LOS ANGELES GENERAL MEDICAL CENTER

DEPARTMENT OF NURSING SERVICES AND EDUCATION

# BLOOD CULTURE WITHDRAWAL PROCEDURE

**PURPOSE:**
To outline the nursing responsibility and methodology for withdrawing blood for cultures.

**PRINCIPLE:**
Blood cultures are ordered to diagnose bloodstream infections (BSI) caused by bacteria and/or fungi. Human skin is naturally colonized with bacteria (e.g., coagulase-negative staphylococci). Bacteria is also naturally present in the surrounding environment and on surfaces. Therefore, strict adherence to proper skin decontamination and sterile technique is essential to prevent contamination of blood culture bottles. ***Blood culture collection should be approached as a sterile procedure*.**

- Cultures may NOT be drawn from an **existing** peripheral catheter.
- Cultures may NOT be drawn from initial placement of a central venous catheter.
- Cultures may NOT be drawn from initial placement of a peripheral catheter outside of the ED.

- Chlorohexidine gluconate (i.e., Chloraprep) will be used for skin disinfection on patients 2 months and older (for patients under 2 months old, the site shall be disinfected with alcohol as described in number 8 below).
    - If the patient is allergic to Chlorhexidine, Betadine may be used to disinfect the site *after* the alcohol step, adhering to the specified cleaning and drying times.

- Blood cultures should be drawn prior to administration of antibiotics whenever possible.

- For adults/adolescents, at least two blood culture sets should be drawn from two separate venipuncture sites, collected simultaneously (or over a short time frame). One blood culture set = aerobic bottle + anaerobic bottle.
    - Drawing blood cultures at intervals is only indicated when it is necessary to document continuous bacteremia (e.g., endovascular infection). It is not necessary to wait until a patient is febrile to draw blood cultures.

- For patients ≤ 9 years of age, two to three blood cultures should be obtained within a 24-hour period.

- It is important to fill the recommended volumes of blood in the culture bottles as outlined in this procedure. Underfilling of blood culture bottles can lead to falsely negative culture results.

- Isolator tubes and/or Mycolytic bottles will be used when fungal and/or Acid-Fast Bacilli (AFB) blood cultures are ordered. See section "Blood Cultures for the detection of *Brucella*, fungi, and AFB" in procedure below for this process.

**For the Emergency Department ONLY:**

Blood cultures may be drawn during placement of a new peripheral IV in the ED only when there is sufficient time to follow the prescribed cleaning and disinfection times outlined in this procedure. Obtaining blood cultures through a freshly placed peripheral IV catheter is associated with higher contamination rates than dedicated venipuncture.

- Only one set of cultures should be obtained using this initially placed peripheral IV and a separate venipuncture is required for collection of each additional blood culture set.
- Blood cultures should not be drawn using the IV extension line due to an increased risk of contamination. Instead, blood may be drawn by inserting a vacutainer attached directly to the Angiocath hub or by use of a syringe directly to the hub.
- If cultures are ordered *after* the peripheral IV has been inserted (i.e., blood culture disinfection was not performed), two separate venipunctures must be drawn for adults/adolescents.
- Emergent peripheral intravenous catheter placement does not allow for sufficient cleaning and disinfection necessary to properly draw the cultures. In such cases, venipuncture will need to be performed, as soon as possible, after peripheral catheter placement.
- Similarly, if the skin was unable to be cleaned and disinfected as defined in this procedure during placement of the new peripheral IV in the ED, blood cultures shall not be drawn and the patient will require two subsequent blood draws (i.e., two venipunctures).

## EQUIPMENT LIST:

- Blood withdrawal device(s) of choice (e.g., Butterfly with vacutainer, add vacutainer if not available)
- Blood transfer device, if needed
- 10, 12, 20 mL syringe
- 2x2 gauze (2) / 4x4 gauze (2) / Alcohol pad (4)
- Chlorhexidine applicator (Betadine if allergic to Chlorhexidine)
- Tourniquet
- Clean gloves & Sterile Gloves
- Blood culture bottles (or Isolator, as appropriate)
- Laboratory request/specimen labels
- Drape
- Clear plastic bag (for transporting required supplies)
- Castille soap (optional)
- Pen

*Alternatively, blood culture collection kit with all necessary supplies pre-assembled can be used instead, if available.

| **PROCEDURE STEPS** | **KEY POINTS** |
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| 1. Perform hand hygiene.<br>Assemble all required supplies/equipment for the procedure. | |

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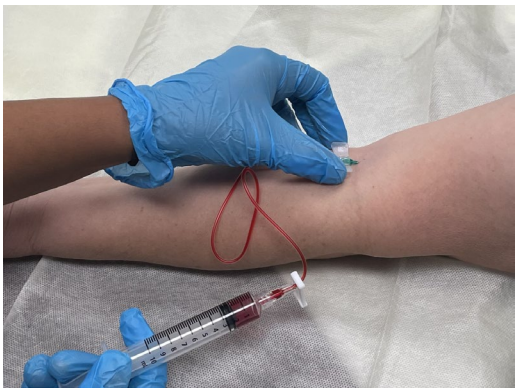
| 2. Place required supplies/equipment on a procedure tray covered with drape. (Alternatively, items can be placed on a freshly disinfected procedure tray, discard gloves post disinfection, if worn.)<br><br>Butterfly needle with attached vacutainer should be used for venipuncture.<br>Attach butterfly to the vacutainer safety holder if pre-attached vacutainer is unavailable.<br><br>Use of a syringe attached to the butterfly is discouraged. However, for pediatrics or adults, if the draw is very difficult or if blood flow is restricted through the vacutainer, a 10-12 mL syringe attached to a butterfly may be used instead.<br><br>Avoid touching the hub(top) of syringe to ensure it does not become contaminated. |  <br>  |
| 3. Compare the specimen labels to the patient's armband or identification using two patient identifiers. | Two patient identifiers must be used (i.e., patient name and medical record number). |

| PROCEDURE STEPS | KEY POINTS |
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| i) With a pen or marker, mark on the pre-measured BACTEC bottles the required blood volume:<br><br>ii) Adults/ Adolescents: 8 to 10mLs per bottle<br><br>iii) Pediatrics ≤ 12 years old: 1mL minimum with an additional 1mL per year of age up to a **maximum** of 10mLs (for example: 8-year-old will need 9mLs).<br><br>Or<br><br>For Pediatrics ≤ 12 years old: **If recommended** volume is between 1-3ml, use pediatric bottle.<br>Difficult blood draws: 1-3 mLs use pediatric bottle.<br><br>iv) Neonates: 1mL in pediatric bottle. | This mark indicates how much blood is to be inserted into the bottle.<br>  <br>The volume of blood is critical because the concentration of organisms is usually low for adults/adolescents. False readings could occur with low volume. |
| 4. Perform hand hygiene and don clean gloves. | |
| 5. Select a venipuncture site.<br>• Once site is selected, if using tourniquet, loosen and leave in place. | Do not leave tourniquet on longer than 1 minute to prevent hemoconcentration.<br>Avoid arm/sites with:<br>• Hematoma<br>• Extensive scarring<br>• Edema/swelling<br>• Extremity affected by stroke, injury, and surgery (e.g., mastectomy)<br>• Arterial-Venous shunt |
| 6. Cleanse selected site for **30 seconds** with 70% isopropyl alcohol pad.<br><br>Cleansing should extend at least 1½ to 2 inches beyond the intended puncture site. **AIR DRY for 1 minute.** | Note: Prior to venipuncture collection, the use of **Castille Soap** may be used to clean the patient, if notably soiled.<br><br>Allowing site to completely dry ensures antisepsis. |

| PROCEDURE STEPS | KEY POINTS |
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| 7. Disinfect by using the Chloraprep swab, rub the swab ***vigorously*** back and forth over the area for **30 seconds.**<br><br>• If the patient is allergic to Chlorhexidine:<br>Betadine may be used to disinfect the site *after* the alcohol step. Adhere to the specified cleaning and drying times.<br><br>• For premature infants as well as infants under 2 months of age:<br>Multiple applications of 70% isopropyl alcohol is an acceptable alternative in these patients. Use a fresh pad for each "scrub" for a total combined scrubbing time of 1-2 minutes.<br><br>Allow the area to **AIR DRY for at least 1 minute** prior to venipuncture.<br>Adequate drying time is essential for proper disinfection. | Using vigorous back and forth friction motion will help to kill the surface bacteria.<br><br>Chloraprep should be avoided in premature infants as well as infants under 2 months of age; may cause irritation and/or chemical burns.<br><br>Avoid touching puncture site once cleansed unless wearing freshly donned sterile gloves. |
| 8. While the site is drying, scrub the top of each blood culture bottle with a 70% isopropyl alcohol pad for at least 5-10 seconds.<br><br>Use one pad per bottle and allow to dry. | **DO NOT** use Chlorhexidine or Betadine to clean bottles. Betadine can disintegrate the rubber cap and iodine can be introduced into the bottles when the specimen is added. |
| 9. Reapply tourniquet without contaminating site.<br><br>• Remove gloves<br>• Perform hand hygiene<br>• Don a pair of sterile gloves<br>• Perform venipuncture | Avoid touching the venipuncture site once it has been disinfected.<br><br>The use of sterile gloves will allow for re-palpation of the site after prepped, if necessary. However, sterile gloves should be donned regardless of whether re-palpation is required.<br><br>**NOTE**: Blood cultures should always be drawn first i.e., before any other blood tube type. |

| PROCEDURE STEPS | KEY POINTS |
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| 10. Obtain required blood volume for routine cultures.<br>• Collect blood sample to appropriate marking.<br>• KEEP the bottles UPRIGHT and VERTICAL while filling.<br>• Fill **aerobic bottle first.**<br>  <br>BOTTLE FILL AMOUNTS:<br>• Adult/adolescents: 8-10mLs per bottle<br>• Pediatric ≤ 12 years old: 1mL minimum with an additional 1mL per year of age up to a **maximum** of 10mLs (for example: 8-year-old will need 9mLs). Can use Aerobic bottle when ≥4mLs is drawn.<br>• Neonates: 1mL in pediatric bottle.<br>• Difficult blood draws: 1-3 mLs use pediatric bottle, ≥4mLs use Aerobic bottle. | <u>The blood culture bottle may be inserted into a vacutainer attached to a butterfly (pictured to the left)</u><br><br>If the draw is very difficult, a 10-12 mL syringe attached to a butterfly may be used. Ensure hub (top) of syringe is not contaminated. Fill aerobic bottle first.<br><br>The arm must be kept low so that the culture medium does not flow into the patient which could cause an infection or allergic reaction.<br><br>Fill the aerobic bottle first to the required volume, adding the remaining required volume to the anaerobic bottle.<br>• If only 8mLs or less is drawn, fill only the **aerobic** bottle.<br>• If only 1-3 mLs is drawn, use pediatric bottle instead.<br><br>NOTE: Anaerobic infections are less common among pediatric patients and an Aerobic or Pediatric bottle will suffice in majority of cases. If specific clinical concern for anaerobic infection is present, the volume of blood drawn can be split between pediatric bottle and anaerobic bottle if indicated. |
| 11. Release the tourniquet. | |
| 12. Remove the needle from the patient's arm.<br>• Deploy safety lock device.<br>• Discard in Sharps container. | |
| 13. Apply pressure to site with dry, clean gauze (usually 1- 2 minutes). | If patient is on anticoagulation medication or has a clotting disorder, may need longer application of pressure. |
| 14. If using a syringe with a butterfly, transfer 8-10 mLs to the aerobic bottle fill anaerobic bottle with the remainder. | Follow the same principles noted in number 11 above. |

| PROCEDURE STEPS | KEY POINTS |
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| 15. Label each bottle in the presence of the patient with the pre-printed labels.<br>• Complete the specimen collection process in Orchid, using bar code scanning.<br>• Indicate the body site on the label and in Orchid under "Order Comment".<br>• Do not cover bar codes on bottles with patient label. (See picture)<br>• During "Down-time" (Orchid not available):<br>○ Initial, date and time all specimen labels and requisition slips.<br>○ Double-check the label against the patient's armband or identification. |  |
| 16. Follow the above steps 1 through 16 to obtain a second set of blood cultures at a different time or site, after obtaining first set.<br>• Refer to Microbiology laboratory for questions | |
| 17. Blood culture specimens should be delivered to the laboratory as soon as possible. | If sent via pneumatic tube, the specimens must be sent in the appropriate hazardous material bag (one bottle per bag) and foam inserts must be in place which can prevent bottle breakage.<br>  |
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| PROCEDURE STEPS | KEY POINTS |
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| **Blood cultures for the detection of *Brucella*, fungi, and AFB:**<br>Routine blood culture bottles are appropriate for the isolation of most yeast (e.g., *Candida*) from blood and no specialized procedure is required to isolate these organisms. If fungemia with a mold is clinically suspected, blood should be collected into an Isolator tube or a Mycolytic bottle (obtained from Microbiology lab).<br><br>Follow steps 1-16 for collection. An Infectious Disease consult is strongly recommended prior to ordering fungal blood cultures.<br><br>If *Brucella* infection is being strongly considered, routine blood culture bottles can be used to isolate this organism in culture. However, because *Brucella* is relatively slow growing, additional incubation time may be required by the laboratory. Please contact the Microbiology Laboratory to request special incubation for *Brucella,* if clinically indicated. | |

Collaboration: LA General Phlebotomy, Microbiology Director

| Initial date approved: | Reviewed and approved by: | Revision Date: |
|---|---|---|
| 02/98 | Blood Utilization Committee<br>Professional Practice Committee<br>Nurse Executive Council<br>Attending Staff Association Executive Committee | 06/06, 09/06, 10/07, 1/08, 12/08, 5/19, 11/23 |
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