BLOOD CULTURES- When and How to take them

INDICATIONS:

Blood cultures should only be taken when there is a clinical reason to suspect a septicaemia. Blood cultures should not be taken for routine assessment or for the investigation of a localised infection.

CLINICAL SYMPTOMS INDICATING SEPSIS ARE:

- Temperature of >38° or < 36° (normal range 36.5° – 37.5°)
- Tachycardia, sustained hypotension, tachypnoea
- Chills or rigors
- Raised or very low white blood cell count
- New signs of confusion or worsening signs of existing confusion
- Unexplained raised CRP in an immunosuppressed patient can be associated with a septicaemia even without a fever.
- Please note that the signs of sepsis may be minimal or absent in the very young or elderly.

Not all the symptoms listed above are indicative of sepsis for example low grade fever within 24 hours of surgery is not specific for septicaemia.[1]

Where signs of sepsis are present 'PAIRED SAMPLES' i.e. two sets of cultures (4 bottles) from two different sites are required for adults[1]. Blood cultures should be taken before administration of antibiotics. Refer to the 'CLAB Zero Guidelines flow chart'

PATIENTS ON ANTIBIOTICS:

- Blood cultures should be taken when clinically indicated by the patient's symptoms of a spike in temperature of
- >38° rigors, new onset confusion.
- Do not draw from a lumen that has had an antibiotic/antimicrobial agent administered through it during the previous hour.[1]
- Advice should be sought from the Microbiologist who will make the decision to stop antibiotics to allow for repeat blood culturing.
- Current antimicrobial information should be indicated on the lab request form.

If endocarditis is suspected please refer to current guidelines regarding blood culture sample timing[12/13]

TIMING OF COLLECTING SAMPLES:

- **The peripheral vein sample should be collected first. Sets taken from either CVAD, peripheral or both sites should be obtained sequentially or within 12 hours of each other**
- The volumes of blood obtained from both sites must match to ensure accuracy e.g. if only 10mL is obtained from the peripheral vein, obtain 10mL from the CVAD[1,4]
- When taking blood from both the CVAD and from a peripheral vein, ensure that the site of each sample is clearly labelled on the culture bottles and the request form.[1, 3]

Collecting peripheral blood cultures:

- Blood cultures should be taken from a suitable, previously unused venepuncture site.[2]
- Blood cultures should not routinely be taken from existing central catheters or peripheral venous cannulae where there is no indication of sepsis.[2,6,7]

Collecting Central Venous Access Device (CVAD) blood cultures:

- If the CVAD is the suspected source of sepsis then taking blood cultures from the CVAD is appropriate.
- Blood cultures should be taken from a CVAD in combination with a separate peripheral IV sample when investigating potential central venous catheter-related septicaemia.[3] Samples should be taken from one lumen and clearly labelled as to which lumen the sample have been obtained from.

Exception: Clinical Haematology /Oncology please follow in house policy

Table 1

Patient Group	Total Volume	Aerobic bottle	Anaerobic bottle
Adult/ Adolescent **(peripheral)**	**20mL (recommended)**	**10mL**	**10mL**
Adult/ Adolescent **(CVAD)**	**20mL (recommended)**	**10mL**	**10mL**
Older children	**5 ml max**	**5mL** (optimal) Paediatric pink bottle	
Infants	**1-3 ml max**	**3ml** (optimal) Paediatric pink bottle	
Neonates	**1ml (min)-3mL according to weight**	**1ml (min)-3mL**(optimal) Paediatric pink bottle	
It may not always be possible to obtain 20mL of blood from an adult. In that case divide the volume in half for each culture bottle. A minimum volume for adults is 5mL per bottle [1,4]			

EXCEPTIONS:

Obtaining CVAD blood cultures as the single source

When peripheral IV access is clinically impossible and the only available source is the CVAD, a blood culture specimen may be taken from the CVAD. The source of the blood culture and the reasons for using a CVAD must be clearly documented on the blood request form and in the patient's clinical notes.[5]

Obtaining blood cultures from patients in ED

Blood cultures are not routinely taken from patients in ED who do not require admission.
Where a patient is unwell enough to require admission obtaining blood cultures may be indicated
Blood cultures may be taken on occasion early in the ED assessment stage when admission is thought likely but subsequent review results in the patient's discharge [3]

Blood Cultures should NOT be taken from the following sites

- From a peripheral IV cannula
- Veins which are immediately proximal to an existing peripheral IV cannula.
- A femoral vein due to difficulty in skin disinfection of the site. This area poses a high risk of contamination. If there a femoral stab is the only option this information must be clearly documented on the *'site' section* of the blood culture request form and documented in the patient's clinical notes [3,7]

- A blood culture set includes to 2 culture bottles
- One **BLUE** top Aerobic
- One **PURPLE** top Anaerobic
- Air must not enter the **PURPLE** topped bottle when transferring blood into the bottle.

NB. Paediatric bottles have PINK tops

When labelling bottles:

- If using a large patient ID label place around the neck of bottle
- If using a small ID label place below Bar
- Do not cover the bar code on the side

Figure 1

HOW TO TAKE PERIPHERAL BLOOD CULTURES FOR RELIABLE RESULTS

N.B. *Draw the peripheral samples first .Draw blood cultures prior to other blood samples*

EQUIPMENT

- Safety butterfly needle
- Dressing for IV puncture site
- Vacutainer holder
- 3 x 2% Chlorhexidine Gluconate & 70% alcohol wipe
- Tourniquet
- Non sterile gloves
- Alcohol Based Hand rub (ABHR)
- Blood culture bottles:
    - **Adult and adolescents**: Two sets consisting of two bottles (aerobic and anaerobic)
    - **Children**: One pink top bottle.
    - Sharps container
    - Point of use alcohol based hand rub (ABHR)

PROCEDURE

1. Identify patient
2. Gather equipment, check expiry date on bottom of culture bottles, a central yellow dot indicates contamination (expired culture bottles may give false negative result),
3. Perform hand hygiene wash hands with soap and water or use ABHR[11] If the patient ha**s** visibly soiled skin wash area with soap and water and dry
4. Remove metal caps from bottles and scrub the rubber bung surface of each bottle with a separate 2% chlorhexidine & 70% alcohol wipe, leave wipes on top of bottles during skin preparation and remove just prior to inoculation the bottle[5] (**Figure 2)**
5. Apply tourniquet and palpate vein. Identify a suitable venepuncture site first before disinfecting the skin. Release tourniquet.
6. Use a 2% chlorhexidine & 70% alcohol wipe, clean for 30 seconds and allow to air dry. **IMPORTANT: skin drying is essential to achieve adequate skin disinfection. Do not palpate vein again after cleaning patient's skin.**
7. Prepare safety butterfly needle and vacutainer holder. Re-apply tourniquet
8. Perform hand hygiene before applying clean non sterile gloves.
9. Insert butterfly needle into selected vein
10. Place vacutainer over blood culture bottle and pierce septum**. IMPORTANT: Fill AEROBIC bottle first (blue top) to ensure all air is removed from the butterfly and tubing.**[1]
11. Remove **AEROBIC** bottle and insert **ANAEROBIC** bottle into the vacutainer holder and when this has filled disconnect it from vacutainer holder before the needle is removed from the vein to avoid air entering the bottle.
12. Keep bottles in upright position during collection. Use the bottle graduation lines to accurately gauge sample volume **(Figure 3).** Collect **10mL** into each blood culture bottle or according to Table one
13. Gently mix each bottle
14. Release tourniquet and remove needle. Apply pressure to site with appropriate dressing
15. Discard safety butterfly needle and vacutainer into sharps container.
16. Remove gloves and perform hand hygiene using ABHR
17. Label each blood culture bottle **'Peripheral'**. Do not cover bar code on bottles with patient labels.
18. Place in the special blood culture cones / bio hazard bags and send to the laboratory with the blood request form
19. Record the procedure in the patient's clinical notes
20. Repeat procedure for each set collected

Figure 2 scrub rubber bungs

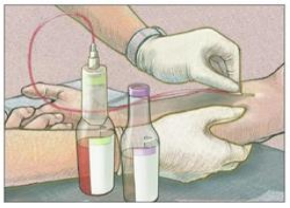


Figure 3, keep bottles upright

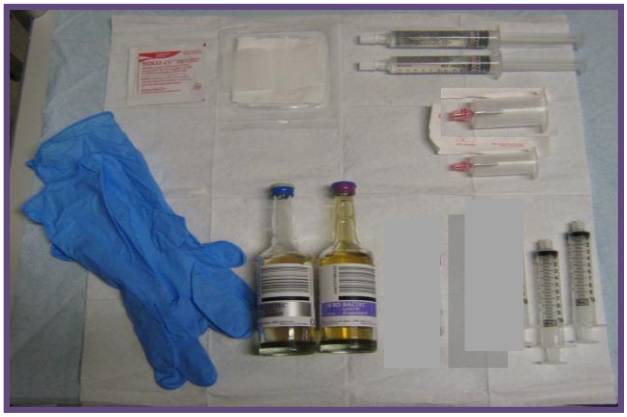
HOW TO TAKE BLOOD CULTURES FROM A CVAD FOR RELIABLE RESULTS

EQUIPMENT

- Open equipment onto a clean surface
- 6x 2% chlorhexidine gluconate3 & 70% alcohol wipes
    1. **Adult and adolescents**: One set consisting of two bottles (aerobic and anaerobic) **Children:** One pink top bottle **<u>for each lumen</u>**
- 2x 10mL sterile syringes (1x for aerobic 1x for anaerobic)
- Pink tip blood transfer device for syringes
- 2x 10mL 0.9% sodium chloride to flush catheter lumen following blood cultures
- Non sterile gloves
- Alcohol Based Hand rub (ABHR)

PROCEDURE

1. Identify patient
2. Gather equipment, check expiry date on bottom of culture bottles, a central yellow dot indicates contamination (expired culture bottles may give false negative result)
3. Effective hand hygiene wash hands or use alcohol based hand rub (ABHR)
4. Use an aseptic non touch technique(ANTT) to minimise contamination of the sampling procedure
5. Remove the metal caps on each bottle and scrub each rubber bung for 30sec with separate 2% chlorhexidine & 70% alcohol wipes, leave a wipe on top of each bottle during CVAD hub preparation and remove wipes just prior to inoculation the bottles[5]
6. Using ANTT remove access device and replace with a new access device. Clean top of new access device with 2% chlorhexidine & 70% alcohol wipe and allow to dry
7. **Use the discard blood from the catheter lumen for the blood cultures**
8. **The blood volume obtained from the peripheral vein and from the CVAD must match to ensure accuracy[1, 4]**
9. Inoculate each culture bottle with equal volumes of blood. Attach syringe to a pink tip transfer device and push down onto the blood culture bottle bung to pierce septum. Inoculate the **AEROBIC** bottle first, repeat for the **ANAEROBIC bottle.** Allow the vacuum to draw the blood into each bottle. Gently mix. **IMPORTANT: do not allow air to enter the ANAEROBIC bottle(purple)**
10. On completion of the procedure discard equipment
11. Remove gloves and perform hand hygiene
12. Label the blood culture bottles accurately i.e. **'CVAD'** and identify which lumen the blood has been taken from
13. Do not cover bar code on bottles with patient labels, **(Figure 1)** Place in the blood culture transport cones /bio hazard bag, send to the laboratory along with the blood request form
14. Record the procedure in the patient's clinical notes.



Equipment for taking blood cultures from a CVAD

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