



# Blood Culture Sampling Guideline – Adult



## SUMMARY

This guideline outlines evidence-based practice for obtaining blood cultures in adult patients with suspected sepsis.

### Key Messages:

1. Two sets (4 bottles) of blood cultures are a minimum for each sepsis episode
2. The two sets must be obtained aseptically and from two different peripheral veins (in the same timeframe)
3. Clean the skin with 70% alcohol and then with chlorhexidine and 70% alcohol (reduces skin contamination of blood cultures), allow to dry for 30 seconds
4. Remove the caps and clean the tops of the blood culture bottles with chlorhexidine and 70% alcohol swabs and allow to dry for 30 seconds
5. Fill each bottle with 10mL blood (total 40mL); do not over or under fill
6. Do not take blood cultures from a pre-existing central, peripheral or arterial line
7. Where a catheter-related blood stream infection is suspected, a blood culture set from the pre-existing vascular access device may be required in conjunction with a peripheral site set of blood cultures. This must be specifically discussed with the Consultant responsible for the care of the patient and the sites of collection noted on the request form
8. Where multiple stabs may be required in patients with difficult access, one blood culture set may be drawn from a freshly inserted, unused IV cannula that was inserted under aseptic technique. The second set is drawn at the same time from a peripheral venepuncture

### In what clinical situations should blood cultures be taken?

All patients

- who meet criteria for commencement on the [Adult Sepsis Pathway](#)
- with SEVERE pneumonia as scored by CORB/SMARTCOP
- with fever or history of fever and suspected or proven neutropaenia
- with fever and who are immunocompromised
- with a fever or evidence of infection and a vascular access device
- overseas travellers with fever
- with suspected bacterial endocarditis take **3 sets** (or 6 sets if the patient has received antibiotics within the last 30 days)<sup>2</sup>
- with delirium

Selected patients with fever of unknown origin who appear unwell or are at risk of sudden deterioration, such as the elderly (age  $\geq 65$ ) or chronically ill, but do not meet criteria for the sepsis pathway may benefit from blood cultures. Discuss these patients with the Staff Specialist or Senior Doctor in charge of the department/overseeing care to the patient.

### TRANSPORT

- Blood culture sample sets should be stored at room temperature prior to collection
- Where collection is delayed, the facility should liaise with the receiving laboratory to establish a simple guideline for sample storage



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## PROCEDURE

1. Perform hand hygiene - Moment 1, before touching the patient
2. Check patient identification, inform patient of the procedure and its purpose
3. Ensure that the relevant history and tests are stated on the blood culture request form as this may affect incubation requirements
4. Collect all equipment required (including personal protection equipment) and place on a trolley cleaned with alcohol-based wipes and bring to the patient zone
  - Two blood culture sets (4 bottles) comprising two aerobic and two anaerobic bottles
  - Check expiry date for each bottle and mark 10mL above the broth for fill level
  - Sterile gloves, small dressing pack, cotton balls, tape, tourniquet(s)
  - Chlorhexidine gluconate (> 0.5%) with 70% alcohol solution, opened onto the sterile field or chlorhexidine and 70% alcohol swabs x 6 or more, opened onto the sterile field
  - Vacutainer and leash with winged infusion set designed to fit over the blood culture bottle
    - if unavailable, use a winged infusion set with luer adapter and syringe
    - once a blood sample has been obtained using a syringe, attach a blood transfer device to the syringe to enable safe inoculation of the blood culture bottles
5. Remove the cap of each blood culture bottle and using a non-touch technique scrub the vial stoppers well using a fresh chlorhexidine and 70% alcohol swab and allow to dry for 30 seconds
6. Prepare winged infusion set and vacutainer, prepare other equipment
7. Position patient appropriately, apply tourniquet to palpate and identify appropriate vein
8. Perform hand hygiene – Moment 2, before the procedure
9. Put on sterile gloves (essential if re-palpation occurs post cleansing of the venepuncture site)
10. Using chlorhexidine with 70% alcohol swabs, disinfect the venepuncture site using a scrubbing motion, use a fresh swab for each scrub. Use 2-3 scrubs. Do this for a total of 1-2 minutes, allowing the site to dry (approximately 30 seconds)<sup>3</sup>
11. Perform venepuncture using vacutainer and leash with winged infusion set/luer adapter (release tourniquet during procedure where appropriate, this will contaminate the gloved hand and using a sterile towel or the non-dominant hand is advised)
12. Place 10mL blood per bottle (20mL/set, 40mL in total), keeping blood culture bottle upright and at/below the level of the venepuncture
13. Always collect/inoculate the blood culture bottles FIRST (inoculating the **aerobic** bottle first) then, if required, collect additional blood pathology tubes at this point
14. Apply cotton ball and pressure to site (where possible obtain patient assistance to hold and apply pressure); repeat procedure for 2<sup>nd</sup> set of blood cultures at a different peripheral site, maintaining aseptic technique, invert bottles gently several times to prevent clotting
15. Discard sharps, collect all rubbish/dirty items and dispose appropriately
16. Label each bottle with patient name, MRN, date/time for collection of blood and location of site used for each set. Do not cover any bar codes or the bottom of the bottle
17. Place bottles into biohazard bag and arrange to send to the lab with request form, transport bottles at room temperature
18. Remove gloves and perform hand hygiene – Moment 3, after the procedure
19. Explain to patient that results may not be available for 48 hours, conclude procedure
20. Document that (a) two sets of blood cultures have been taken, (b) from which sites, (c) include reason for site choice if this differs from a peripheral site
21. Do not delay administering antibiotics, do not wait for results, see the [CEC Sepsis Adult FIRST DOSE Empiric IV Antibiotic Guideline](#).

**For Paediatric Blood Culture** (infant/small child): use one paediatric aerobic bottle and fill with 0.5mL to 4mL blood. If the child is less than 2 months of age, use only 70% alcohol swabs. Using a spiral motion clean from the proposed puncture site outwards and use a fresh swab for each spiral. Do this for 1-2 minutes and allow to dry.

### Frequently Asked Questions:

**Q1: Why do I need to use an aseptic technique? Why do I need to use a dressing pack?**

Aseptic technique using a dressing pack prevents contamination of the sample and a false positive result.

**Q2: Why do I need to wear sterile gloves?**

Sterile gloves should be worn if there is the risk of re-palpating the cleansed site.

**Q4: Why should I take an anaerobic bottle as part of a set of blood cultures?**

An anaerobic bottle is now recommended as improvements in broth medium and pathology equipment have increased anaerobic yield and some aerobic organisms will signal faster in an anaerobic bottle.

**Q5: Why 2 sets (4 bottles) of blood cultures?**

A single set (2 bottles) may miss up to 40% of bacteraemias/fungaemias and if only one set is taken and it is positive it could be the result of a contaminant (false positive result). Two sets showing growth makes it easier to eliminate the risk that a skin contaminant has been cultured. Taking blood from separate sites is a further aid.

**Q6: Do you have to wait between taking the first and second set of blood cultures?**

No. If 2 sets of blood cultures are taken from different peripheral sites and antibiotics have not been given, there is no reason to delay between taking the blood cultures.

**Q7: My ED has a once daily collection of pathology. When treating patients with suspected sepsis we give antibiotics and then transfer the patient to a referral facility. Wouldn't it be more efficient to let the receiving hospital (with onsite pathology services) take the blood cultures?**

No. Once you have given IV antibiotics, it will then be difficult to grow an organism in the blood culture bottle. Also, having given your first dose of empirical antibiotics you would then want to review results when available to prescribe targeted ongoing therapy.

**Q8: Most blood cultures come back negative – why bother taking them?**

There are many ways to render a blood culture worthless. If you follow this Blood Culture Sampling guideline, you can help reduce false negative/positive results. Remember to use aseptic technique, obtain the correct volume required for each bottle in each set of blood cultures (10mL/bottle, total of 4 bottles, 2 from a peripheral site; repeat). Where an inadequate blood volume sample is obtained, blood volume  $\leq$  10mL should be placed solely into the aerobic bottle. Do not overfill the bottles as this also impedes detection (the culture result is less sensitive).

**Q9: Why do I need to clean the tops of the blood culture bottles after removing the caps?**

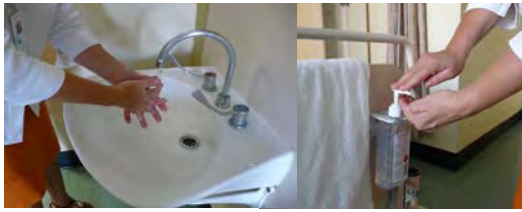
The tops of the blood culture bottles are clean but may become contaminated. Clean the tops using aseptic technique prior to inoculating the bottles with blood.

### REFERENCES

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For further enquiries contact the CEC Sepsis Program Manager via [email](#)



1. Assemble equipment, use sterile field and aseptic technique.



2. Vacutainer and winged blood collection kit can be used; take blood cultures first then other blood samples.



3. Mark 10mL above the broth level, remove caps from bottles and clean vial stoppers with chlorhexidine and 70% alcohol swabs. Allow to dry for 30 seconds.



4. Clean vein site with chlorhexidine and 70% alcohol swabs in a scrubbing motion for 1 minute, using multiple swabs. Allow to dry for 30 seconds. Do not re-palpate vein.



5. If there is a risk of re-palpating the cleansed site, wear sterile gloves when performing venepuncture for blood culture sampling. Keep blood culture bottle upright, insert into vacutainer. Collect 10mL blood per bottle and inoculate the aerobic bottle first.



6. Remove winged collection set, cover the venepuncture site and apply pressure.

Dispose of sharps appropriately.



7. Gently mix blood with broth, keep at room temperature and send promptly to the lab as an urgent request. Do not cover bar codes or base of bottle and state from which site the blood culture set was obtained.



8. Finally:

Repeat process for second set of blood cultures.  
Label and complete request form.  
Document in health care record that blood cultures were sent to lab (date/time).  
Give antibiotics as soon as possible and as indicated. Do not delay antibiotic therapy.