacteraemias, reducing contamination, and eliminating false-positive central line-associated bloodstream infections. Am J Infect Control 2015;43:1222-37
10. Australian Commission on Safety and Quality in Health Care. Antimicrobial Stewardship Clinical Care Standard. Sydney: ACSQHC; 2020 [Accessed 04 September 2025]

4. Definitions

Term	Definition
Antimicrobial	A substance that inhibits or destroys bacteria, parasites, viruses or fungi, and can be safely administered to humans or animals. Used when broadly referring to agents used to treat or prevent infections caused by microorganisms, the term embraces antibacterial, antifungal, antiviral, antiparasitic and antiseptic agents[10]
Bloodstream infection	Bloodstream infection (BSI) is the presence of pathogenic organisms (e.g. bacteria, fungi, parasites, viruses) in the blood.
Sepsis	A life-threatening condition that arises when the body's response to infection injures its own tissues and organs. Sepsis can present in any patient and in any clinical setting, and is a medical emergency. It is one of the leading causes of inpatient death worldwide[10]

Document Summary

Coverage	WACHS Wide
Audience	Medical officers, nurses and midwives working in settings where blood cultures may need to be collected.
Records Management	Health Record Management Policy
Related Legislation	*Health Practitioner Regulation National Law (WA) Act 2010* (WA)
Related Mandatory Policies / Frameworks	• MP 0038/16 - Insertion and Management of Peripheral Intravenous Cannulae in Healthcare Facilities Policy • MP 0051/17 - Language Services Policy • Public Health Framework
Related WACHS Policy Documents	• Hand Hygiene Policy • Aseptic Technique Policy • Medical Management of Neutropenic Sepsis - Febrile Neutropenia in Adult Oncology - Haematology Patients Procedure • Peripheral Intravenous Cannula (PIVC) Guideline • Specimen Collection and Transport Procedure
Other Related Documents	Nil
Related Forms	Nil
Related Training	Available from MyLearning: • Aseptic Technique: Theory (ICATC EL2) • Aseptic Technique: Surgical Declaration (ICATS EL3) Aseptic Technique: Standard Declaration (ICATC EL3)
Aboriginal Health Impact Statement Declaration (ISD)	ISD Record ID: 4847
National Safety and Quality Health Service (NSQHS) Standards	3.11, 8.04, 8.10
Aged Care Quality Standards	N/A
Chief Psychiatrist's Standards for Clinical Care	N/A
Other Standards (please specify and include link)	N/A

8. Document Control

Version	Published date	Current from	Summary of changes
1.00	6 Jan 2026	6 Jan 2026	New guideline

9. Approval

Policy Owner	Executive Director Clinical Excellence
Co-approver	Nil
Contact	Director Safety and Quality
Business Unit	WACHS Safety and Quality
EDRMS #	ED-WA-25-501765

This document can be made available in alternative formats on request.