How to Collect a Specimen for Blood Culture
6586/87040.1

Principle

Under normal conditions, blood is sterile. Blood is cultured to isolate the causative agents of septicemia, bacterial endocarditis, and other conditions associated with bloodstream invasion by microorganisms. Blood should be drawn using aseptic technique to reduce the possibility of contaminating the blood culture with skin organisms. The Peds Plus/F and Plus Aerobic/F Bactec media contain resins to neutralize antimicrobial activity.

Supplies & Materials

Plus Aerobic/F (grey cap) Bactec bottle
Lytic Anaerobic/F (purple cap) Bactec bottle
Peds Plus/F (pink cap) Bactec bottle
Blood Transfer Device (BD 364880)
Prevantics Swab 1 mL (3.15% Chlorhexidine gluconate/ 70% isopropyl alcohol) - PDI # B10800
70% alcohol prep
20 mL sterile syringe or two 12 mL sterile syringes
Sterile needles
Nonsterile gauze

Sample Information

ADULT BLOOD CULTURE VOLUMES

<table>
<thead>
<tr>
<th>Blood Volume Drawn (venous)</th>
<th>Blood Culture Bottle(s)</th>
</tr>
</thead>
</table>
| **Optimum: 20 mL**         | 10 mL in Lytic Anaerobic/F  
                           | 10 mL in Plus Aerobic/F  
                           | Note: Inoculate anaerobic bottle first to prevent entry of air from syringe. Do NOT overfill bottles (maximum: 10 mL for Aerobic and Anaerobic bottles.) |
| **10-20 mL**               | Divide evenly between: Lytic Anaerobic/F  
                           | Plus Aerobic/F |
| **4.1-9 mL**               | Plus Aerobic/F |
| **1.5-4.0 mL**             | Peds Plus/F (aerobic)  
                           | Note: Use Peds Plus/F only in cases where it is extremely difficult to obtain a larger volume of blood, as the more blood drawn, the greater the recovery of organisms. 
                           | Do NOT overfill bottle (maximum 4.0 mL/Peds bottle.) |
| Less than 1.5 mL           | Unsatisfactory for adult. |

The blood volume cultured is crucial for detection of organisms. Collect the optimum volume listed if possible. Culturing lower volumes may result in false negative results.

On adults greater than 18 years of age, the following automatic comment is added to the report if only one bottle is drawn: “Low volume blood culture received; possible false negative culture.”

November 2016
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6586/87040.1

**PEDIATRIC BLOOD CULTURE VOLUMES**

<table>
<thead>
<tr>
<th>Pediatric Patient Weight</th>
<th>Blood Volume Drawn</th>
<th>Blood Culture Bottle(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;4 kg</td>
<td>1 mL *</td>
<td>Peds Plus/F</td>
</tr>
<tr>
<td>4.0 - 13.9 kg</td>
<td>3 mL *</td>
<td>Peds Plus/F</td>
</tr>
<tr>
<td>14 - 24.9 kg</td>
<td>Optimum: 10 mL</td>
<td>Lytic Anaerobic/F (5 mL)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Plus Aerobic/F (5 mL)</td>
</tr>
<tr>
<td></td>
<td>4.1-9 mL</td>
<td>Plus Aerobic/F</td>
</tr>
<tr>
<td></td>
<td>1.5-4.0 mL</td>
<td>Peds Plus/F (aerobic)</td>
</tr>
<tr>
<td>&gt;25 kg</td>
<td>Optimum: 20 mL</td>
<td>Lytic Anaerobic/F (10 mL)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Plus Aerobic/F (10 mL)</td>
</tr>
<tr>
<td></td>
<td>10-20 mL</td>
<td>Divide evenly between:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lytic Anaerobic/F</td>
</tr>
<tr>
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<tr>
<td></td>
<td>4.1-9 mL</td>
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</tr>
<tr>
<td></td>
<td>1.5-4.0 mL</td>
<td>Peds Plus/F (aerobic)</td>
</tr>
</tbody>
</table>

*Less than 1 mL blood accepted, but not optimal, in patients less than 4 years of age. Note volume drawn on bottle.

1. Anticoagulants, such as citrate, oxalate, EDTA, and heparin are toxic for some bacteria.

2. **Timing and Number of Cultures to be Collected**
   a. Blood should be drawn before therapy is initiated, if possible.
   b. **General recommendation:**
      
      **2 blood culture sets* collected simultaneously, sequentially, from 2 different peripheral sites.**
      
      * One set refers to one culture with both aerobic and anaerobic bottles or a single Peds bottle for small quantities.
   c. Drawing blood at intervals is only indicated when it is necessary to document continuous bacteremia in patients with suspected infective endocarditis or other endovascular (e.g. catheter-related) infections.
   d. Single blood cultures should never be drawn from adult patients. This practice results in an inadequate volume of blood cultured, and the results of single blood cultures are more difficult to interpret.
   e. No more than 3 sets of blood cultures should be drawn within a 24 hour period, as this does not significantly increase positive results. More than 3 sets require approval of a Pathologist.
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Procedure

1. **Due to the increased risk of contamination from colonized bacteria, blood cultures should NOT be drawn through an indwelling intravenous or intra-arterial catheter** unless it cannot be obtained by venipuncture or upon physician request. Procedure for line draw if absolutely necessary:
   - Choose capped port or proxima port of IV tubing on an existing infusion.
   - **Scrub port 15 seconds** using a twisting motion with Prevantics™ Swab (chlorhexidine) and **allow to air dry for 30 seconds**. Do not blot or wipe dry; will be tacky. Discard after single use.
   - Waste 5-10 mL.
   - Aspirate 20 mL sample and flush catheter.

2. **EACH BLOOD CULTURE SET MUST BE A SEPARATE VENIPUNCTURE. EACH SITE MUST BE PREPARED INDIVIDUALLY,** even if more than one blood culture is to be drawn at the same time.

3. Remove FLIP OFF cap of each bottle.
   - a. Sterilize the exposed rubber septum using a 70% alcohol prep.

4. Apply tourniquet to patient's arm and select vein.

5. Prepare venipuncture site.
   - a. Tear open the Prevantics Swab packet and remove the swab. Do not unfold the swab.
   - b. Apply swab to skin using repeated back-and-forth strokes for 15 seconds.
   - c. Allow the prepped area to **air dry for 30 seconds**. Will be tacky.
      - Note: Do not blot or wipe the solution away, or fan or blow on the site, as this may result in contamination of the blood culture.
   - d. Discard the applicator after a single use.

   Start at the center of the chosen site and swab in increasingly wider concentric circles. **Allow to dry** (If using Povidone Iodine instead of Iodine Tincture, wait 2 minutes)

   **DO NOT** fan, blow on site, or wipe off Iodine, as this may result in contamination of the blood culture

6. Blood must be drawn with a syringe and butterfly or a syringe and needle. The vacuum in the Bactec bottles is not predictable and the volume markings on the bottles are inaccurate, so do **NOT** draw the blood directly into the bottle.

   SPS vacutainer tubes or Isolator tubes should NOT be used to draw the blood, as the additional anticoagulants in these tubes may be detrimental to organism recovery.

November 2016
7. After the venipuncture site has been disinfected, the vein may NOT be palpated again. If further palpation of the vein is necessary during aspiration, a sterile glove should be worn.

8. For adults, withdraw 20 mL* blood. See Appendix section below for procedure for drawing 20 mL blood using two 12 mL syringes.

   **The blood volume cultured is crucial for detection of organisms. For adults, collect 20 mL if possible. Culturing lower volumes may result in false negative results.**

   * For pediatric patients, see “Sample Information - Pediatric Blood Culture Volumes” chart.

9. Release tourniquet, place gauze on the needle, and withdraw the needle from the vein while gently compressing the gauze.

10. DISCARD NEEDLE AND ATTACH BD BLOOD TRANSFER DEVICE TO SYRINGE. (Utilize one Transfer Device to inject both bottles.)

11. Inject 10 mL of blood into the Lytic Anaerobic/F bottle first to prevent entry of air from the Syringe, and then inject 10 mL of blood into the Plus Aerobic/F bottle.

For volumes of blood less than 20 mL for an adult**, see "Sample Information - Adult Blood Culture Volumes" for inoculation of Bactec media.

For pediatric patients, see “Sample Information - Pediatric Blood Culture Volumes” for inoculation of Bactec media.

**Note: In adults, collection of less than 20 ml of blood per blood culture may result in false negative results.

Inoculation of greater than 10 ml blood into the Aerobic or Anaerobic bottle or more than 4 ml into the Peds Plus/F bottle may result in suboptimal blood to media ratios and possible false negative results.
12. After thoroughly mixing contents by gently inverting bottles, place Lab barcode label vertically on the bottle.

- Do NOT cover sensor on bottom of bottle.
- DO NOT COVER BOTTLE BARCODE.
- On the bottle, write tech # or initials of person drawing, time of collection, and site (line, red port, etc) if applicable.
- DO NOT WRITE OVER THE BARCODES.

13. Transport to the Microbiology Lab within 48 hours of collection. Keep at ambient (room) temperature.

- Bottles may be sent through the pneumatic tube system:
  a. Place in special conical blood culture carriers (obtained from Lab)
  b. Place carrier in Ziploc bag with absorbent material, such as paper towels.
  c. Send in a foam-lined pneumatic tube carrier.

- If blood culture carriers or foam-lined tubes are unavailable, call Lab to obtain or hand carry blood culture to the Lab.
APPENDIX

Collection of 20 mL Blood Utilizing Two 12 mL Syringes

If using two 12 mL syringes, a butterfly needle must be used.

1. Open packaging of two 12 mL syringes, leaving the syringes in the sterile packaging, but easily within reach.
2. Attach butterfly needle to first 12 mL syringe.
3. Perform venipuncture. A piece of tape can be used to stabilize the butterfly. (Place it away from the puncture site).
4. Collect 10-12 mL blood.
5. Without disrupting the puncture site, “pinch” butterfly tubing by bending and lightly squeezing the bent tubing.
6. Remove the filled syringe and place it in its sterile packaging.
7. Attach the second syringe and draw 10-12 mL blood.
8. Release tourniquet, place gauze on the needle, and withdraw the needle from the vein while gently compressing the gauze. Check for cessation of bleeding and tape gauze over puncture site.
9. DISCARD NEEDLE AND ATTACH BD BLOOD TRANSFER DEVICE TO THE SECOND SYRINGE. Note: The same BD Blood Transfer Device can be used for both syringes, but ensure that none of the hubs are touched to maintain sterility.
10. Inject 10 mL of blood into the Lytic Anaerobic/F bottle, preventing the entry of air from the syringe.
11. Then inject 10 mL of blood from the other syringe into the Plus Aerobic/F bottle.
12. Discard syringes and transfer device in the sharps container.
13. After thoroughly mixing contents by gently inverting the bottles, place Lab barcode label vertically on the bottle. Do NOT cover the bottle barcode or the sensor on the bottom of the bottle.