



Document History:

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3	Section 15 - Blood Volume Collected - statement added related to minimizing excessive blood volume loss	Feb 2010
4	Section 1 – deleted “Laboratory staff will be responsible for the collection of blood specimens from patients.” Phlebotomy is not sole responsibility of laboratory staff	26-Feb-10
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1. Purpose

Phlebotomy is the process of obtaining a blood specimen from a patient. The phlebotomist represents the front line staff to the patients. Techniques used to procure a blood specimen must be performed in a professional manner that promotes a positive experience with the patient while ensuring that quality specimens are collected.

2. Scope

This document will establish criteria for the correct collection of blood specimens. Testing cannot produce a good result from a poor specimen. Proper specimen collection and handling are important because significant errors can occur in the pre-analytical phase of laboratory testing. Pre-analytical errors can be numerous (incorrect patient identification, incorrect order of draw, incorrect use of additive tubes, labeling errors, incorrect timing of collection, clerical errors). This document is intended to help prevent these problems and protect against complications of patient mismanagement that can arise when specimens are improperly collected.

3. Safety Precautions

As it is impossible to know what isolates or specimens might be infectious, all patient and laboratory specimens are treated as infectious and handled according to Routine Practices.

For patient safety wear a face mask when performing venipuncture if phlebotomist has a respiratory illness. Similarly, if the patient exhibits a product cough or sever signs of respiratory illness, phlebotomist may choose to wear a face mask.

4. Requisition / Test Request Completion

DSM policy #10-50-03, Specimen Acceptance Policy, must be followed.

In order to ensure correct patient identification, matching of request to specimen, appropriate testing and result reporting the following information is required on all requisitions:

1. Patient information	<ul style="list-style-type: none"> a. First and last name b. PHIN (Personal Health Identification Number) or unique identifier c. Date of Birth d. Gender
2. Physician information	Name of ordering physician and facility name (can include address/phone). If there is a request to copy the report to another physician, that physician's address/phone must be included.
3. Specimen information	Source of specimen must be included when requesting Microbiology, Cytology, Fluid analysis or other testing where analysis and reporting is site specific.
4. Collection information	Date and time of collection
5. Test information	Test(s) requested and priority For Transfusion Medicine and CBS orders for blood components: type of blood component, quantity of blood component and date and time the blood components are required for transfusion must be indicated.
6. Phlebotomist	Initials of phlebotomist and collection time are written on

information	the requisition when the collection is complete. <ul style="list-style-type: none"> • Transfusion Medicine and CBS (Canadian Blood Services) requisitions also require the name of the phlebotomist printed and a complete signature. • Transplant Immunology requires full name printed and initials
7. Location	Require location of where final report is to be sent
8. Clinical Information	If applicable

Note: Multipart requisitions must include the patient and physician information on every sheet.

4.1 Additional Requirements for Transfusion Medicine

Canadian Blood Services requires that documentation of the requesting physician (last name and first initial) appear on all requisitions sent to CBS Winnipeg or DSM Crossmatch Sites, otherwise the sample will be rejected. As other healthcare practitioners are authorized to order testing, the professional designations of the ordering physician/practitioner must also be indicated on the requisition such as:

1. Physicians – Dr. (Prefix)
2. Nurse Practitioner – NP (Suffix)
3. Registered Nurse Extended Practice – RN(EP) (suffix)

5. Materials

5.1 Ward Phlebotomy

1. Completed requisition
2. Evacuated collection tubes
3. Safety engineered needles (multi-sample, syringe type)
4. Single use tourniquet
5. Single use vacutainer holder/adaptor
6. Alcohol moistened cotton balls / alcohol prep pads
7. Chlorhexadine/alcohol swab sticks or pads (for blood cultures)
8. Gauze
9. Adhesive bandages/hypoallergenic tape
10. Blood lancets
11. Microtainer tubes
12. Latex free gloves
13. Safety sharps container
14. Syringes/winged collection sets
15. Transfer device for syringe collections
16. Face masks

5.2 Satellite Laboratory Phlebotomy

1. All supplies listed for ward phlebotomy
2. Venipuncture chair and/or bed
3. List of tests indicating minimum volume, special handling and precaution procedures.

6. Procedure

6.1 Summary

Step 1	Verify requisition is complete (DSM policy 10-50-03).
Step 2	Acknowledge patient and wash or disinfect hands.
Step 3	Positively identify the patient.

Step 4	Verify patient diet restrictions (i.e. fasting).
Step 5	Reassure patient
Step 6	Assemble necessary supplies and select appropriate tubes according to test request.
Step 7	Glove, where applicable
Step 8	Position patient
Step 9	Apply tourniquet
Step 10	Select vein
Step 11	Cleanse venipuncture site
Step 12	Perform venipuncture
Step 13	Release tourniquet as soon as possible after the blood begins to flow.
Step 14	After all tubes collected, place gauze directly over needle.
Step 15	Remove needle and apply pressure to venipuncture site.
Step 16	Dispose of puncture kit
Step 17	Bandage the arm
Step 18	Label tubes and record time of collection on requisition
Step 19	Observe any special handling requirements.

6.2 Patient Greeting

The phlebotomists' role requires a professional, courteous and understanding manner in all contacts with the patient. The phlebotomist must gain the patient's confidence by displaying a positive bedside manner. Greet the patient and identify yourself and indicate the procedure that will take place. Assure the patient that although the venipuncture will be slightly painful, it is of short duration. Explain to the patient the importance of holding the arm very still. It is wise to tell the patient when the needle enters the skin so the patient is not frightened. Never tell a patient "this won't hurt". Effective communication – both verbal and nonverbal – is essential.

7. Patient Identification

Proper patient identification is **MANDATORY**

7.1 Inpatients

1. The following two sources of identification must be used:	
a. Patient self ID	Patient verbally states their full name and/or date of birth. Verify against the information on the requisition.
b. Wristband	Verify the information provided on each requisition matches that on the patient's wristband.
2. Resolve any discrepancies with nursing staff prior to collection.	
3. Proceed with collection.	
4. Where either the wristband or verbal ID is not available, the following steps must be taken prior to collection:	

a. Wristband / no patient self ID	Have nursing confirm patient ID and sign requisition.
b. No wristband / patient self ID or no patient self ID	Ask a nurse to get an armband. DO NOT collect the blood until the patient has an armband. The armband must be on the patient, not on the bed, nearby table or equipment.

7.2 Neonates

Neonates are banded with two different bands. One band contains the neonates personal information at birth and the other band is used to link mother to the neonate.

Step 1	Laboratory staff must identify the neonate's requisition information against the band that contains their personal information, not against the band that links mother to neonate.
Step 2	Confirm the requisition and band match identically for the following information: a. Newborn's last name b. Gender of newborn c. Date of birth d. Health record number (HRN)
Step 3	Resolve any discrepancies with nursing prior to collection.

7.3 Outpatients

Step 1	Outpatients do not present with wristbands. Ask the patient to state their full name and spell it. Verify against the requisition. In some facilities outpatients must go through patient registration and are issued a registration card which has all the necessary information (same info you would find on an addressograph) and is used in place of a wristband.
Step 2	Ask patient to present their MB Health card. Compare information against requisition (name, date of birth, PHIN). If there is a discrepancy noted which cannot be resolved either with documentation (Health card) or confirmation by Manitoba Health, the blood sample should not be collected until clarification can be obtained.
Step 3	Ask the patient for their date of birth. Verify against the requisition. DOB is not a requirement for TM, however PHIN or other unique identifier is a must.
Step 4	Infants, mentally incompetent patients or patients not speaking the language of the phlebotomist must be identified by the patient's nurse or caretaker/family member. Document on the requisition the name of the identifying person.
Step 5	Unidentified Emergency patients will be given some temporary but clear designation by Emergency until positive identification can be made.
Step 6	Blood specimens are not to be collected unless the phlebotomy requisition is in possession of the phlebotomist at the time of collection and has completed patient demographics present.

8. Assembly of Supplies

Assemble equipment needed prior to presenting at the bedside. This will display organization and may help to put the patient at ease.

9. Order of Draw

Blood collection tubes must be drawn in a specific order to avoid cross-contamination of additives between tubes and must be filled completely. The recommended order of draw is as follows:

Type of Collection Tube	Color
Blood cultures	-
Coagulation (citrate)	Light blue
Serum tubes with or without separator gel clot activator	Red, Gold, Red Gray
Serum (no gel)	Red
Heparin with or without separator gel	Light or Dark Green
EDTA with or without separator gel	Lavender, Royal Blue, Pearl
Na Fluoride, K Oxalate	Grey

Note: tubes with additives must be thoroughly mixed. Erroneous test results may be obtained with the blood is not thoroughly mixed with the additive. Mix tubes gently by inversion, as per order of draw or as per manufacturer's instruction. Verify tube colours listed match what is used at your site.

10. Patient Information

Be aware of any signs that would indicate phlebotomy restrictions such as, but not limited to:

1. "No venipuncture on right/left arm"
2. "NPO (Fasting)"
3. "Patient has a cannula/fistula"
4. "Patient hard of hearing"
5. "Patient on strict isolation"

11. Procedure for Adults

11.1 Venipuncture Site Selection

Step 1	Verify any collection conditions noted on requisition are met prior to collection. Examples include fasting and time of dosage for pre- or post-medication collection.
Step 2	Reassure patient. Explain the procedure. Never tell a patient the procedure will not hurt. Be honest and tell them that there will be a small amount of discomfort.
Step 3	Patient must be sitting or lying down. Never collect from a patient who is standing.
Step 4	Place arm in a downward position, forming a straight line from shoulder to wrist. Placing a pillow under the arm may help achieve proper positioning.
Step 5	Apply the tourniquet (if needed) 3-4 inches above the intended venipuncture site.
Step 6	Have patient make a fist. Do not have patient pump the hand.

Step 7	Select a vein. The large and fuller median cubital and cephalic veins of the arm are used most frequently. Veins on the back of the hand are also acceptable for venipuncture. Do not collect specimens from the underside of the wrist (palm side) due to the proximity to nerves, arteries and tendons.
Step 8	Do not leave tourniquet on for more than 1 minute. Hemo-concentration of non-filterable elements may occur resulting in elevations of protein-based analytes, packed cell volume and other cellular elements. If vein selection, cleansing and access takes longer than one minute, then the tourniquet must be released and can be reapplied after waiting two minutes. Do not use a tourniquet for lactate.
Step 9	Palpate and trace the path of veins with the index finger. Arteries pulsate, are more elastic and have a thick wall. Thrombosed veins lack resilience, feel cord-like and roll easily.
Step 10	If superficial veins are not readily apparent, then a warm towel can be applied to the site for 5 min to enhance the flow of blood.
Step 11	Certain areas should be avoided when selecting a site: a. Extensive scars from burns and surgery b. Upper extremity on the side of a previous mastectomy c. Hematoma d. Edematous extremities e. An arm with an IV f. An arm with a cast g. An arm with a fistula (this is very common in dialysis patients)

11.2 Performance of Venipuncture

Step 1	Wear gloves during phlebotomy procedure. Change gloves and wash hands between patients.
Step 2	After site is chosen, cleanse area using alcohol moistened cotton ball or prep pad.
Step 3	Allow area to dry.
Step 4	If possible, position the patient's venipuncture site in a downward position to prevent "backflow" from collection tube into the vein.
Step 5	Anchor vein by drawing the skin taut with the thumb of the phlebotomist's hand that is firmly holding the patient's arm. The phlebotomist's thumb should be 1 to 2 inches below the venipuncture site to avoid accidental needle stick.
Step 6	Perform venipuncture, ensuring proper positioning of the needle (bevel up, angle of insertion of 30 degrees or less).

Step 7	Push/connect the first tube to the needle using the holder flanges to prevent needle movement. Collect appropriate tubes following the appropriate order of draw. Allow tubes to fill until the vacuum is exhausted and blood flow ceases. This is important to ensure a correct ratio of blood to tube additives. Once blood ceases to flow remove tube and collect any other tubes required. Immediately after drawing each tube that contains an additive, mix the blood thoroughly and gently by inverting the tube the required number of times as per order of draw or as recommended by tube manufacturer.
Step 8	Release tourniquet as soon as blood flow is established to the first tube. Tourniquet should have been on less than 1 minute.
Step 9	Once the last tube has been collected and removed from the needle, remove the needle from the patient's arm. Immediately activate the safety feature on the needle.
Step 10	Press down on the site with a clean gauze pad once the needle is removed, applying adequate pressure for the appropriate amount of time to stop bleeding. Cotton balls are not recommended because they may dislodge the platelet plug at the venipuncture site.
Step 11	Dispose of contaminated material/supplies in the designated waste containers.
Step 12	Check that bleeding has stopped, check for hematoma, and apply a bandage over the venipuncture site. If bleeding persists for more than 5 minutes or if a hematoma develops a nurse or physician should be notified. Continue to apply pressure to site with a gauze pad until bleeding stops.
Step 13	Label all tubes prior to leaving patient's bedside follow DSM specimen Acceptance Policy 10-50-03.
Step 14	Remove gloves and wash hands.

11.3 Use of a Syringe or Winged Collection Set

Syringe and/or winged (labs are required to use the safety winged collection sets) collection procedure is not required for routine vascular access and in general should be avoided for safety reasons. Use only when vascular access is compromised (ie. Children or small veins).

Step 1	Wear gloves during phlebotomy procedure. Change gloves and wash hands between patients.
Step 2	After site is chosen, cleanse area using alcohol moistened cotton ball or prep pad.
Step 3	Allow area to dry.
Step 4	If possible, position the patient's venipuncture site in a downward position to prevent "backflow" from collection tube into the vein.
Step 5	Assemble needle and syringe. Break the seal of the plunger and advance it fully forward, expelling air from syringe before use.

Step 6	Anchor vein by drawing the skin taut with the thumb of the phlebotomist's hand that is firmly holding the patients arm. The phlebotomists thumb should be 1 to 2 inches below the venipuncture site to avoid accidental needle stick.
Step 7	Perform venipuncture, ensuring proper positioning of the needle (bevel up, angle of insertion of 30 degrees or less).
Step 8	Insert needle into vein. Successful insertion is indicated by a flow of blood into the hub of the syringe or line of winged set.
Step 9	Pull gently back on syringe plunger to start flow of blood into syringe. Remove the tourniquet as soon as possible once blood begins to flow.
Step 10	After removed of needle from patient's vein, activate the safety feature on the needle. If using a winged collection set, continue to pull gently back on the syringe to ensure all blood is removed from the line.
Step 11	Press down on the site with a clean gauze pad once the needle is removed, applying adequate pressure for the appropriate amount of time to stop bleeding. Cotton balls are not recommended because they may dislodge the platelet plug at the venipuncture site.
Step 12	Disconnect the syringe from the needle and/or winged set.
Step 13	Discard the needle/collection set in appropriate waste container.
Step 14	Connect syringe to transfer device, pierce the stopper of the tube with the needle and allow the tube to fill without applying any additional pressure to the plunger until flow ceases. Dispense blood into tubes as per order of draw.
Step 16	Dispose of contaminated materials in the appropriate waste container.
Step 17	Mix specimens by gentle inversion as per order of draw or as per manufacturer's instructions
Step 18	Label all tubes prior to leaving patient's bedside follow DSM specimen Acceptance Policy 10-50-03.
Step 19	Remove gloves and wash hands.

11.4 Collecting Samples from an IV Arm

Every attempt must be made to perform collection from a site other than the arm with an IV. If this attempt fails, specimens may be collected from a vein several centimeters below the point of IV infusion. Collection above an IV is a last resort.

Collection below IV

Step 1	Ensure a suitable vein is available for collection by applying tourniquet below IV site.
Step 2	Remove tourniquet and have nursing staff turn IV off for a minimum of 2 minutes prior to collection of specimen.
Step 3	After 2 minutes, reapply tourniquet (between the IV and venipuncture site) and perform venipuncture.
Step 4	Document collection below IV on requisition (ie. "Collection below IV; IV off 2 minutes").

Collection above IV (to be avoided if at all possible, microcollection is a better alternative if possible)

Step 1	Ensure this is the only suitable vein available for collection.
Step 2	Request nursing staff turns IV off for a minimum of 2 minutes prior to collection of specimen.
Step 3	Apply tourniquet 3 to 4 inches above the antecubital fossa, perform venipuncture.
Step 4	Document collection below IV on requisition (ie. "Collection above IV; IV off 2 minutes")

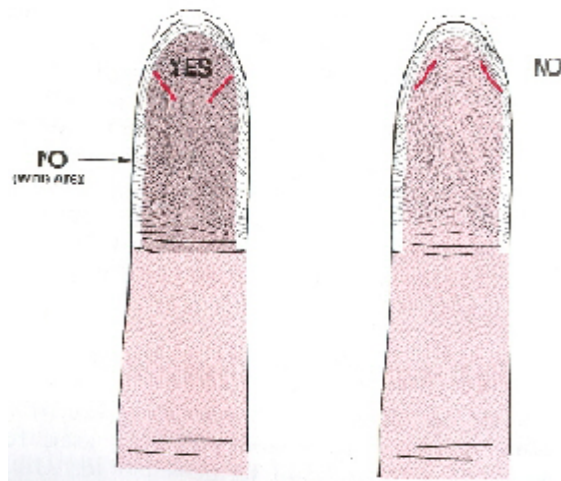
11.5 Collecting Samples from Arterial/Central Lines

Laboratory staff will not perform collection of specimens from arterial or central lines. Nursing staff will withdraw line specimens.

Step 1	Laboratory staff may provide collection tubes, ensure patient identification is correct and order of draw is followed (if present for collection).
Step 2	Individual performing collection is responsible for ensuring adequate blood is withdrawn from the line and discarded prior to collection of specimen to ensure the actual specimen is not diluted or contaminated with flush solution. Additional Notes: <ul style="list-style-type: none"> - The volume of discard varies depending upon the type of indwelling line. Site specific nursing procedures for flushing of lines should be followed. - It is recommended that a discard tube be used in all cases where dilution or heparin effect may be possible. - A discard tube must be collected prior to a sodium citrate tube when collecting from a dual-port line. - Collection of blood culture from a line is not optimal but if necessary a discard tube is required prior to collection of all blood cultures for Microbiology. - Samples for drug levels can not be drawn from the same line as was used to administer them.
Step 3	If collection will be performed when lab staff is not present, leave collection tubes for nursing staff to collect sample and label. Do not pre-label any tubes.
Step 4	Leave requisition. Nursing will identify patient, collect specimens and bring specimens and requisition to the lab. Note must be made that the specimen is collected by nursing. It should also be noted if arterial or venous sample and what type of line (i.e. Art line, PICC, etc)

11.6 Skin Puncture in Adults and children > 12 months old

Skin puncture is performed on adults when there are no accessible veins. Skin puncture sites should be warm, pink and free of scars, cuts, bruises or rashes. Do not choose a site that is cold, cyanotic or edematous. The recommended site for skin puncture on adults or older children is the palmar surface of the distal phalanx (end segment of the finger) of only the middle or ring finger of the non-dominant hand.



The puncture should be made in the central fleshy portion of the finger, slightly to the side of the center and perpendicular to the whorls (grooves) of the fingerprint. This will allow the blood to form a bead or drop that is easily collected. Warming the intended site increases the arterial blood flow; dangling the hand will also increase blood flow. If blood is collected by skin puncture, this must be documented on the requisition and in the computer if there is an LIS.

11.7 Skin Puncture Procedure

Step 1	Put on gloves
Step 2	Ensure arm is firmly supported and extended with the palmar surface of the hand facing up.
Step 3	Select the site, middle or ring finger, cleanse and let air dry.
Step 4	Pull the protective tab off the end of the lancet.
Step 5	Grasp the finger firmly between your thumb and index finger.
Step 6	Position the lancet so the puncture will be perpendicular to the grooves of the fingerprint and press the white button with thumb to activate the lancet.
Step 7	The first drop of blood must be assumed to contain an excess of intracellular fluid with surface debris and wiped away with dry gauze.
Step 8	Position the site downward and continue to apply moderate pressure proximal to the puncture site. Do not squeeze or massage vigorously.
Step 9	Touch the "scoop" of the micro collection tubes to the drop of blood and let the drop of blood run down the walls of the tube. Tap the tube gently to encourage the blood to settle to the bottom of the tube.
Step 10	Cap tubes with caps provided and mix additive tubes as per order of draw or as per manufacturer's instructions. Collect remaining microtainers. Note: Order of collection differs from vacutainers. Collect EDTA specimen(s) first, then other additives and serum last.

Step 11	Following collection apply pressure to puncture site with clean gauze until bleeding stops.
Step 12	Discard puncture device in appropriate container.
Step 13	Apply bandage if required. Do not use bandages on children <3 as they may place the bandage in their mouth and aspirate it.
Step 14	Label specimens prior to leaving patient's bedside following DSM specimen Acceptance Policy 10-50-03.
Step 15	Remove gloves and wash hands.

12. Phlebotomy Procedure for Children

12.1 Venipuncture Procedure in Children

Collection procedure is the same as with adults but with the following considerations:

1. In children <2 years of age the venipuncture is the responsibility of the ordering physician – may be sight specific.
2. Take special care to secure the child's arm to prevent injury caused by unexpected movement when the needle enters the skin.
3. Use a syringe with a 21 to 23 gauge needle or a 21 to 23 gauge winged infusion set with attached tubing.

12.2 Skin Puncture in Infants <1 year old

The heel is the recommended site for collection of infants less than 1 year. A complication of heel puncture is calcaneal osteomyelitis. To avoid this complication, the following should be done:

1. Only perform punctures on the most medial or most lateral portion of the plantar surface of the heel.
2. Puncture no deeper than 2.0mm.
3. Do not puncture through previous puncture sites.
4. Do not puncture the posterior curvature of the heel or in the area of the arch.

12.3 Skin Puncture Procedure

Step 1	Select appropriate puncture site using guidelines (see diagram #1).
Step 2	Ensure that the site is warm to guarantee dilated skin vessels and thus a free flow of blood. If not, cover the site for 3 minutes with a hot, moist towel at a temperature no higher than 42°C.
Step 3	Cleanse the puncture site with 70% v/v isopropyl alcohol, in a circular motion from the inside to the periphery, ensuring that the antiseptic remains in contact with the skin for at least one minute.
Step 4	Let the area air dry thoroughly.
Step 5	Wear gloves. Place the Quickheel against the site with the Quickheel logo facing you. Place the blade slot area securely against the heel at a 90 degree angle to the length of the foot (see diagram #2).
Step 6	Using your index finger, firmly and completely depress the trigger.
Step 7	After performing the puncture, release pressure for a few seconds.
Step 8	The first drop of blood must be assumed to contain an excess of intracellular and interstitial fluid with surface debris and is wiped away with a 2x2 gauze.

<p>NOTE: To obtain good samples without hemolysis or contamination with tissue fluid, the blood flow must be quite free; any milking of the puncture site must be avoided. With infants, using heel puncture, if the blood flow slows after some drops have been obtained, it may be restored by gently pressing the thumbs on the heel surface, stretching the skin away from the puncture site.</p>	
Step 9	Hold microtainer tube with FloTop collector at an angle below horizontal with vent holes in upward position (see diagram #3).
Step 10	Touch tip of the FloTop collector to underside of drop as shown. Blood will flow through the FloTop collector and down the tube wall. Occasional tapping will assist flow. Do not scrape up blood sample.
Step 11	Twist off FloTop collector from the tube and discard.
Step 12	Seat appropriate plug securely in the tube opening and mix specimen manually by inversion as per order of draw or as per manufacturer's instruction. Collect remaining microtainers. Note: Order of collection differs from vacutainers. Collect EDTA specimen(s) first, then other additives and serum last.
Step 13	Following collection of blood samples from a skin puncture, a 2x2 gauze should be pressed to the puncture site until it stops bleeding. This procedure will be facilitated if the infants' foot is held above the level of the heart.
Step 14	Use the narrow plastic tape on babies' heels in the nursery. DO NOT use paper tape as it tears the skin on some babies.
Step 15	NEVER apply a band aid to a puncture on a child as they may place the band aid in their mouth and aspirate it.
Step 16	Label all samples appropriately. Micro specimens for CBS should be labeled with the hospital number, name and date of collection using the small white labels.
Step 17	Make sure to gather up all equipment before leaving the patient. All incubators must be closed.
Step 18	Remove gloves and wash hands

Diagram 1:

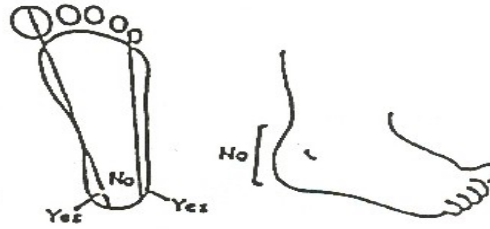
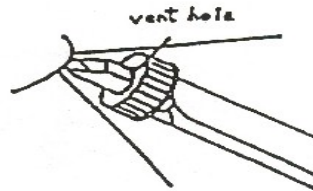


Diagram 2:



Diagram 3:



13. Labeling of Specimens

Label specimens **prior to leaving patient's bedside**; follow DSM specimen Acceptance Policy 10-50-03.

13.1 Labeling Blood Transfusion Medicine Specimens

All tubes for crossmatch, type and screen, miscellaneous transfusion testing, MB Rh Program and Transfusion Reaction Investigations must be hand labeled using indelible ink with:

1. Patient first and last name (no abbreviations)
2. PHIN number or unique identifier (MRN)– no exceptions will be made for Manitoba residents
3. Date of specimen collection (dd/mm/yyyy)
4. Facility name
5. Phlebotomist's initials

Any incompletely, improperly or incorrectly labeled tubes will be rejected for testing.

Canadian Blood Services requires that documentation of the requesting physician (last name and first initial) appear on all requisitions sent to CBS Winnipeg or DSM Crossmatch Sites, otherwise the sample will be rejected. As other healthcare practitioners are authorized to order testing, the professional designations of the ordering physician/practitioner must also be indicated on the requisition such as:

4. Physicians – Dr. (Prefix)
5. Nurse Practitioner – NP (Suffix)
6. Registered Nurse Extended Practice – RN(EP) (suffix)

13.2 Labeling Specimens for Transplant Immunology

All Tubes for Transplant Immunology must be labeled with:

1. Patient first and last name
2. PHIN
3. Date of collection

Note: Use of the TI label is optional

14. Troubleshooting
14.1 Incomplete Collection or No Blood is Obtained

Step 1	Assess the situation
Step 2	Adjust the angle of the needle; draw needle back, push needle further in. Do not "dig". Probing is not recommended as it is painful to the patient.
Step 3	Loosen the tourniquet.
Step 4	Try another tube; there may be no vacuum in the one being used.
Step 5	Re-anchor the vein.
Step 6	Attempt collection at another site (below the first site or in the opposite arm).
Step 6	It is not advisable to attempt a venipuncture more than twice. Have another person attempt to draw the specimen. If still unsuccessful, the chart will be flagged as "hard to get" and the physician will become responsible for collection of the patient.

14.2 Blood Stops Flowing into the Tube

Step 1	Vein may have collapsed. Remove the needle, take care of the puncture site and redraw.
Step 2	Needle may have pulled out of the vein when switching tubes. Hold equipment firmly and place fingers against patient's arm, using the flange for leverage when withdrawing and inserting tubes.

14.3 Other Problems

Hematoma	Sometimes the needle penetrates through both walls of the vein. Blood leaking from the vein into surrounding tissue may form a hematoma. Release the tourniquet immediately and withdraw the needle; apply firm pressure.
Blood is bright red, or rapidly forming hematoma, or rapid tube filling	May be arterial rather than venous. Withdraw needle and apply firm pressure for more than 5 minutes until active bleeding has ceased. Notify nursing staff and/or physician and document the incident according to institutional policy. Consult with supervisor to determine if specimen collected is suitable for testing (may need to consult Clinical Chemist, Hematopathologist, or Clinical Microbiologist depending on tests requested).
Patient feels a shooting, electric-like pain, or tingling or numbness	May have injured a nerve. Terminate venipuncture and remove needle immediately. Repeat the venipuncture in another site if needed. Document incident and direct patient to medical evaluation according to institutional policy.
Rolling veins	When a vein rolls, the needle may slip to the side of the vein without penetrating it. Remove the tourniquet, withdraw the tube and remove the needle from the arm.

14.4 Preventing Hematoma

1. Puncture only the uppermost wall of the vein.
2. Remove the tourniquet before removing the needle.
3. Use the major superficial veins whenever possible.
4. Make sure the needle fully penetrates the uppermost wall of the vein. Partial penetration may allow blood to leak into the soft tissue surrounding the vein.
5. Apply adequate pressure to the venipuncture site post-venipuncture.

14.5 Preventing Hemolysis

1. Avoid vigorously mixing of the tubes; mix by gentle inversion 5-10 times.
2. Avoid drawing blood from a hematoma.
3. When using a syringe assembly, avoid pulling the plunger back too forcefully.
4. Make sure the venipuncture site is dry; no residual alcohol.
5. Avoid a probing and traumatic venipuncture.

14.6 Nerve Damage

1. A shooting, electrical pain sensation, tingling or numbness during the procedure indicates potential nerve involvement.
2. If nerve involvement is suspected, remove the needle immediately and perform the venipuncture on a different site, preferably the opposite arm.
3. Document the incident.
4. Communication to patient regarding incident; notify supervisor/designate regarding incident

15. Monitoring Blood Volume Collected

The laboratory may use the following processes to minimize excessive blood volume loss and phlebotomy induced anemia.

1. Use smaller draw volume collection tubes or micro collection tubes. The phlebotomist must ensure the specimen is collected appropriately to provide accurate results. Collection tubes must be filled completely to their fill levels to maintain the correct blood to anti-coagulant ratio and provide the required sample dead volumes to perform the analysis.
2. Consult with the care giver to check if the test request and frequency is appropriate or if the volume of blood being collected is of concern.

16. Safety and Infection Control

Due to contact with sick patients and their specimens, it is important to follow safety and infection control procedures. Routine Practices must be followed to maintain proper infection control:

1. Wear a clean lab coat or gown when performing phlebotomy
2. Wash hands between each patient and when contaminated. Waterless hand sanitizer may be used if adequate hand washing facilities are not available.
3. Gloves must be worn.
4. Clean blood spills with hospital approved disinfectant or freshly made 10% sodium hypochlorite (bleach)
5. Dispose of needles immediately upon removal from the patient's vein. **DO NOT** recap needles

17. Needle Stick

If you stick yourself with any sharp:

Step 1	Remove gloves
Step 2	Squeeze puncture site to promote bleeding
Step 3	Wash area well with soap and water
Step 4	Record the patient's name and ID number if the sharp was contaminated
Step 5	Notify immediate supervisor
Step 6	Follow site procedure for reporting needle-stick injury

18. Emergency Situations

Emergency numbers and codes must be up-to-date and available near the phones in the phlebotomy areas

18.1 Fainting or Unexpected Non-responsiveness

Step 1	Notify the designated first-aid trained personnel. This will vary by facility. Please refer to facility specific instructions.
Step 2	Where practical, lay the patient flat or lower his/her head and arms, if the patient is sitting
Step 3	Loosen tight clothing

18.2 Nausea

Step 1	Make the patient as comfortable as possible
Step 2	Instruct the patient to breath deeply and slowly
Step 3	Apply cold compresses to the patients' forehead
Step 4	Notify the designated first-aid trained personnel. This will vary by facility. Please refer to facility specific instructions.

18.3 Vomiting

Step 1	Give the patient an emesis basin or carton and have tissues ready
Step 2	Give the patient water to rinse out his/her mouth
Step 3	Notify the designated first-aid trained personnel. This will vary by facility. Please refer to facility specific instructions.

18.4 Convulsions

Step 1	Prevent the patient from injuring themselves
Step 2	Do not restrain the movements of the patient's extremities completely, but try to prevent them from being injured
Step 3	Notify the designated first-aid trained personnel

19. Special Procedures

19.1 Ionized Calcium – Micro Collection

Step 1	Warm the foot with a hot wash cloth (40°C) for 3-5 minutes.
Step 2	Remove cloth, disinfect foot, perform puncture and wipe away first drop of blood.
Step 3	Keeping foot at a level lower than the heart and with minimal squeezing, collect a capillary tube full of blood. There must be no air bubbles in the tube.
Step 4	Firmly seat a capillary cap on one end of the capillary tube.
Step 5	Insert a flea into the tube and firmly place a capillary cap on the other end of the capillary tube. There must be no air in the tube.
Step 6	Mix the blood and anticoagulant by moving the flea with the magnet along the full length of the tube approximately 20 times. The whole blood volume required is 130-150µL.
Step 7	Store the sample if necessary in the refrigerator in a horizontal position until analyzed (maximum 4 hours).
Step 8	Before analysis, mix sample again. The flea should not be removed before the sample is aspirated for measurement. Place the flea at the end of the tube opposite to that from which the blood is to be aspirated.

19.2 Blood Culture Collection using Syringe

Step 1	Just prior to venipuncture, remove center metal tab from each vial to expose rubber membrane.
Step 2	Swab top of each vial with sterile alcohol pad.

Step 3	<p>Put on gloves; select vein for venipuncture. Clean venipuncture site using Chlorhexidine/alcohol swab stick as follows:</p> <ol style="list-style-type: none"> 1) Peel back the packaging and remove the stick (both sides of the stick are the same). 2) Use a back and forth friction rub to cleanse the skin, using enough pressure so that the handle of the stick bends slightly upwards. 3) Side "A" – cleanse the skin for 15 seconds using a back and forth friction rub, covering an area of about 4cm x 4cm. 4) Side "B" – turn the swab over and cleanse for another 15 seconds using a back and forth friction rub, covering the same 4cm x 4cm area. 5) There is no need to let the site dry between the two rubs. Let dry after second rub (approximately 20 seconds). 6) Use one swab stick for each site unless the two sites are so close together that they are both cleansed in the 4cm x 4cm scrub area.
Step 4	<p>Using a 20cc syringe, collect 16-20cc of blood. When using pediatric culture bottles, collect up to 4cc of blood. Without changing needles, immediately inoculate vials adding 8-10cc to aerobic bottle and 8-10cc to anaerobic bottle. Always inoculate the aerobic bottle first. Do not overfill the bottles.</p>
Step 5	<p>After completing venipuncture #1, locate and prepare site #2, repeating steps 1-3. Collect 10cc of blood and immediately inoculate aerobic bottle only with 8-10cc of blood. Note: blood volume collection for pediatric patients varies with the weight of the patient.</p>
Step 6	<p>Indicate the time of collection and the site on the requisition (i.e. L or R arm). Indicate site (i.e. L or R arm) on bottle(s) as appropriate.</p>
<p>Note: if only 8-10cc of blood is obtained, inoculate only the aerobic bottle. This should be the exception. DO NOT set syringe on bed or nightstand or allow needle to come in contact with foreign objects as this may result in contamination.</p>	

19.3 Blood Culture Collection using Butterfly

Step 1	Follow Steps 1 through 3 noted above for site selection and preparation
Step 2	Perform venipuncture using the vacutainer butterfly collection set
Step 3	Select the aerobic vial first, push and hold the vacutainer hub over the top of the vial to puncture the septum
Step 4	Hold the vial upright
Step 5	Collect blood to desired fill level
Step 6	Remove hub from vial
Step 7	Immediately push and hold hub onto second vial
Step 8	Fill to desired level and remove hub from vial
Step 9	If more samples are required, additional tubes may be drawn after the blood culture collection is complete

Step 10	After completing venipuncture #1, locate and prepare site #2
Step 11	Collect 10cc into the aerobic bottle only
Note: holders are available to attach to the end of the butterfly and place over the culture bottles. These also have adapters for collection vacuum tubes for other blood work. Indicate the time of collection and the site on the requisition (i.e. L or R arm)	

19.4 Ammonia (Venous Collection)

Step 1	Get ice
Step 2	Collect sample in EDTA tube
Step 3	Mix well immediately
Step 4	Place on ice immediately
Step 5	Send to lab immediately – document time of collection as sample must be analyzed within 20 minutes of collection or frozen

19.5 Ammonia (Capillary Collection)

Step 1	Warm heel or finger for 5 minutes (use of diaper on heel keeps it warmer)
Step 2	Get ice
Step 3	Cleanse collection site well to ensure no trace of sweat remains
Step 4	Collect 1-½ EDTA microtainers – mixing well
Step 5	Place in ice and send to lab immediately

19.6 Micro Lactate

Step 1	Warm heel or finger for 5 minutes
Step 2	Get ice
Step 3	Cleanse the site with alcohol and allow to air dry
Step 4	It is important that the baby not be crying so using a soother may be helpful
Step 5	It is important to have a free flow of blood as excessive squeezing causes elevation of lactic acid
Step 6	Collect 2 gray capillary blood tubes (250µL each)
Step 7	Mix well and place on ice

19.7 Drawing Blood Samples for Crossmatch, Type & Screen & Miscellaneous Testing, Transfusion Reactions

Step 1	Request for Blood Components Requisition / Request for Miscellaneous Testing / Transfusion Reaction Investigation or other facility specific applicable Blood Transfusion Service Requisitions, providing information for proper identification of the patient, must be presented before the specimen may be collected.
Step 2	The patient's nurse must identify the patient.
Step 3	Positive identification of the patient must be made by the phlebotomist; ask the patient to repeat and spell their family and given names and to repeat their date of birth. If the patient is unable to communicate, the identification by the nurse is sufficient provided it is documented.

Step 4	Check the patient's hospital identification band; verify that the information is identical with the information on the Request for Blood Products requisition or other requisitions as applicable and appropriate.
Step 5	If errors or discrepancies with patient identification are found, blood specimens should not be drawn until the problem is resolved.
Step 6	<p>Before collecting Pre-Operative Assessment Clinic (PAC) specimens, the scheduled OR date must be documented beside "When needed" (CBS Request for Blood Components Requisition) or on a DSM Blood Transfusion Service requisition designated spot.</p> <p>The scheduled OR date must be within the acceptable time frame of 21 days prior to the scheduled OR.</p>
Step 7	<p>If any of the above is missing, the PAC sample should not be collected:</p> <ol style="list-style-type: none"> 1. The PAC is phoned and the clinic nurse is informed why the specimen cannot be collected at this time. 2. If the patient and/or clinic nurse knows the OR date and it is within the acceptable time frame, it can be documented on the appropriate requisition location and the specimen collected.
Step 8	<p>6mL of blood is collected into a mauve stoppered tube (EDTA). Neonate samples require 250 – 500µL (2 microtainer tubes which are properly labeled may be used). Outpatients for the PAC collected in a satellite laboratory required two 6mL tubes in case further investigation is required.</p>
Step 9	<p>At the bedside and in the presence of the patient, initial and print in indelible ink the following information on the CBS label on the tube:</p> <ol style="list-style-type: none"> 1. Patient's primary identification # (PHIN). If PHIN is not available, the MRN number may be used. "N/A" must be indicated by PHIN# on the requisition. 2. Patient's first and last given names (note: this is limited to 24 characters on the hospital addressograph and summary sheet) Abbreviations are not acceptable. 3. Hospital 4. Date of collection (dd/mm/yyyy)
Step 10	The Request for Blood Products requisition or other requisitions as applicable and appropriate is signed by the phlebotomist.
Step 11	The specimen is given to the nurse identifying the patient, who is requested to initial the tube and co-sign the requisition.
Step 12	<p>The log sheet on the ward is signed to indicate the specimen was drawn. Sample is left at the desk for the ward staff to send to the facility Blood Bank.</p> <p>Note: In some regions the nurse also performs the functions of the blood bank.</p>

Step 13	In the case of a satellite lab, PAC collections, the phlebotomist initials the tube and signs the requisition. A second phlebotomist checks it.
Step 14	If drawn in a satellite lab, the specimen and requisition are placed in a plastic transport bag and send to the facility Blood Bank.

19.8 Protocol for Ordering Drug Assays for the Purpose of Therapeutic Drug Monitoring

- Prior to sample collection, the phlebotomist will confer with the appropriate ward to confirm the collection time, last dose and next dose.
- There are two kinds of doing for vancomycin, aminoglycosides, gentamicin, tobramycin: 8 hour dosing interval (traditional dose) or once daily dosing interval (high dose). The reference ranges are different. If the patient is on high dose therapy it will be marked on the requisition. Samples can be ordered without specifying peak or trough if collected at non-standard time.

NOTE: Non-trough drug levels are available under the following circumstances and must be clearly stated on the requisition:

- Patient in renal failure or those receiving hemodialysis
- Patient receiving a continuous IV drug infusion
- Overdose
- Suspect toxic level
- When requested by a clinical pharmacist who will interpret the result

19.9 Trough Drug Levels

Step 1	<p>Blood is collected for trough values within 45 minutes before the next dose with the following exceptions:</p> <ul style="list-style-type: none"> • Tricyclic antidepressants and lithium may be collected with morning blood work (10-12 hours post-dose) • Digoxins may be collected 0-4 hours pre-dose • Within the province of Manitoba there is lack of consensus in the appropriate monitoring of once daily dosing of aminoglycosides. At some centres monitoring is done 6-14 hours post-first dose once-daily dosing, in contrast to trough level monitoring and uses the "Hartford" nomogram to predict trough levels and dosing. • For aminoglycosides and vancomycin, clearance is different in newborns and patients with cystic fibrosis. As such, therapeutic monitoring of once daily administration of aminoglycosides in these patients may involve monitoring at non-trough times <p>Blood collection is ordered as a timed collection. Technical staff must confer with nursing staff prior to collection to confirm the appropriateness of the collection time. Reference values on laboratory reports when ordered as a trough level are for samples collected within 45 minutes prior to next dose. Samples can be ordered without specifying peak or trough if collected at non standard time.</p>
Step 2	Nursing staff will ensure that the patient is available throughout the collection time interval.
Step 3	If the patient is not available when the phlebotomist arrives on the ward, the blood collection will not be done.
Step 4	The phlebotomist will inform the nurse that the patient is absent and a new collection time will be arranged.
Step 5	The exact drawing time of the blood sample must be noted.

19.10 Peak Drug Levels

Step 1	Peak (post-dose) blood values are useful only in specific circumstances, but the timing of the blood collection is more critical.
Step 2	Following the dose, the time for the peak drug blood collection must be <u>specified by the lab or drug protocol</u> or by the <u>ordering physician</u> . The peak time can be from ½ hour to 3 hours.
Step 3	Peak blood collections are booked as timed collections with the laboratory by specifying it as " <i>Name of drug peak blood level</i> ".
Step 4	The phlebotomist (or house staff) may draw blood within ±5 minutes of the specified collection time, but the exact collection time must be noted.
Step 5	Peak levels are collected post completion of IV infusion as follows: <ul style="list-style-type: none"> • Gentamicin 20-40 minutes • Tobramycin 20-40 minutes • Vancomycin 60-120 minutes Refer to section 20.8 and 20.9 for non-standard times for blood collection for aminoglycoside and vancomycin monitoring. Reference values on laboratory reports when ordered as a peak level are for samples collected at times above. Samples can be ordered without specifying peak or trough if collected at non standard time.
Step 6	Prior to sample collection, laboratory staff will confer with the appropriate ward to confirm the collection time, last and next dose times.

19.11 Transplant Immunology (only applies to phlebotomy collections performed by TI staff at their site)

Step 1	Verify patient identification – ask patient / donor for provincial health card. Photo ID may also been presented (ie passport, driver's license, treaty card). If no ID is available, approval from Transplant Immunology Charge Technologist may be obtained for "KNOWN" patients. PHIN must be presented within 24 hours of venipuncture.
Step 2	Verify name, PHIN, date of birth and match to the requisition using the card. If there is a discrepancy between the requisition and health card, correct the requisition using the card information and notify the Transplant Coordinator.
Step 3	<ul style="list-style-type: none"> • Verify sensitization history: Request sensitization history from potential transplant recipients regarding the number of pregnancies, number of transfusions/dates and previous transplant/dates • Document history on TI Immunology Lab requisition • Initial clinical information area
Step 4	Proceed with collection

20. Guidelines for Patients on Strict Isolation

Step 1	Read isolation sign on door; additional precautions may be required.
Step 2	Wash hands.

Step 3	Don a gown; tie neck strings and lap the gown at the back to cover as much uniform as possible. Tie waist straps..
Step 4	Don mask; paper mask is prevent touching face (for respiratory isolations, special masks must be provided).
Step 5	Prepare a clean transport bag and leave it just outside the room.
Step 6	Put on gloves.
Step 7	<p>Take in only the necessary equipment (Preferred method of collection is with a syringe as it is easier to keep the tubes clean. Tubes may be kept clean by keeping them and the red tube holder inside an open plastic bag or a glove and holding onto them through the bag):</p> <ul style="list-style-type: none"> • Collection tubes and red tube holder (inside a plastic bag or glove to keep clean) • Alcohol swab • Gauze • Syringe with needles and/or winged collection set (safety engineered) • Piece of tape (to secure gauze on puncture site) • Latex free single use tourniquet • Single use vacutainer holder
Step 8	Leave lab tray and requisitions outside the room.
Step 9	Enter patient's room and locate tourniquet. If none in the room, use the one provided in the cart, leaving it in the room when finished.
Step 10	Place paper towels on bed or bedside table and place phlebotomy equipment on them until you are prepared to collect blood.
Step 11	Collect specimen(s).
Step 12	Transfer blood to tubes making sure they are kept clean by handling them through the plastic bag only
Step 13	Discard or put away all other supplies
Step 14	<p>Open door of room, remove one glove and with the clean hand transfer blood with the holder to the cart, leaving the contaminated plastic bag in the room's garbage.</p> <p>Note: Sample leaving the room must be clean as it will be treated the same as any other in the laboratory</p>
Step 15	If Vacutainer method was used to collect, alcohol outside of collected tubes by holding rubber tops of tubes with alcohol swab.
Step 16	Pull other glove off and discard in waste container.
Step 17	Wash hands.
Step 18	Untie gown waist and neck ties.

Step 19	Without touching the outside of the gown, slip one hand under opposite sleeve and pull sleeve over the hand. With the hand covered by the sleeve, grasp the opposite sleeve and pull it over the hand and ease the gown off.
Step 20	Fold the outside of the gown inward, roll it into a bundle and place in the soiled gown hamper.
Step 21	Wash hands.
Step 22	Exit room using a clean paper towel to open the door.
Step 23	Remove mask, handling only the elastics and not the front of the mask; dispose of in garbage.
Step 24	Wash hands.
Step 25	Label tubes.

21. Additional Considerations

21.1 Dress Code DSM Policy #20-70-03, *Dress Code*, will be followed

21.2 Patient Inquiry Staff should not discuss test/results with patients. A general statement should be made when patients inquire about tests such as “*According to hospital policy, I cannot discuss your blood work. This must remain confidential between you and your doctor*”.

21.3 Patient Who Refuses Blood Collection Laboratory staff is not permitted to draw blood if a patient refuses. If a patient refuses, inform the nursing staff. If ward staff can convince the patient to have their blood drawn, draw the blood and document the incident. If the patient still refuses, do not draw the blood. Only a court order on a patient’s chart can override the patient’s wishes.

21.4 Physician Relationship The physician has priority with the patient. The phlebotomist must ask for permission to draw the patient’s blood if a physician is visiting with the patient.

22. Packaging & Shipping Diagnostic Specimens

Refer to DSM Policy #110-10-05, *Serum/Plasma Separation Procedure*. Determine if specimen requires aliquoting prior to transport.

Processes and equipment for packing and shipping diagnostic specimens must comply with the Transportation of Dangerous Goods Act. (<http://www.tc.gc.ca/tdg/menu.htm>).

For Transfusion Medicine specimens package and ship as per MP.017 Specimen Referral outlined in the Manitoba Transfusion Quality Manual for Blood Banks and DSM Phlebotomy Collection Manual.

Refer to DSM Laboratory Safety Manual for specific instructions regarding packaging and shipment of diagnostic specimens.

Refer to applicable DSM Transportation of Diagnostic Specimens policies and procedures for additional information.



23. References

SBGH Biochemistry Phlebotomy Information Manual

CLSI H3-A6 Vol. 27, No. 26. "Procedures for the Collection of Diagnostic Blood Specimens by Venipuncture; Approved Standard" Sixth Edition

Manitoba Transfusion Quality Manual For Blood Banks, Version 2, June 2007

Transportation of Dangerous Goods Act

DSM Laboratory Safety Manual,

24. Associated Documents

DSM Document #10-50-03, Specimen Acceptance Policy

DSM Document #20-70-03, Dress Code

DSM Document #110-10-05, Serum/Plasma Separation Procedure

DSM Laboratory Safety Manual