ALBERTA PRECISION LABORATORIES

Collection of Blood for Culture (LTR57195)

Last Updated Time: 07/19/2021 **Revision: 3.60**

Introduction

The prompt detection and identification of living microorganisms from the blood of patients with bacteremia, fungemia and mycobacterium is critical to providing good patient care.

Principle

Strict adherance to the special techniques required for collection of blood for culture is crucial to providing a viable specimen free from contamination.

Specimen

Human blood drawn into Bactec Culture Vials or sodium polyanethol sulfonate (SPS) tube.

Materials and reagents

Each media is designed to promote the growth of specific organism types. The collector must use the correct media type to detect the infecting microorganisms.

BACTEC Culture Vials (store at 2 - 25°C until expiration date)
There are individual culture vials for bacteria, yeast and fungi and pediatric patients.

SPS tubes (store at 2 - 25°C until expiration date) are used for collection of mycobacteria (TB or non TB) and m.chimaera blood culture requests.

Media Type	Volume of Blood Required	Stock Item
BACTEC Plus Aerobic (Blue/Silver Top)	8 - 10 mL per vial	1S1372
BACTEC Lytic Anaerobic (Purple Top)	8 - 10 mL per vial	1S1371
BACTEC Peds Plus (Pink Top)	1.0 - 1.5 mL per vial (optimal) for neonates 1.0 - 5.0 mL per vial for children <10 years old or <30kgs	1S1385
Sodium Polyanethol Sulfonate (SPS) (Yellow Top Tube)	5 - 8 mL per tube	1S1126

Materials and reagents (continued)

Do not use vials if …	• beyond expiry date or show evidence of damage or deterioration. • necks are cracked, improperly sealed, turbid, contaminated or show darkening of the media. • fluorescent material at the base of the vial has separated from the glass.

Collecting Materials	
• 2% Chlorhexidine/70% Alcohol swab • 70% Alcohol swab • Vacutainer Adapter • Butterfly Collection Set • Surgical tape/bandages	• Gloves • Tourniquet • Gauze/cotton balls • Sharps container • "Post Phlebotomy Care" information sheet (Stock #1S1328).

Safety

Note the following safety precautions. Contact the Safety Officer immediately following any incident with human samples.

Hazard	Precaution
Needlestick	• Use only safety engineered needles • Activate safety device immediately after specimen collection. • Assess patient's ability to hold arm still during phlebotomy; obtain assistance if required. • Maintain control of the needle at all times. • Do not recap needles. • Do not break or cut needles. • Discard used needles into puncture resistant needle disposal containers.
Human Pathogen	• Human blood specimens are assumed to be potentially infectious for bloodborne pathogens. • WHMIS Class D3. • Avoid skin contact by wearing gloves. • Wash hands thoroughly after use. • Decontaminate spills using OP*TIM* 33 TB.

Procedure

<table>
<tr><th>Step</th><th>Action</th></tr>
<tr><td>1.</td><td>Complete Patient Registration by asking patient to provide 2 pieces of government issued identification (i.e. Alberta Health Care card, Driver’s License, etc…).
Ensure it matches the requisition and demographics in LIS.</td></tr>
<tr><td>2.</td><td>If patient is unable to provide Patient Registration, then confirm patient identity by asking the patient to spell their first and last name and state their date of birth.
Ensure it matches the requisition and demographics in LIS.</td></tr>
<tr><td>3.</td><td>Explain the procedure to the patient.</td></tr>
<tr><td>4.</td><td>Select appropriate BACTEC blood culture vials using the following tables.
<table>
<tr><td colspan="3">If Bacterial Culture, yeast or fungus requested…</td></tr>
<tr><td colspan="3">Adults and Children (≥10 Years Old and >30 kg)</td></tr>
<tr><td></td><td>Blood Culture Vial</td><td>Blood Volumes</td></tr>
<tr><td>Site 1</td><td>Aerobic BACTEC Plus
Anaerobic BACTEC Lytic</td><td>8 – 10 mL
8 – 10 mL</td></tr>
<tr><td>Site 2</td><td>Aerobic BACTEC Plus
Anaerobic BACTEC Lytic</td><td>8 - 10 mL
8 - 10 mL</td></tr>
<tr><td>Total</td><td></td><td>32 - 40 mL of Blood</td></tr>
<tr><td colspan="3">Children Less Than 10 Years Old</td></tr>
<tr><td></td><td>Blood Culture Vial</td><td>Blood Volumes</td></tr>
<tr><td>Site 1</td><td>Peds Plus vial</td><td>1 - 5 mL</td></tr>
<tr><td>Site 2</td><td>Peds Plus vial</td><td>1 – 5 mL</td></tr>
<tr><td>Total</td><td>*Optimal collection
If 2 vials cannot be collected, then the minimum is 1-5 mL in one vial</td><td>3 - 5 mL of Blood</td></tr>
<tr><td colspan="3">If Mycobacterium Culture requested…</td></tr>
<tr><td colspan="3">Adults and Children</td></tr>
<tr><td></td><td>Blood Culture Tube</td><td>Blood Volumes</td></tr>
<tr><td>Site 1</td><td>SPS tube</td><td>5 – 8 mL</td></tr>
<tr><td colspan="3">Neonates (<1 Month Old)</td></tr>
<tr><td></td><td>Refer to AHS Collection Site</td><td></td></tr>
</table>
</td></tr>
<tr><td>5.</td><td>Mark the volume of media on each BACTEC vial.</td></tr>
<tr><td>6.</td><td>Using the prior tables as a guide, mark another line on each BACTEC vial to indicate the volume of blood to be collected.</td></tr>
<tr><td>7.</td><td>Perform hand hygiene with soap and water or alcohol hand sanitizer in view of the patient. If your hands are visibly soiled, hands must be washed with soap and water.</td></tr>
<tr><td>8.</td><td>Assemble all collection materials.</td></tr>
<tr><td>9.</td><td>Put on disposal examination gloves.</td></tr>
</table>

Procedure (continued)

Step	Action
10.	Select the puncture site(s): • Persons aged 10 and older: two sites generally left and right arm • If limited to using one arm, use the arm and hand • Children under 10 years: optimally two sites, generally left and right arm; however the minimum amount is 1-5mL in one vial. • Neonates and Mycobacterium collections: one site
11.	Prepare the puncture site: • Vigorously cleanse the skin over the venipuncture site (a circle approximately 5 cm in diameter) with 70% alcohol. Allow to air dry. • Starting in the center of the circle, apply 2% Chlorhexidine/70% Alcohol swab in ever-widening circles, until the entire circle has been saturated. This step will sterilize the collection site. • Allow the venipuncture site to dry. The 2% Chlorhexidine/70% Alcohol must remain on the skin for at least 30 - 60 seconds to be effective. **Note:** If a patient has an allergy to alcohol then use two 10% Providone-Iodine (Betadine) swabs. The first to clean the site and the second to sterilize the site.
12.	Disinfect the blood culture vial by removing the tab from the cap and swabbing the septum with 70% alcohol.
13.	If required to re-touch the venipuncture site after preparation ensure that your "touching finger" has been vigorously cleaned with both alcohol and 2% Chlorhexidine/70% Alcohol to maintain sterility of the site.
14.	Perform the venipuncture using a vacutainer adapter and butterfly needle.
15.	Ensure you do not contaminate the cleansed area at any time during collection.
16.	When collecting for bacterial culture, collect the **aerobic bottle first**, and collect the **anaerobic bottle second**.
17.	Keep the vial upright and fill to the blood volume mark you made. **Note**: For pediatrics and neonates, draw only the required volume of blood. Do not fill the culture vial(s). See APPENDIX I for maximum draw from pediatric patients.
18.	Collect blood into other vacutainer tubes as per "Order of Draw" after the blood culture collection.
19.	For adults and children, repeat step 11 - step 15 for Site 2

Post Phlebotomy

Step	Action
1.	In sight of the patient, label vials or tube with the LIS label making certain the computer labels do not obscure the barcode and adjacent sequence number on the original BACTEC vial label.
2.	Document: • On Requisition: Right arm/left arm and vial type per site (ie: right arm Aerobic (ABC), left arm Anaerobic (AABC) • On Vial: right arm/left arm Record your tech code and the time of collection in the appropriate areas on the source document.
3.	Provide each PCC patient with a "Post Venipuncture Care" information sheet (stock #1S1328) before they leave the collection station.
4.	Ensure bleeding has stopped before applying surgical tape or a Band-Aid on the venipuncture site. Patients on anticoagulant therapy may take longer to clot. **Do not release the patient until bleeding has fully stopped.**
5.	Clean the phlebotomy station arm immediately following each collection. • Use an Optim 33TB® wipe to wipe the arm ensuring the wipe makes contact with the entire surface of the arm; this will clean and disinfect the arm. If the arm is visibly soiled, repeat this step. • If any visual contamination is noted on other surfaces, clean and disinfect immediately using this same process.
6.	Place labeled specimens and requisition in the processing area.
7.	Remove gloves and discard into regular garbage.
8.	Perform hand hygiene (hand washing with soap and water or use of alcohol hand sanitizer).

Post Phlebotomy (continued)

Step	Action
9.	If a sub optimal volume of blood is collected, (i.e. < 8-10 mL for adults bacterial culture, <1-5 mL for pediatric bacterial culture), Microbiology must be alerted by adding a specimen flag into the LIS. Entering a specimen flag for a blood culture: A. Open Specimen Update using the blood culture's specimen ID B. Click the box for Specimen flags C. Select "low specimen volume" from the list, and click Accept

Notes and precautions

- It is critical there be meticulous preparation of the skin prior to venipuncture with maintenance of an aseptic technique, in order to minimize the frequency of contamination.
- When using a butterfly needle, the air in the tubing is drawn into the first blood culture vial. Since this air has the potential to affect the anaerobic culture, the aerobic vial must be drawn first, and the anerobic vial second.
- For difficult adult collections, attempt to collect at least the aerobic vial.
- A lesser volume of blood is adequate in Pediatrics because the concentration of microorganisms during bacteremia is higher than in adults. It is recommended a blood culture consist of a total of 1 - 5 mL of blood collected from one venipuncture site. Collection of blood for culture from two sites is optimal but may not be practical in pediatric collections.
- Only 4 sets of blood cultures should be collected from an adult in a 24 hour period (one adult collection is considered 2 sets).

Supporting documents

Document Title	Doc ID
Phlebotomy –Collecting Blood by Venipuncture	Procedure – PCS 9798

References

1. Galbraith, J., Laboratory Recommendations on the Collection of Blood for Culture. Dynacare Kasper Medical Laboratories, May 7, 1996.
2. BACTEC 9050 System User's Manual. Becton Dickinson Diagnostic Instrument Systems. Becton Dickinson and Company MA-0103 Revision: D June, 1998.
3. Bactec Fluorescent Series User's Manual. Becton Dickinson & Company MA-0074, Revision: S, 2001/07.
4. BACTEC Plus Aerobic/F* Data Sheet. Becton Dickinson Diagnostic Instrument Systems. Becton Dickinson and Company MA-0034, 2006/08.
5. BACTEC PEDS Plus/F* Culture Vials Data Sheet. Becton Dickinson Diagnostic Instrument Systems. Becton Dickinson and Company MA-0034, 2006/08.
6. BACTEC Lytic 10 Anaerobic F Culture Vials Data Sheet. Becton Dickinson Diagnostic Instrument Systems. Becton Dickinson and Company MA-0034, 2008/01.Wilson, M.L. Blood Cultures, Clinics in Laboratory Medicine, 1994, 14:1-7.
7. BACTEC Plus Aerobic/F* Data Sheet, Becton Dickinson Diagnostic Instrument Systems, Becton Dickinson and Company, MA-0034, Page OSSB, September, 1993.
8. 12. Laboratory Bulletin: Update on Blood Culture Collecion August 2008, Vol. 13, No. 9.
9. Principles and Procedures for Blood Cultures, Approved Guideline, M47-A Vol 27, No. 17, 5/24/2007.

Distribution **PCC LAII, FVM, HLV, LACR, NLHC**

APPENDIX I

MAXIMUM DRAW IN PEDIATRIC PATIENTS (UNDER 14 YEARS OF AGE) WITHIN A 24 HOUR TIME PERIOD

PT'S WT (KG):	**2.7 - 3.6**	**3.7- 4.5**	**4.6 - 6.8**	**6.9 - 9.1**	**9.2 - 11.4**	**11.5- 13.6**	**13.7 - 15.9**
PT'S WT (LBS):	**6 - 8**	**9-10**	**11-15**	**16-20**	**21-25**	**26-30**	**31-35**
Max. Cumulative Amount over 1 month (mL):	23	30	40	60	70	80	100
Max Amount at any one time (mL):	2.5	3.5	5	10	10	10	10
PT'S WT (KG):	**16.0 - 18.5**	**18.6 - 20.4**	**20.5- 23.0**	**23.1 - 25.0**	**25.1 - 27.5**	**27.6 - 29.5**	**30.0 – 32.0**
PT'S WT (LBS):	**36-40**	**41-45**	**46-50**	**51-55**	**56-60**	**61-65**	**66-70**
Max. Cumulative Amount over 1 month (mL):	130	140	160	180	200	220	240
Max Amount at any one time (mL):	10	20	20	20	20	25	30
PT'S WT (KG):	**32.1- 34.0**	**34.1 - 36.0**	**36.1 - 38.5**	**38.6 - 40.5**	**40.6 - 43.1**	**43.2 - 45.4**	
PT'S WT (LBS):	**71-75**	**76-80**	**81-85**	**86-90**	**91-95**	**96-100**	
Max. Cumulative Amount over 1 month (mL):	250	270	290	310	330	350	
Max Amount at any one time (mL):	30	30	30	30	30	30	