



Blood Culture Collection Guidelines for Phlebotomists (UAH/Stollery/CCI Site)

Purpose

This procedure provides guidelines for phlebotomists on how to collect blood culture from adult and pediatric patients.

Important Notes

- The rate of isolation of micro-organisms from blood is directly related to the volume of blood collected. Therefore, it is recommended that the optimal blood volumes be collected as outlined in **Table 1** below.
- It is critical that there be meticulous preparation of the skin prior to venipuncture to prevent contamination of the specimen which could result in inappropriate antimicrobial therapy. **Please follow the site preparation guidelines carefully.**

Optimal Blood Culture Volumes

Table 1 – Blood Culture Collection Volumes according to Body Weight

Body Weight (kg)	Site 1	Site 2	Optimal Volumes per BACTEC Vial
≤ 2 kg	Peds Vial		1-3 mL
2.1-12.7 kg	Peds Vial	Peds Vial <i>(if two sites selected)</i>	1-3 mL
12.8 kg-30 kg	Aerobic + Anaerobic	Aerobic <i>(if two sites selected)</i>	8-10 mL
>30kg	Aerobic + Anaerobic	Aerobic + Anaerobic	8-10 mL

NOTES:

- In adults and in children 10 years old and > 30 kg, two (2) sets (32-40 mL total) drawn from two different venipuncture sites are indicated for all suspect bacteremia or candidemia cases. Collect both sets immediately before antimicrobials. Each set consists of 1 aerobic + 1 anaerobic vial, and both vials should be collected at the same time.
- For pediatric patients, the decision to obtain a sample from a second site is at the discretion of the physician or nurse practitioner.
- Volume is very important in detection of bacteria. The more blood collected the better the chance of detecting the presence of bacteria^{1,2}. For pediatrics especially, there must be a balance between volume of blood collected and the clinical condition of the patient.



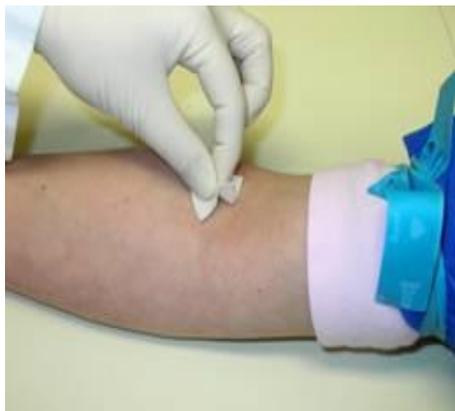
Blood Culture Vials

- BACTEC blood culture vials (Aerobic, Anaerobic, Pediatric) are used for blood cultures.
- Obtain blood culture vials (available from the exchange cart on the ward or call Dispatch).
- Do NOT use vials that have expired or show signs of contamination, e.g. turbidity, bulging septum. Dispose of these in a biohazard container (Sharps).
- Check the expiry date on the side of the vial. Return any expired vials to the Lab Collections area. These vials are used for training purposes.

Site of Collection

- The initial collection should be peripheral venipuncture (not through a line) if possible.
- Second site may be a central line if line sepsis is suspected or peripheral access sites are unavailable. Peripheral sites are preferred. For pediatric patients, the decision to obtain a sample from a second site is at the discretion of the physician or nurse practitioner.
- Collect peripheral blood distally (towards the extremities) of any venous/arterial lines in the same limb, but preferably in a limb without a line.
- In specific critical care units, blood cultures are collected from central venous catheters or arterial lines upon insertion. If line sepsis is suspected, do not collect blood cultures from an existing central or arterial line.
- In Hemodialysis Units, blood culture may be collected in the dialysis blood lines during a dialysis session.

Site Preparation



Vigorously cleanse the skin over the venipuncture site in a circle approximately 5 cm in diameter with 70% alcohol. Scrubbing should continue for 30 seconds. Allow to dry.



Starting in the centre of the circle, apply 10% povidine iodine (betadine) in ever widening circles until the entire circle is saturated with iodine. Chlorhexidine swabs which are 2% chlorhexidine Gluconate and 70% Isopropyl Alcohol can be used in place of iodine.



Leave the iodine for 1.5 to 2 minutes^{3, 4, 5}, or chlorhexidine for 60 seconds on the venipuncture site to act.

- For **pediatric patients**, omit the iodine/chlorhexidine step and clean **two** additional times with 70% alcohol.
- Do not touch the venipuncture site after preparation and prior to phlebotomy.

NOTE:

Remove iodine/chlorhexidine from skin with 70% alcohol or water when collection is complete.

Mark Volume and Disinfect Top of Vial



Before collection mark the appropriate volume on the vial. For aerobic and anaerobic vials, mark off 10 mL above the fluid level in the vial. For pediatric vials mark off 3mL above the fluid level in the vial.



Remove the cap and disinfect the septum with a 70% alcohol swab and allow to dry. Do not use iodine as it may damage the septum.



Order of Draw/Collection

- Collect blood cultures first starting with the aerobic vial followed by the anaerobic vial from the first site.
- Draw all other blood work (i.e. Chemistry, Hematology, etc.) from this site after blood culture has been collected.
- Collect blood culture from second site, if collecting.
- After collection, mix the bottles thoroughly by gentle inversion.

Butterfly needle procedure: (preferred method except for neonatal patients)

- Remove butterfly needle and tubing from the package. [**Be careful not to touch the rubber cover to prevent contamination**].
- Perform venipuncture by inserting the needle with the rubber cover directly into the Bactec bottle. The needle and vacutainer holder must be held down to keep the needle from popping out of the vial.
- Remove the vial(s) when the blood flow has reached the mark that has been made on the vial indicating the appropriate fill level (Table1).
- Remember to hold the vacutainer/needle assembly down onto the vial.
- After collection mix the bottles thoroughly by gentle inversion.



For alternate syringe draw:

- Perform venipuncture with needle and syringe and draw proper amounts of blood.
- Inoculate the blood into the appropriate blood culture vial(s).
- Do not change needles before injecting the blood into vial(s).
- Be sure to inoculate the correct volume into each vial.
- Do NOT recap the needles.

After collection mix the bottles thoroughly by gentle inversion.



Collection of Blood from Intravascular Catheters:

- Mark volume and disinfect top of vial (see above for details).
- Using 2 separate 70% alcohol swabs, scrub catheter hub connection for 15 seconds. Air dry.
- While wearing gloves, disconnect the tubing or cap of catheter and attach syringe to collect discard blood (suggested amounts: 3ml for adults and 0.2ml for pediatric patients). This blood is not used for culture.
- **NOTE:** Avoid drawing from lines within an hour of completion of antimicrobial agent administration.
- Using a new syringe, collect blood for culture through the hub. Quickly reconnect tubing.
- Connect filled syringe to safety system adapter.
- Holding syringe plunger for control, inoculate the bottles with no more than the marked volume.
- Mix the bottles thoroughly by gentle inversion.
- Label vials (**see above for details**)

Labelling the vials



Label vials with the following information:

- Patient Name
- ULI Number (PHN/ULI Number) Day and Time of Collection Site # (site 1 or site 2)
- Site Location (Left Arm, Right Hand, line type, etc.) Collector's Initials.
- Make certain the Labels go around the vials, but **DO NOT OBSCURE THE BARCODE** and adjacent sequence number on the original Bactec vial Laboratory
- Immediately (within 1 hour) transport the specimen to the Laboratory
- Use one requisition for each blood culture set, indicating the site(s) used and time(s) collected.
- If you have any questions regarding collection, have the Microbiologist on call for your site paged.

References

1. Leber, et al. Clinical Microbiology Procedures Handbook, 4th ed. 2016
2. Miller, et al. A Guide to Utilization of the Microbiology Laboratory for the Diagnosis of Infectious Diseases: 2018 Update by the Infectious Diseases Society of America and the American Society for Microbiology. Clin Infect Dis 2018; 67(6):e1-94.
3. Strand, et al. JAMA 1993. 269(8):1004-6
4. Mimoz, et al. Ann Intern Med. 1999. 131(11):834-7
5. Little, et al. Am J Med.1999. 107(2):119-25