

Notes

The rate of isolation of micro-organisms from blood is directly related to the volume of blood collected; therefore, it is best to fill each blood culture bottle to the optimal volume (see page 2 Materials Required).

However, for pediatric patients, there must be a balance between the total volume of blood collected, the patient's body weight, and the patient's clinical condition. For pediatric patients weighing 5.1 to 30 kg collection from a second site is at the discretion of the clinician. Collection from two sites helps to confirm blood culture contaminants and/or line infections.

Body Weight (kg)	Site 1	Site 2	Number of bottles to be collected
Less than or equal to 5 kg	Pediatric Bottle minimum 1 mL*	NA	1
5.1 - 12.7 kg◆	Pediatric Bottle 4 mL	Pediatric Bottle 2-4 mL	1-2
12.8 kg - 30 kg	Aerobic + Anaerobic 10 mL + 10 mL	Aerobic 10 mL	2-3
Greater than 30 kg	Aerobic + Anaerobic 10 mL + 10 mL	Aerobic + Anaerobic 10 mL + 10 mL	4

Table 1 – Blood Culture Collection Volumes According to Body Weight

◆ For pediatric patients weighing 5.1 to 12.7 kg a second pediatric bottle can be collected from the same site if the decision is to collect from one site only instead of the recommended 2 sites.

***** More blood (up to 4 mL per bottle) can be collected if clinically appropriate.

Refer to *PA03-023 Monitoring Maximum Blood Volume* for pediatric weight-based maximum blood volume drawn in 24 hours. Blood culture volumes can be in addition to the maximum volume allowed for a single blood collection.

- For patients weighing greater than 30 kg with suspected bacteremia or candidemia, draw two (2) sets of blood cultures from **two different** venipuncture sites. Each set consists of 1 aerobic **and** 1 anaerobic bottle, for four bottles total. In cases of suspected infectious endocarditis, a third set may be collected 1 hour after the collection of the first two sets to further increase sensitivity. Each set is considered a separate test request therefore each set requires its own separate paper requisition or order in the hospital information system.
- Peripheral venipuncture (not indwelling line) is the technique of choice for obtaining blood for culture unless an intravascular catheter-associated infection is suspected.
 - For patients with suspected intravascular catheter-associated infection 1 set (1 aerobic and 1 anaerobic bottle) should be obtained from the catheter along with a second set (1 aerobic and 1 anaerobic bottle) from a peripheral site. Withdrawal of a discard tube or flushing of the indwelling line is not required when line sepsis is suspected. Ensure the indwelling line collection site is indicated on the bottle(s) and the test request.
- In hemodialysis units, blood cultures may be collected from the dialysis blood lines during a dialysis session
- In the NICU, Advanced Starters may collect blood culture during PIV insertion if specimen contamination is avoided at all times. Healthcare providers (non-lab) follow site specific nursing procedures for *Blood Sample Collection During Intravenous Cannula Insertion*. Blood cultures may be collected from a newly inserted Umbilical Vascular catheter line before initiation of IV fluids.

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Risks or Cautions

- It is critical that the skin be meticulously prepared before venipuncture to prevent contamination of the specimen, which could result in inappropriate antimicrobial therapy. Please follow the site preparation guidelines carefully and perform collection while practicing sterile technique.
- Blood cultures should be collected before administration of antimicrobial agents whenever it is safe to do so.
- **Overfilling:** The vacuum in the bottle will usually allow for the optimal blood volume to be exceeded. Therefore, it is important to observe the volume of the bottles as they are filled using the visual volume markers on the sides of the bottles, to ensure they are not overfilled.
- Underfilling: If unable to collect the optimal amount for a culture set from an adult patient, place as much blood as possible into the aerobic bottle (as close to 10 mL as possible) and then place remaining blood into the anaerobic bottle. For pediatric patients weighing 5.1 to 12.7 kg, place blood into the first pediatric bottle (as close to 4 mL as possible) and then place the remaining blood into a second pediatric bottle.
- False negative results may occur if the optimal volume of blood is not placed into the blood culture bottle.
 - Underfilling reduces the amount of organism available to be detected, if present, and can significantly reduce the frequency of detection and/or increase the time-to-detection of organisms.
 - Overfilling of blood culture bottles dilutes the nutrient media and antibiotic-absorbing resin, also paradoxically reducing the frequency of detection and/or increasing time-to-detection of organisms
- False positive results can occur during the collection process (contamination).

Materials Required

- Routine venipuncture supplies
- 70% Isopropyl alcohol swabs or wipes
- Antiseptic agent (2% chlorhexidine gluconate (CHG) with 70% isopropyl alcohol [preferred] or 10% povidone iodine (PVP-I; iodopovidone). For NICU collections healthcare providers (non-lab) should follow site specific nursing guidelines for selecting appropriate chlorohexidine solution strength.
 Note: Use the type of antiseptic agent as available or prescribed by institutional protocols.
- Winged collection set units (butterfly needle) with adapter for blood culture bottles or syringes for pediatric difficult collections
- BD BACTEC[™] bottles use a vacutainer holder, whereas bioMérieux BacT/ALERT[®] bottles must be used w the BacT/ALERT[®] Blood Collection Adapter Cap
- Sterile needleless transfer device (syringe collections or vascular access collections only)
- Appropriate blood culture bottles (Aerobic, Anaerobic or Pediatric):



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Collecting the Specimens

The collection instructions provided below represent best practice recommendations. However it should be noted that there may be situations that fall outside normal processes; in these situations sites should follow local institutional protocols.

Step	Action	Notes	
1	Confirm patient identity using two approved identifiers.		
2	 Check bottles for signs of contamination. Signs of contamination include: Bottle media appears cloudy Bulging or indented septa or visible gas Bottom of the bioMérieux BacT/ALERT[®] bottle is bright yellow Check bottles for signs of damage: Check for cracked or distended bottles or bottles that have lost their caps. A star-like crack pattern on the bottom of the bottle is consistent with a drop or impact that has compromised the container. Check that the fluorescent material at the base of the BD BACTEC[™] bottle has not separated from the glass. 	 DO NOT USE contaminated or damaged bottles: Bottles that have been dropped should be discarded and not used for collection Discard cracked or distended bottles or bottles without caps If the bottom of the bioMérieux BacT/ALERT[®] is a bright yellow then do not use; this is a sign the bioMérieux BacT/ALERT[®] is compromised. 	
3	Check the expiry date printed on each blood culture bottle label.	If expired, DO NOT use. Discard expired bottles.	
4	Optimal Volume:		
	BD BACTEC™	bioMérieux BacT/ALERT [®]	
	Mark optimal volume on the blood culture bottle Interview of the pediatric path For BACTEC [™] PEDs Plus/F and BACT/Alert [®] Pedia appropriate volume for the weight of the pediatric path	Do not draw lines on bioMérieux BacT/ALERT® Aerobic FA Plus or Anaerobic FN Plus blood culture bottles; these bottles include a manufacturer indicated FILL line. Refer to <i>MIC32-002 Filling and Labelling bioMérieux</i> <i>BacT/ALERT® Blood Culture Bottles</i> BACT/Alert® Pediatric (PF Plus) do not have a manufacturer indicated fill line. tric (PF Plus) draw two lines to mark the tient.	
5	Select a blood collection site.	 Healthcare providers (non-lab) should follow site specific nursing procedures when collecting from an indwelling device. Laboratory staff are permitted to perform 	
		venipuncture collections only and must follow APL venipuncture procedures.	

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Blood Culture Collection Guideline

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Step	Action		Notes	
6	 Cleanse the site: Cleanse the site with 70% isopropyl alcohol for a minimum of 30 seconds using a circular motion, starting at the center of the site and moving outward to the periphery (5 cm diameter). Do not return the 70% isopropyl alcohol swab or wipe to the center of the site. Allow to dry. Do not blow on, waft air over or wipe off the alcohol. Allow to completely air dry. 		•	If patient is allergic to 70% isopropyl alcohol, use double application of 10% povidone iodine. Consult with site medical or microbiologist if patient is allergic to both cleansing agents.
7	Disinfect the site:		•	2% chlorhexidine gluconate with 70%
	Select skin antiseptic in use by y 3M SoluPrep* (2% chlorhexidine gluconate with 70% isopropyl alcohol) • Using a continuous back and forth friction motion move first horizontally across the center of the treatment area to the periphery and repeating the motion over the desired treatment area for 15 seconds. • Continuous back and forth motion is then repeated over the same area moving in a vertical direction for an additional 15 seconds. *For those institutions where 3M Solup the manufacturer's instructions for the chlorhexidine gluconate with 70% isopperiment. • Allow to dry, preferably for 2 dry time is 1 minute.	your institution: 10% povidone iodine (PVP or PVP-I) Disinfect the site with 10% povidone iodine using a circular motion for a minimum of 30 seconds. Start at the center of the cleansed site moving to the periphery (5 cm diameter). Do not return the swab or wipe to the center of the site. Drep is not available follow brand of 2% propyl alcohol utilized. minutes, minimum	•	2% chlorhexidine gluconate with 70% isopropyl alcohol is the preferred antiseptic for skin disinfection. Refer to local practices and guidelines for antiseptic use in neonates. If patient is allergic to iodine, use a double application of 70% isopropyl alcohol. Allow the dry.
	Do not touch the venipunctur preparation and before phleb	re site after		
8	Remove the cap and disinfect th stopper) with a 70% isopropyl al and allow to dry for 1 minute.	ne septum (rubber Icohol swab or wipe	•	DO NOT use iodine as it can damage the septum.
9	 Review Order of Draw: Collect blood cultures from a pediatric patients ≥ 12.8kg) fit collection site. Start first with followed by the anaerobic bo For pediatric patients weighin collect using pediatric bottles collection sites. 	adult patients (and from the first the aerobic bottle, ottle. ng 5.1-12.7 kg, s from one or two	•	Draw blood specimens according to <i>PA03-005 Order of Draw and Order of Transfer.</i> Other blood work (e.g. Chemistry, Hematology, etc.) can be drawn from the first site after the blood culture bottles have been collected.

Blood Culture Collection Guideline

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Step Ac	tion	Notes	
10 Win nec col	 Winged collection set peripheral venipuncture procedure is the preferred method except for neonatal patients. Healthcare providers (non-lab) should follow site specific nursing procedures when collecting from neonatal patients. Remove winged collection set and tubing from the package. Do not touch the rubber cover to prevent contamination. 		
•	 Attach winged collection set to vacutainer holder or blood collection adapter as shown: 		
BI	BD BACTEC [™] bioMérieux BacT/ALERT [®]		
	acutainer holder	BacT/ALERT® Blood Collection Adapter Cap	
•	 Place the vacutainer holder (BD BACTEC[™]) or adaptor (BacT/ALERT[®]) over the blood culture bottle. Holding the bottle upright, press straight down to pierce the septum. The needle and vacutainer holder must be held down to keep the needle from popping out of the bottle. Keep the bottle upright during collection in order to monitor the fill line; and collect desired volume of blood. DO NOT allow the bottle contents to touch the stopper or the end of the needle during collection. DO NOT collect all 4 bottles from the same venipuncture. Remove the bottle when the blood flow has reached the FILL line as indicated in <i>Step 4</i>. Ensure bottles are not underfilled or overfilled. This is important to ensure appropriate ratio of blood to culture media for optimal recovery and detection of pathogenic bacteria. 		
Co •	 Collection using a syringe: Collections using syringes are not recommended due to risk of needle stick injury. If a syringe collection is required: Following institution specific procedures draw appropriate volume of blood as indicated in Table 1. Immediately discard needle into approved biohazard sharps container. Transfer specimen to the culture bottle using needleless transfer device (connector). Transfer the blood into the appropriate blood culture bottles following the approved <i>PA03-005 Order of Draw and Order of Transfer.</i> Be sure to transfer the correct volume into each bottle. 		
Co	llection from Intravascular Catheters (Non-L	ab Healthcare Providers only):	
•	• The patient care unit must collect one set from the line and may request the lab to draw the other set by venipuncture		
•	 Do not connect the blood culture bottle directly to a vascular access device for the following reasons: To prevent the broth media from flowing back into the patient's vein due to the short length of the tube 		
•	 To reduce potential for incorrect volume co Follow site specific nursing procedures for indv 	llection. velling device collections.	
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Step	Action	Notes
11	Collect blood culture from a second site, selecting a separate venipuncture site from the other arm. Start with the aerobic bottle or pediatric followed by the anaerobic bottle.	 If only one arm is available, a different location on the same arm may be used for the second site draw. If a different location on the same arm is not possible then use of same vein is acceptable.
12	Gently mix bottles by inversion 8 to 10 times to prevent clotting.	
13	Remove residual iodine/CHG from skin with 70% isopropanol after venipuncture	If the patient is allergic to 70% isopropyl alcohol, use soap and water to remove iodine residue.

Labelling the Blood Culture Bottles (at patient bedside)

- Label the blood culture bottle(s) with the patient full first and last name, date and time of collection, Provincial Health Number (PHN/ULI), or Government issued identification such as Federal, Military, RCMP, or Immigration.
 - If patient label(s) has been provided, then apply the label vertically to the outside of the container.
 DO NOT place a label on the bottom of the bottle.
 - DO NOT OBSCURE THE BARCODES. Do not obscure the adjacent sequence number on the original BD BACTEC[™] bottle label or the the optical volume read window on the BacT/ALERT® bottle.

Notes: For additional information refer to *MIC32-002 Filling and Labelling bioMérieux BacT/ALERT*[®] *Blood Culture Bottles.*

Lab Test Request

- For each blood culture set collected, the following must be indicated on the paper requisition or in the electronic ordering system:
 - Site(s) used.
 - Date and time of collection.
- Indicate on the primary patient label in the empty area after the patient name the site location (left arm, right hand, line type, etc.) or complete collection site in the Rover.
- Place each blood culture set collected into a separate plastic resealable specimen bag. If submitting test requests on paper requisitions fold and place the requisition in the **outside** pocket of the plastic bag.

Delivery to Lab

- Accurate results depend on the specimen being received in Microbiology laboratory as soon as possible. Blood culture specimens should be sent to the laboratory immediately after collection. Specimens must be received in the testing laboratory within 4 hours of collection if collected in Calgary, Edmonton, or at a hospital with a microbiology laboratory, and 24 hours for other collection locations.
- Transport at room temperature. DO NOT refrigerate or incubate.
- Bottles transported through the pneumatic tube system should be packaged with extra padding to ensure bottles are not damaged from impacts inside the carrier.
- If you have any questions regarding collection consult your local laboratory or page the Microbiologist or Pathologist on-call for your site.

RELATED DOCUMENTS

MIC32-002 Filling and Labelling bioMérieux BacT/ALERT[®] Blood Culture Bottles PA03-005 Order of Draw and Order of Transfer PA03-023 Monitoring Maximum Blood Volume



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- Clinical Laboratory Standards Institute (CLSI). Procedures for the Collection of Diagnostic Blood Specimens by Venipuncture, 7th ed. Approved Standard GP41. Wayne, Pennsylvania: Clinical Laboratory Standard Institute, April 2017.
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