STANTON TERRITORIAL HEALTH AUTHORITY

Yellowknife, Northwest Territories

TITLE: Blood Culture Collection	**Revision Date:** 01-December-16	**Issue Date:** 01-December-14
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Distribution: Specimen Control Manual	**Page: 1 of 15**	
Approved by: Cheryl Case, Manager of Diagnostic Services	**Signed by:** Cheryl Case	

PURPOSE:

To guide Non-Bacteriology Technologists and Lab Assistants in the following BACTEC™ FX related procedures:

- Venipuncture procedure for Blood Culture collections
- Accessioning instructions
- Vial insertion into BACTEC™ FX (different protocol for PCC – refer to **Blood Culture Job Aid for PCC**)
- Receipt protocol for > 24 hour post-collection or BACTe Alert bottles

REAGENTS and/or MEDIA:

Media	Information
BACTEC™ FX	• Source: Becton Dickinson • Location: Bacteriology Lab 
Blood Culture bottles	• Source: Becton Dickinson, ordered from Stores • Location: Main Laboratory wash-up room, various wards • Storage: 2- 25°Celsius

	BACTEC™ Plus Aerobic/F Culture Vials (**blue top**) Organisms detected: • Aerobic/facultative anaerobic/fastidious bacteria • Fungi & Yeast	
	BACTEC™ Lytic/10 Anaerobic/F Culture Vials (**purple top**) Organisms detected: • Anaerobic/facultative anaerobic bacteria • Partner to the Aerobic Plus bottle	
	BACTEC™ Peds Plus™/F Culture Vials (**pink top**) Organisms detected: • Aerobic/facultative anaerobic/fastidious bacteria • Fungi & Yeast	

SPECIAL SAFETY PRECAUTIONS:

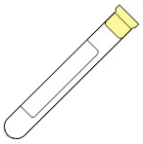
All patient specimens are assumed to be potentially infectious. Follow standard precautions. Viable micro-organisms may be present: all cultures must be handled with appropriate precautions. All equipment in contact with cultures should be decontaminated by appropriate methods.

GUIDE TO BLOOD CULTURE COLLECTIONS:

Patient	Criteria	# of Bottles
TIMING of collections (recommendations from the 2014 CLSI standards):		
Simultaneous blood culture sets (recommended): The two venipunctures should be performed **one after the other** (or closely spaced out) from different areas of the body (different sites) in one 24 hour period. If a different side for the 2nd draw is difficult or impossible to draw from, repeat the 2nd venipuncture on same side as the 1st draw (document on requisition). **Timed culture sets (not recommended):** Cultures drawn at 30 min →1 hr intervals show **no improvement in bacterial recovery** over simultaneous blood draws. Therefore, timed venipunctures are not recommended and should be avoided **unless Endocarditis is suspected and indicated on the requisition**.		
Number of blood culture sets (varies with patient age and weight):		
Note: the number of organisms per mL of blood in most cases of bacteraemia are low, especially if patient is on antimicrobial therapy; therefore good volume is ideal for optimal organism recovery.		
Adult (≥ 12 yrs) or (≥30 kg)	**Two venipuncture sites = ONE SET** 1. Aerobic Plus & Anaerobic Lytic bottle 2. Aerobic Plus bottle • Draw volume: 8-10 mL per bottle • Order Entry code: CXSET, CXBAE Unusual pathogen requested: • One set is recommended per 24 hr period Extended protocol: (>5 days incubation) • Unnecessary even if suspect *Brucella* or HACEK group due to high sensitivity of Blood culture media and automated detection methods (ie. BACTEC)	 1st site CXSET  2nd CXBAE

	Suspect Endocarditis: • Timed collection intervals recommended: ***One set*** *(2 sites) should be collected followed by 2 further Aerobic Plus bottle at* ***30 minute to one hour intervals*** *within a 24 hour period. If those sets are negative after 24 hours,* ***two more Aerobic Plus bottles should be collected (from different sites)****.* • *A total of 5 Aerobic Plus bottles and 1 Anaerobic Plus bottle collected overall within a 5 day period. Anaerobes are very unusual pathogens in Infective Endocarditis. If all cultures are negative after 5 days, an alternative diagnosis should be considered.* • Extended protocol unnecessary.	
Child/ Pediatric (≤ 12 yrs) or (< 30 kg)	**Two venipuncture sites = ONE SET** 1. Pediatric Plus bottle 2. Pediatric Plus bottle • Draw volume: 1-5 mL per bottle • **Guide: Draw 1 mL per year of age** *(ie. patient 3 years old, draw 3 mL blood/set)* • Order Entry code: CXBPE (x 2) *Note: In infants and children, the number of organisms per mL of blood during bacteremia is higher than in adults; so smaller blood draw volumes are acceptable for culture than in adult patients.* Unusual pathogen requested/Extended protocol/Endocarditis: • Follow rules as above for Adult patients.	 1st site CXBPE  2nd CXBPE
Neonate/ Infant (<1 year)	**One venipuncture site = SINGLE SET** 1. Pediatric Plus bottle • Draw volume: 1-1.5 mL per bottle • Order Entry code: CXBPE	 CXBPE

Difficult draw for multiple vials	If impossible to draw the required amount, make the decision to **collect more blood into the Aerobic Bottle** and reduce volume in the anaerobic bottle, **or not to collect the anaerobic bottle** at all. Document on requisition.

Patient	Criteria	Sample:
Blood culture collection with a request for Mycobacteria – do not use blood culture vials.		
Any age	**One venipuncture site = SINGLE SET** • Draw volume yellow top SPS: 8-10 mL • Order Entry code: MRAFB and referred out to Provincial Lab	-SPS blood collection tube (yellow top glass tube) 

SUPPLIES FOR BLOOD CULTURE COLLECTION:

- BACTEC™ bottles
- Tourniquet
- Butterfly collection device
- Vacutainer holder
- Alcohol swabs
- Benzalkonium Chloride Wipes (LORIS™ 0.13% BZK)
- Gauze
- Band-aid or tape

PROCEDURE INSTRUCTIONS FOR BLOOD CULTURE COLLECTION:

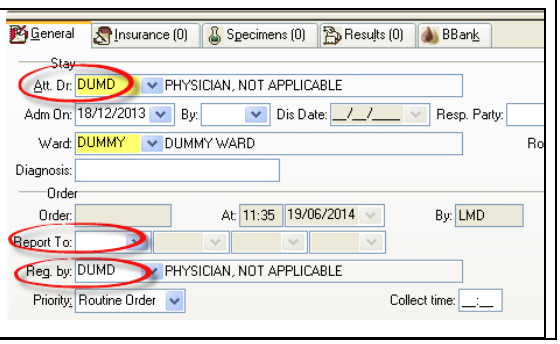
Steps	Action:
Follow the steps below to collect blood into blood culture vials	
1	**Identify patient.** • Use hospital arm band if an in-patient, or verbal read-back the patient's last name and date of birth and certify with name and DOB on requisition.
2	**Put on PPE (ie. gloves).** This is mandatory.
3	**Gather supplies (place near venipuncture site) and prep vials.** • Mark the volume of liquid media in each vial • This is your base-line of fill • Every hatch mark on the vial is approximately 5mL.  • Remove the caps from blood culture vials • Cleanse the rubber tops with an alcohol wipe. 
4	**Tie tourniquet. Palpate vein. Clean venipuncture site with an alcohol swab.** • If the blood collector needs to palpate the vein again after cleaning, clean the gloved FINGER with alcohol and Benzalkonium Chloride to reduce contamination of venipuncture site.
5	**Disinfect site (following alcohol swab) with a Benzalkonium Chloride wipe.** • Helps reduce the chance of pseudo-bacteremia (false positive blood cultures due to skin contaminants in sample). • Clean the gloved FINGER with **Benzalkonium Chloride** to disinfect if the blood collector needs to palpate the vein again.

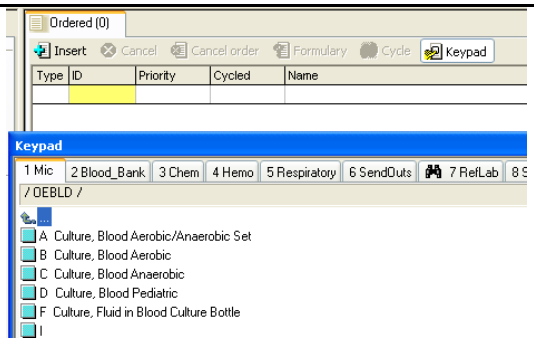
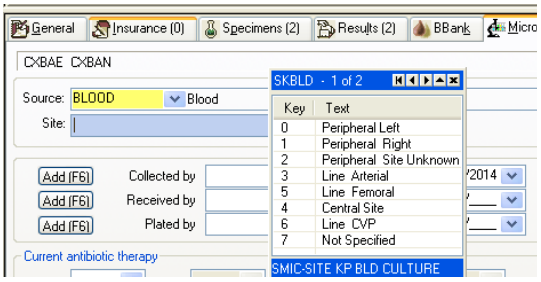
6	**Assemble butterfly and vacutainer holder and line up vials upright while the disinfectant dries on arm.** • Be quick. Do not remove tourniquet until the last bottle is filled (blood flow can stop if tourniquet is loosened before the last bottle is collected). • Be mindful of leaving the tourniquet on too long. 
7	**Perform venipuncture.** • Grasp wings of butterfly needle to insert needle into vein 
8	**Inoculate the blood culture vials.** • Begin with the aerobic bottle (BLUE TOP) • Push vacutainer holder against vial; press down so the needle punctures through the rubber top of vial, and hold in place for continuous blood flow into the vial. • Hold vial vertical to measure the volume of blood drawn (use vial hatch-marks to estimate). 
9	**Once optimal volume is drawn in 1st vial, move to next vial.** • Remove vacutainer holder from aerobic/1st bottle and place on top of 2nd bottle and press down to puncture the top with the needle for continuous blood flow into the vial **** If patient is a difficult draw and multiple sets are to be collected, the blood collector should make the decision to collect more blood in the Aerobic Bottle and reduce volume in the anaerobic bottle, or not to collect the anaerobic bottle at all. Record actions on requisition****

10	**Remove needle & bandage the venipuncture site.** • With a free hand, grab a piece of gauze close by, place gauze pad over insertion site and slowly remove needle from vein • Slide the yellow guard over needle to help prevent needle stick injuries.  • Apply mild pressure to stem blood flow. Hold gauze in place for 30 seconds and then check that site has stopped bleeding • Apply bandage or tape over site. 
11	**Discard waste.** • Discard needle in sharps container; • Discard tourniquet, gauze, and other supplies into regular waste bin.
12	**DO NOT WRITE OR PLACE A LABEL OVER THE BOTTLE BARCODE.**  **Label all blood culture vials with the following:** • Patient name • Date of Birth and/or HCN • Venipuncture site (ie. Right arm, Left foot, central line, etc) • Date and time of collection
13	**Remove gloves.** **Wash hands with soap & water or use an alcohol-based hand rub.**
14	**Transport blood culture bottles to Lab.**

	• If delay in transport, do NOT refrigerate and do not cool with ice packs. • Keep vials at room temperature for transport • If collected within hospital, transport to lab ASAP

PROCEDURE INSTRUCTIONS ON HOW TO ACCESSION BLOOD CULTURES:

Steps	Action:
Follow the steps below to accession blood cultures:	
1	**Log into Soft → SoftMIC or SoftLAB → Double click on Order Entry (OE)** • Patient should already have a Medipatient (MP) Encounter if the patient has either been admitted to Stanton Hospital or is in the ER (EMERG staff should already have created an encounter in MP). • Blood cultures from communities require their own MP laboratory case to be created. Check MP tracer tree to see if the patient has been admitted to hospital (often the community NIC will collect a blood culture set before the patient is flown to Stanton Hospital; the blood culture and requisition arrives with the patient in ER and is sent down to the lab with the community requisition. If this occurs, CC the admitting hospital ward in OE).
2	• Find the patient in OE by searching by hospital chart number, HCN, or last & first name.
3	**Fill out Stay information from requisition.** Fill out attending doctor ("Att. Dr.") if not already admitted, and then requesting doctor ("Req. by:") if the attending and requesting physician are different • Check if any CC's are requested on requisition ("Report To:") 

	One unique order number per collection site. Order Entry (OE) codes are as follows: • **"CXSET"** → Aerobic and Anaerobic vial collected together • **"CXBAE"** → One Aerobic vial • **"CXBPE"** → Pediatric vial	 On the right side of screen in the Ordered tab → under ID box→ type the Blood culture OE test code, or find the BLD folder in the keypad → select the appropriate choice for the vial(s).
4	• Fill out the **Site** (Source is always Blood unless a Body Fluid in Blood Culture Bottle) • Use keypad or free text Site (ie. Left Arm) • If site is unspecified, indicate that it is not specified in the Site line	
5	• Fill out **Collector**; if illegible write "ILEG"; if Collector initials not written and was collected by nursing staff then write "UNK" • **Received By:** Click "Add [F6]" to automatically fill out your initials and date/time • Do NOT click the **"Plated By"** button (used by Bacteriology staff for positive blood cultures)	
6	• Fill out remaining information from requisition such as Clinical History and Antibiotics.	

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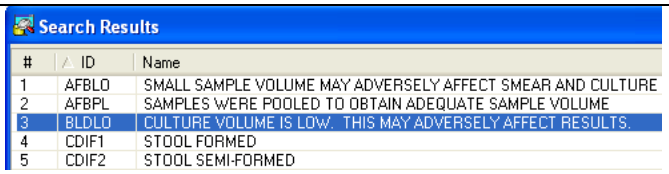
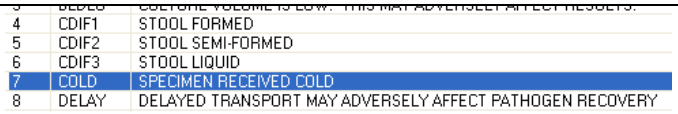
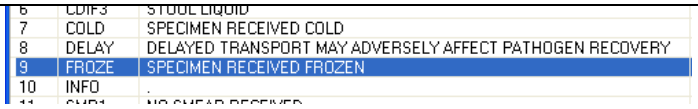
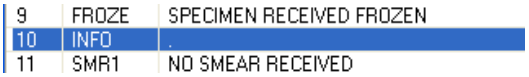
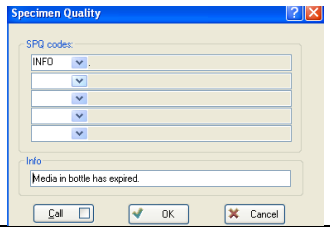
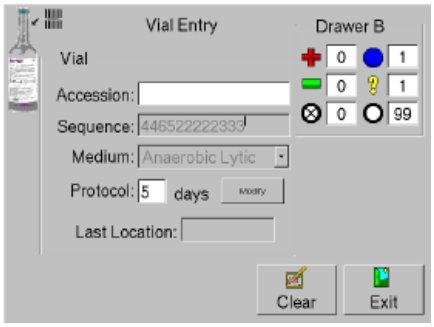
Ensure to examine the blood culture bottles while they are being accessioned and add the appropriate Specimen Quality Comments below:

Low blood volume **"BLDLO"**	
Specimen cold **"COLD"**	
Specimen frozen **"FROZE"**	
Any quality issue that is not in a SPQ canned text. **"INFO"** *Examples: Media in bottle has expired.*	• Select "INFO" ID with the "." Name (see below):  • Free-type the SQ issue under "Info" line. Click "OK" 
Vial appears visibly POSITIVE upon receipt: i. Lemon yellow bottom, ii. blood is dark/hemolyzed iii. Bulging septum.	• Receive bottle, and then bring to the attention of a Bacteriology Tech and leave bottle with Microbiology Staff to handle • If > 8pm: Core Lab Tech should receive bottle. • Place the BACTEC vial(s) in the O2 incubator; **do not place on BACTEC FX.** • Leave a note attached to the requisition on the Accessioning bench in Microbiology outlining your actions.

8	• Click the **SAVE** button to save the order and click **OK** to print out the LIS accession labels
9	• Label the blood culture vials ***** DO NOT WRITE OR PLACE A LABEL OVER THE BOTTLE BARCODE***** • If a blood culture set was accessioned, **pay attention to the "bottle extensions"**  ➢ AN = label for anaerobic bottle ➢ AE = label for aerobic bottle
10	• Insert the accessioned vials into the BACTEC FX following the procedure below.

PROCEDURE INSTRUCTIONS FOR INSERTING VIALS INTO THE BACTEC:

Steps	Action:
Follow the steps below to insert an accessioned vial into the BACTEC:	
1	**Open any drawer (left side or right side; it doesn't matter) of the BACTEC FX.** • Grasp the half-elliptical handle and pull towards you. Use your thumb against the side of the drawer for leverage to smoothly open the drawer.  Pull drawer towards you to open  Open drawer with bottles placed inside

2	**Scan the BOTTLE barcode.** • Drawer opens → Scanner automatically activates and lights up • Scanner is aimed downwards so scan the horizontal bottle with barcode facing UP • When the bottle barcode is scanned, the screen displays "Vial Entry Display" (see below). Always scan the **bottle barcode** before the order #.  • The bottle barcode populates the Sequence line. Bottle type populates the Medium field. Protocol is the length of incubation in the BACTEC. Default is 5 day incubation.
3	**Scan the LIS accession label** • The accession # will fill out in the Accession field on the Vial Entry Display
4	**Place vial into any station that is lit up with a solid green LED.** • The BACTEC FX will **NOT** assign a specific station for the vial. The bottle can go into ANY station that displays a solid green LED light. 
5	**Repeat steps 2→ 4 for additional vials** • Scan bottle barcode→ accession barcode→ place into any green station. • Keep the drawer open the entire time while vials are being inserted (do not have to open and close the drawer between vials).

6	**Close Drawer.** • The drawer has a damper on it which will make a knocking noise as the drawer closes; this is normal. The knocking noise is not a broken noise. Continue to close drawer until the BACTEC makes a soft "checking" sound. • Place requisition by the Bacteriology Accessioning computer for filing.

PROTOCOL FOR RECEIPT OF > 24 HOUR BLOOD CULTURE BOTTLES or BACTe ALERT BOTTLES:

Blood cultures that sit in transit for over 24 hours risk the possibility that bacteria, if present, has overgrown the growth curve algorithms on the BACTEC FX. Consequently, blood culture bottles received into the lab >24 hours from collection or vials sent to the lab that are not BACTEC vials require special handling.

Steps	Action:
BACTe Alert or >24 hr vials are received in the laboratory:	
1	A > 24 hour vial is one that has exceeded 24 hours from date & time of collection to when it has been brought into the lab. • Check the time of collection on the LIS accession label or in Order Entry if the bottle is already accessioned, or check the time of collection on the requisition.
2	During lab hours: • Notify a Bacteriology Technologist that there is a >24 hr blood culture or a non-BACTEC blood culture vial in the lab. After 8pm: • Leave the blood culture (s) in the white bin.
3	A Bacteriology Technologist will take care of the special plating procedures for these types of blood cultures. *Bacteriology Technologists: Refer to either the Specimen Processing Manual or the Blood Culture Manual for procedure instructions.*

REFERENCES:

- BD Diagnostics. (2011). *BD Bactec FX Instrument User's Manual.* Sparks, MD: Benex Limited.
- BD Diagnostics. (2011). *BD BACTEC FX System.* Sparks, Maryland, USA: BD Diagnostics.
- BD Diagnostics. (2008, January). BD BACTEC Lytic/10 Anaerobic/F Culture Vials. Shannon, County Clare, Ireland: BENEX Limited.
- BD Diagnostics. (2006, August). BD BACTEC PEDS PLUS/F Culture Vials. Shannon, County Clare, Ireland: BENEX Limited.
- BD Diagnostics. (2011, March). BD BACTEC Plus Aerobic/F Culture Vials and BACTEC Plus Anaerobic/F Culture Vials. Shannon, County Clare, Ireland: BENEX Limited.
- CLSI. *Principles and Procedures for Blood Cultures; Approved Guideline.* CLSI document M47-A. Wayne, PA: Clinical and Laboratory Standards Institute; 2007.

REVISION HISTORY:

REVISION	DATE	Description of Change	REQUESTED BY
1.0	07-NOV-14	Initial Release Reviewed by: Dr. T. Wuerz, Dr. D. Scott, M. Arbuckle & C. Russell	L. Driedger