Blood Collection and Specimen Processing Procedure (Phlebotomy)	**Attachments** ☒ Yes ☐ No
Key words Phlebotomy, Blood Collection, Blood draw, Specimen Collection, Venipuncture, Capillary, Heelstick, Fingerstick, specimen processing, heel, finger	**GHI-PC-NS-CLINIC LAB-PROCEDURES-Blood Collection v. 02-2020**
Category Provision of Care	**Effective Date** **See Electronic File**
Manual Clinic Laboratory Procedure Manual	**Last Review Date** **See Electronic File**
Issued By Clinic Laboratory Administration	**Next Review Date** **See Electronic File**
Applicable Clinic Laboratory Staff, W@W staff	**Origination Date** **September 1985**
	Retired Date
Level of Complexity Not applicable	**Approved Date** **See Electronic File**
Review Responsibility Regional Clinic Laboratory Supervisors	**Contact** Regional Clinic Laboratory Supervisors
APPROVAL(S) Laboratory Medical Director	

PURPOSE/PRINCIPLE

The purpose of blood collection is to obtain adequate blood specimens by venipuncture or capillary puncture (microtechnique) for diagnostic laboratory testing. This procedure ensures a consistent practice to preserve the condition and availability of patient's veins and ensures accurate results by avoiding pre-analytical errors. This procedure addresses processing serum and plasma specimens after collection in preparation for testing.

POLICY

Laboratory staff collecting blood specimens will follow the approved techniques for specimen collection and processing outlined in this procedure.

HealthPartners Family of Care uses single-use needles and devices for all phlebotomy and blood collection procedures. Should it be necessary to re-stick a patient, a new, single-use needle or device will be used.

HealthPartners Medical Group and Clinics **will not accept** blood specimens or cultures (from sources not traditionally collected by patients) for testing that are brought in or collected by patients or family members.

Lab staff is allowed to assist care unit staff in finding needle placement for IV starts, but cannot infuse.

SPECIMEN

The type of blood tubes required for tests is accessible via the HealthPartners Laboratory Test Directory, in the Epic Beaker lab system when in Lab Order Inquiry, and also on the patient labels generated by the computer.

Venipuncture technique should be used when collecting more than one milliliter of whole blood. Venous and capillary blood collection may be performed on all ages of patients.

REAGENTS/MATERIALS

Gloves (latex-free)	Blood transfer devices	Syringes
Eclipse Vacutainer® needles, varying gauges	Alcohol prep pads	Blood collection tubes
Butterfly needles, varying gauges	Band-Aids	Microtainer tubes
BD Microtainer® Contact-Activated Lancets (Blue) (1.5mm x 2.0mm)	Tape (Coban, Coflex)	Hot packs (heel warmers)
BD Microtainer® Contact-Activated Lancets (Pink) (21G x 1.8mm)	Armrest and/or pillow support	Gauze
BC Microtainer® Contact-Activated Lancets, heel (Green) (2.5mm length x 1mm depth)	Non-latex disposable tourniquets	Sharps container
Disposable vacutainer holder	ChoraPrep® One-Step	

PATIENT PREPARATION

1. When calling the patient to the drawing area, use their first name and first initial of their last name. Greet the patient in a friendly, professional manner using approved scripting:
    a. Greet the Patient:

    "*Good Morning (afternoon, evening), Welcome to the lab, how may I help you?*"

    b. Introduce yourself and what you are going to do:

    "Hello, I'm _____, one of the lab staff. I'm going to draw your blood today."

    c. When you are finished ask:

    "Is there anything else I can do for you today?"

    Note: Well At Work providers do not need to use the scripting as they are treating the patient as well as the person performing the procedure.
2. Verify identification of the patient. Ask the patient to state their first and last name and date of birth while you verify the information matches the information on the label.
3. **All lab orders will be reviewed with the patient in the draw station before selecting tests to be collected. The Beaker settings may need to be changed to "view all" if you do not see orders in the regular lab order inquiry screen. In the "view all" screen, be sure to only collect orders that are due. If the orders are not clear, contact the care team to verify which orders need to be collected.**
4. If the patient has no orders:
    a. Ask the patient if they know the provider who would have placed these orders and what tests are needed. Give the patient the option of waiting while we contact the care team or coming back at a later date once the orders are placed.
    b. If the patient chooses to come back at a later date, respond with "*I can send a message to your provider and once the orders are placed you will be notified to come back for the lab testing.*"
    c. Send a telephone encounter to the care team indicating to contact the patient to return for testing once the orders are placed.
5. Position the patient.
    a. Procedure for seating the patient

The patient should be seated comfortably in a chair and should position their arm on an armrest, extending the arm so as to form a relatively straight line from the shoulder to the wrist. The arm is supported firmly by the armrest and should only be slightly bent at the elbow. If additional support is needed, a pillow may be placed under the arm from which the specimen is to be drawn.

b. Procedure for having the patient lie down

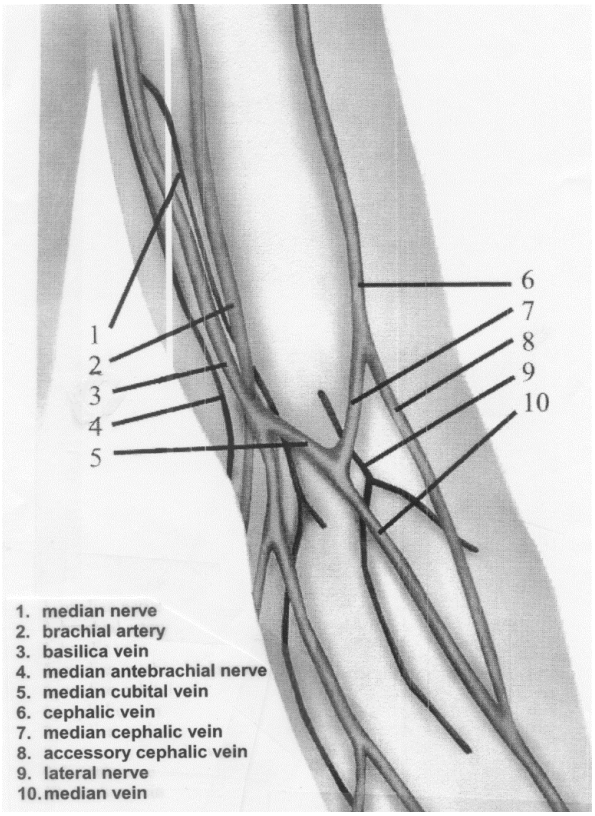
The patient lies comfortably on their back. If additional support is needed, a pillow may be placed under the arm from which the specimen is to be drawn. The patient extends the arm so as to form a relatively straight line from the shoulder to the wrist.

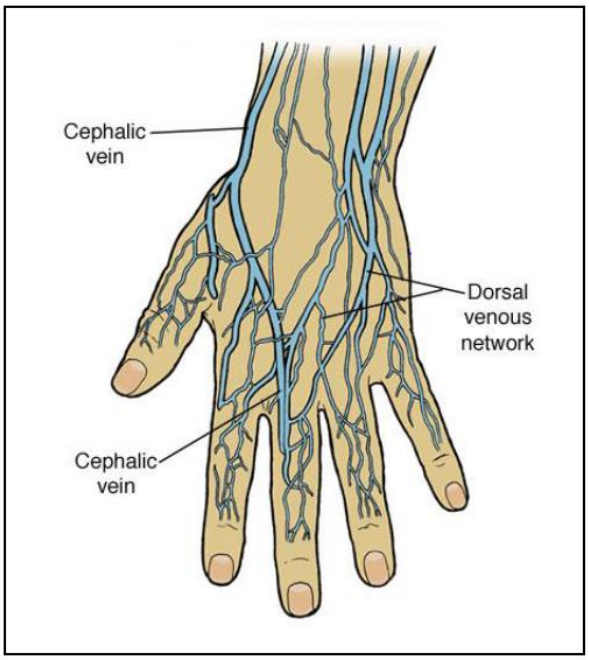
6. Determine whether to perform a venous or capillary puncture.
7. Perform hand hygiene in the presence of the patient before the procedure.
8. It is not required to wear gloves when finding a vein. Gloves are required to be worn during the actual phlebotomy procedure in its entirety.

VENOUS BLOOD COLLECTION

Performing a venipuncture

1. Assemble supplies for collecting the blood specimen.
2. Apply the tourniquet 3 to 4 inches above the bend in the elbow. Ensure the tourniquet does not roll up, but remains flat against the circumference of the arm. Create a loop in the tourniquet to provide an easy one-handed release.
3. Instruct the patient to make a fist but discourage hand pumping as it can elevate some analytes.
4. Tourniquet application must not exceed one minute before accessing the vein in order to prevent hemoconcentration. If a tourniquet has been in place for longer than one minute, it must be released and reapplied after two minutes before the venipuncture is performed.
5. Site Selection
    a. Choose the vein that feels fullest. Use the index finger to palpate and trace the path of the vein. Thrombosed veins lack resilience, feel cord-like, and roll easily. Feel firmly, but do not tap or rub finger lightly over skin because you may feel only small surface veins. Always feel for the median cubital vein first; it is usually bigger and closest to the skin's surface, more stationary, less painful and is associated with the least degree of risk to underlying structures. The cephalic vein (depending on size) is the second choice over the basilica vein, because it does not roll and bruise easily.





b. If any of these conditions preclude the use of the antecubital area, an alternative site should be considered, such as the dorsal side (back) of the hand. When venous access is not readily available, skin puncture is recommended as an alternative collection method, when appropriate.

    i. Avoid veins on the lateral and palmar surface of the wrist as there is increased risk of nerve, tendon, and arterial involvement. Similarly, avoid using the vein on the lateral wrist above the thumb to the mid forearm.

ii. Avoid drawing from an arm with edema. Swelling makes locating the veins more difficult, can prolong healing and closure of the puncture site, and alter test results.

iii. Avoid areas with a hematoma as it may cause discomfort to the patient and potential altered test results.

iv. Do not collect blood from the arm on the same side as the mastectomy. Punctures to the arm on the same side are not permitted without physician approval because of the risk of edema and the potential for altered test results.

v. With provider approval the lower limbs may be considered for venous access. There are risks of tissue necrosis in diabetic patients and thrombophlebitis in patients with coagulopathies.

vi. Avoid draws from an arm that has injuries (i.e. burns, extensive scarring, infection and inflammation).

vii. Avoid draws in extremities extremely affected by stroke and injury because of the inability to detect adverse reactions (nerve injury, pain, infection).

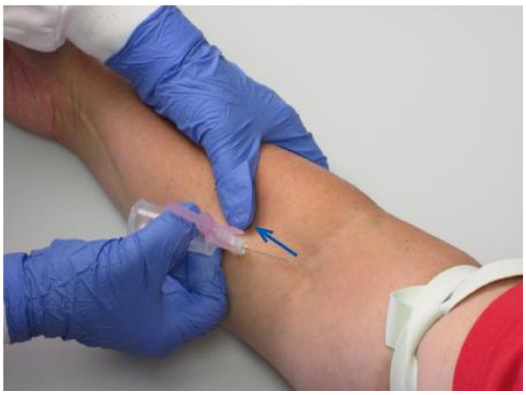
viii. Do not collect blood from an arm that has a fistula or vascular graft. It threatens the integrity of fistulas and vascular grafts, which can lead to patient complications.

ix. Do not draw blood from an indwelling line, lock or vascular access device (VAD) unless it is within your scope of practice (RN, LPN, CMA).

6. If more than one tube type is needed, the following order of tubes in drawing should be followed:
    a. Blood culture (See blood culture procedure for details)
    b. Blue top (sodium citrate)
    c. Serum tubes (Red/ Gold/ Speckled red)
    d. Green top (heparin) with or without gel, dark green, light green, speckled green)
    e. Purple top (EDTA) (lavender or pink)
    f. White top (K2EDTA with gel)
    g. Grey top (sodium fluoride)
    h. QuanteFERON TB Gold tubes
7. Once the vein to be used has been identified, release the tourniquet.
8. If gloves were not worn when finding a vein, don gloves ***in front of the patient.*** From this point, gloves must be worn continually through the entire blood collection process.
9. Using a clean alcohol prep, cleanse the area using back and forth friction.
10. Allow to air dry. NEVER touch the skin after the site is cleansed unless you have prepped your gloved finger. DO NOT remove the finger of the glove to re-palpate the vein. Discard the used alcohol prep.

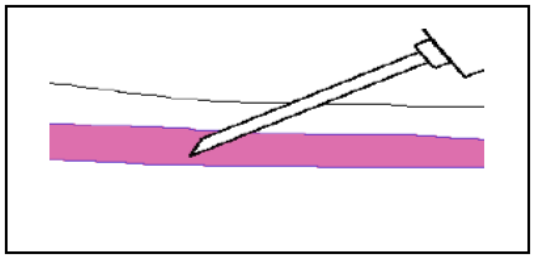
    NOTE: For collection of blood cultures, refer to the Blood Culture Procedure.
11. Determine the gauge of needle to use and the method to perform the venipuncture.
12. Reapply the tourniquet. **Do NOT re-palpate the site to be used unless the glove is disinfected with an alcohol wipe.**
    a. **Evacuated tube method**
        i. Use of a disposable vacutainer holder is required. Thread the needle onto the vacutainer holder. Inspect the needle and evacuated tube before performing the venipuncture. The cover of the safety needle must not be removed until the phlebotomist is ready to draw blood, thus avoiding needle contamination. Rotate the safety shield back. If the needle touches anything but the sterile site, it must be changed.

ii. Grasp the patient's arm firmly, using the thumb to draw the skin taut.



iii. To prepare the patient, inform them the venipuncture is about to occur.

iv. Insert the needle into the vein quickly and smoothly with the bevel of the needle upward at a 30º angle or less. Hold the evacuated tube with one hand while the other depresses the tube to the end of the holder. The angle of insertion should be as low as possible to prevent going through the vein entirely. Otherwise, this will cause bleeding inside the arm.



v. The tube should be filled until the vacuum is exhausted and the blood flow ceases, thus ensuring a correct ratio of anticoagulant to blood. After drawing each tube, immediately mix by gently inverting the tube at least ten times while filling the next tube. Gentle inversion will avoid clotting and hemolysis. Never shake a tube of blood after collecting a blood specimen.

vi. Occasionally a faulty tube will have no vacuum. If a tube is not filling and the needle is inside the vein, use another tube. If a tube starts to fill but then stops, the needle should be moved slightly forward or backward, NEVER side to side. This can cause severe pain and injury to nerves. Usually this adjustment will increase the flow.

b. **Syringe Method**

A syringe and needle may be used to collect blood from patients with more difficult veins.

i. Assemble the needle and syringe. When using a syringe, unseat the plunger from the barrel by pulling back on it to break the seal and then, return the plunger fully forward, expelling all air from the barrel.

ii. Remove the sheath from the needle. Inspect the tip of the needle visually to determine it is free of hooks at the end of the point and its opening is unobstructed.

iii. Follow steps 12.a.ii. through 12.a.iv. under Evacuated tube method.

iv. When using a syringe, a flash of blood may appear in the hub of the needle. However, the absence of a flash of blood should not be misinterpreted as an indication that the vein has not been accessed. Once the blood begins to flow, loosen the tourniquet with the free hand.

c. **Butterfly Method**

i. Assemble the butterfly needle and the vacutainer holder or syringe.

ii. When using a winged infusion set and a coagulation tube is the first tube to be drawn, use a discard tube as a primer. Apply the discard tube just long enough so that the tubing of the butterfly set is primed with blood. By filling the tubing with blood the vacuum of the citrate tube is not partially exhausted with air in the line, which could result in under-filling of the tube.

iii. Follow steps 12.a.ii. through 12.a.iv. under Evacuated tube method.

13. Instruct the patient to unclench their fist, unless it is felt that doing so would cause vein collapse.
14. Release the tourniquet after the blood is flowing.
15. Finish collecting all tubes and/or sufficient volume of blood for testing.
16. Lay a gauze pad lightly on the insertion point without applying pressure.
17. Withdraw the needle, immediately activating the device's safety feature according to manufacturer's instruction. Dispose of needle in a sharp's container.
18. Apply pressure to the puncture site using the gauze pad. Cooperative patients may be allowed to apply pressure. Bending the patient's arm up is not an adequate substitute for pressure.
19. If using a syringe, replace the needle with a Blood Transfer Device to transfer the blood from the syringe to the appropriate tubes or culture bottles. Dispose of the contaminated needle in the sharp's container.

    Note: The use of a needle to transfer blood into tubes or culture bottles is strictly prohibited.
20. Gently invert all tubes containing anticoagulant or separating gel 10 times.
21. **Label all tubes with the computer generated label in the presence of the patient**.
    a. **Do not** label tubes before venipuncture.
    b. **Do not** leave the draw station before labeling tubes.
    c. **Do not** dismiss an outpatient before labeling is complete.

    Note: In the absence of computer labels, label tube with patient first and last name, date of birth, date and time collected and the collector's initials. See the Patient Identification and Labeling Procedure about reviewing the specimen labels with the patient prior to collecting the specimens.
22. Lift the gauze and observe the puncture site for 5-10 seconds for superficial bleeding and any mounding or rising of the surrounding tissue.
23. If bleeding has not ceased, reapply pressure for 1 to 2 minutes and re-examine site. Repeat the process until bleeding has stopped.
24. Cover puncture site with a Band-Aid or gauze and tape. Instruct the patient to leave the bandage in place for at least 15 minutes.
25. To keep our pediatric patients safe, HealthPartners' laboratories do not bandage patients under 2 years old due to known risks, including choking, blood flow constriction and/or potential long term irreversible damage. This includes Band-Aids, tape, Coban or Coflex.
    a. Apply pressure for a short time. If bleeding does not stop, direct the parent/guardian to have a seat in the lab waiting area with their child and ask them to apply pressure until bleeding has stopped.
    b. For pediatric patients older than 2 years, notify the parent/guardian to remove Band-Aids and tape within 30 minutes.

Note: Use Coban sparingly **and never on pediatric patients.** Coban should only be used on patients who are able to remove the wrap themselves or have someone aware of the risks and can assist with removal as soon as possible. If Coban is used for a patient, instruct the patient or care giver to remove it immediately if there is any discomfort and do not leave the wrap on longer than 1 hour.

26. Evaluate the patient for signs of dizziness, nausea, hyperventilation, perspiration, pallor, etc. If there is any indication the patient did not tolerate the procedure well, do not release the patient from your care until signs and symptoms subside.
27. Inspect the area, remove and dispose of all used supplies. Remove any unused labels from the draw area and dispose of in the shred bin.
28. Deliver specimens to appropriate area.
29. Remove gloves and perform hand hygiene.

Blood Specimens that cannot be obtained via venipuncture

1. Repositioning the needle without establishing vein location is considered blind probing and must not be performed.
2. When blood does not flow upon needle insertion or when blood stops flowing during collection, the phlebotomist must assess the situation before considering the following actions.
    a. If the needle placement is perceived too shallow, advance it slightly farther.
    b. If it is perceived too far into the vein, withdraw it slightly.
    c. If it is perceived the vein has collapsed, release the vacuum pressure (remove the tube or release the plunger of the syringe) to allow the vein to fill, and reapply vacuum pressure.
    d. A calculated lateral relocation may be attempted only if precise vein location has been determined. The phlebotomist must withdraw the needle until it is just beneath the dermis, re-anchor the vein, reorient the needle toward the perceived position of the vein, and advance the needle.
    e. New collection supplies must be used with each attempt.
    f. A maximum of two attempts should be made before enlisting assistance from a colleague, if available.

CAPILLARY BLOOD COLLECTION

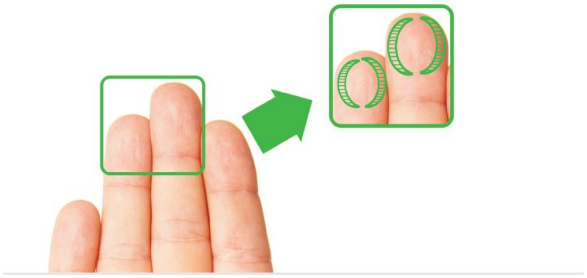
Determine whether to use a finger or heel.

- Fingers are acceptable puncture sites for adults and older children.
- Fingers of newborns and infants less than 6 months old must **not** be used for capillary blood collection.
- For children between 6 and 12 months old, the decision to use the finger instead of the heel must be based on the child's weight.
    - For infants weighing more than 10kg, the finger can be used as long as the lancet depth **does not exceed 1.5 mm**.
- The maximal lancet depth for heelstick in average-weight newborns and older children is 2.0 mm. For preterm and low birth weight term infants, the maximal lancet depth is 0.85 mm.

Performing a capillary finger puncture

1. The puncture must be on the palmar surface of the distal segment of the middle or ring finger.

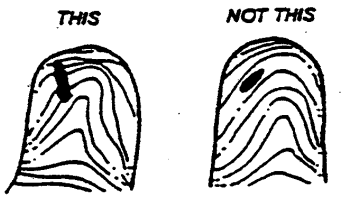
2. The side of the finger near the nail's edge and tip of the finger must be avoided because the tissue is about half as thick as the tissue in the center of the finger. The puncture should be made slightly off-center, in the fleshy area of the thickest part of the finger.



3. Choose a finger that is not cold, cyanotic, or swollen. If the patient's fingers are cold:
    a. Massage the hand and fingers.
    b. Encourage the patient to run their hands under warm water.
    c. Warm the fingers in a warm cup of water for 30 seconds
    d. Use a commercial warming device (heel warmer).
4. **The order of draw is different for microtainer tubes. The EDTA must always be filled first to prevent clotting.**
    a. EDTA tube
    b. Other additive tubes
    c. Non-additive tubes
    d. Newborn screening cards are typically collected by a separate puncture.
5. Don gloves.
6. Gently massage the finger five or six times from base to tip to aid blood flow.
7. With an alcohol pad, cleanse the ball of the finger with back and forth friction. Allow to air dry.

    For lead testing, thoroughly wash the patient's hands with soap and water to reduce environmental contamination.

7. Prepare lancet device.
8. Hold the lancet firmly between your fingers.
9. The puncture should be made perpendicular across the fingerprints to produce a large, round drop of blood.



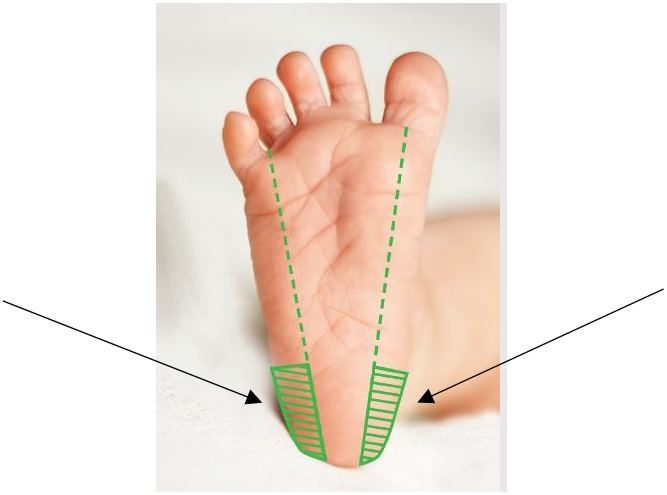
10. Hold the patient's finger firmly to prevent sudden movement.
11. Position the lancet on the desired site and activate the lancet device.
12. Immediately discard the lancet device in the sharps container.
13. Wipe the first drop of blood away with a clean gauze since the first drop is likely to contain tissue fluid.

NOTE: Point of care INR testing (Coaguchek) requires the first drop of blood – DO NOT wipe away the first drop.

14. Allow well-formed drops of blood to flow into the collection containers by gravity and/or capillary action. Provide gentle squeezing only, as necessary to promote blood flow.
15. Holding the puncture site downward and gently applying intermittent pressure to the surrounding tissue enhances blood flow from the puncture. Strong repetitive pressure (milking) should not be applied as it may cause hemolysis or contamination of the specimen with tissue fluid.
16. Do not use a "scooping" motion to collect blood or allow the blood to pool on the skin surface, as these actions cause hemolysis.
17. If excessive squeezing is necessary due to insufficient blood flow, terminate the procedure. Prewarm another site and repeat the procedure using a new lancet device.
18. Mix additive microtainer tubes by gentle inversion 10 times immediately after collection.
19. With a clean gauze, apply pressure until bleeding stops for at least 5-10 seconds.
20. Label the microtainer tubes in the presence of the patient.
21. When the bleeding has stopped, apply a gauze bandage if the patient is greater than 2 years of age. Applying bandages in children younger than 2 years old is not advised because they pose a safety hazard (e.g. Aspiration, choking, adhesive irritation).
22. Instruct patient to leave bandage on for at least 15 minutes.

Performing a capillary heel puncture

1. Choose a site for the heel puncture on the most medial and lateral portion of the plantar surface. (See shaded green sections in photo.)



2. Do not perform punctures on the posterior curvature of the heel or the arch area of the foot.
3. Do not perform punctures on toes other than the great toe.
4. Do not perform punctures through previous puncture sites or bruised areas.
5. Prewarm the intended puncture site for 3 to 5 minutes using an infant heel warmer at no higher than 42ºC. If the procedure has not been started within 10 minutes, discard the infant heel warmer and reassess the area. If the area has cooled, rewarm with a new heel warmer.
6. Cleanse the area with an alcohol pad with back and forth friction. Allow to air dry.
7. Hold the heel firmly to prevent sudden movement, position the lancet device on the skin with minimal skin compression.

8. Activate the release mechanism on the lancet device. Dispose in sharps container.
9. Wipe the first drop of blood away with clean gauze and discard.
10. Allow well-formed drops of blood to flow into the collection containers by gravity and/or capillary action. Provide gentle squeezing only as necessary to promote blood flow.
11. Holding the puncture site downward and gently applying intermittent pressure to the surrounding tissue enhances blood flow from the puncture. Strong repetitive pressure (milking) should not be applied as it may cause hemolysis or contamination of the specimen with tissue fluid.
12. Do not use a "scooping" motion to collect blood or allow the blood to pool on the skin surface, as these actions cause hemolysis.
13. If excessive squeezing is necessary due to insufficient blood flow, terminate the procedure. Prewarm another site and repeat the procedure using a new lancet device.
14. Mix additive microtainer tubes by gentle inversion 10 times immediately after collection.
15. With a clean gauze, apply pressure until bleeding stops.
16. Label the microtainer tubes in the presence of the patient.
17. With clean gauze, apply pressure until bleeding stops for at least 5-10 seconds.

GENERAL PHLEBOTOMY PROCEDURE NOTES

1. The care team performs blood collection from indwelling catheters (e.g. Hickman). Laboratory staff should not attempt to collect the sample from the line. However, lab staff may be asked to assist during the collection to transfer blood into the proper tubes.
2. Requests for arterial punctures should be referred to the hospital.
3. In the event a large hematoma develops, treat the hematoma area by applying ice for 10-15 minutes. This will reduce the swelling in the area. The patient should repeat the ice application at home. If necessary, tell the patient see their provider.
4. **Use Coban sparingly and never on pediatric patients.** Coban should only be used on patients who are able to remove the wrap themselves or have someone aware of the risks and can assist with removal as soon as possible. If Coban is used for a patient, instruct the patient or care giver to remove it immediately if there is any discomfort and do not leave the wrap on longer than 1 hour.

Patients for whom capillary puncture may be inappropriate

1. Patients who are severely dehydrated.
2. Patients with poor circulation.
3. Patients who present with a callus, skin ulceration, or blister at the intended puncture site.
4. Patients with thrombocytopenia and/or platelet abnormalities.
5. Patients with peripheral edema.

COMPLICATIONS OF BLOOD COLLECTION

1. Accidental arterial puncture

   If accidental arterial puncture is suspected (rapidly forming hematoma, rapid filling of tube), remove the needle immediately and apply direct pressure to the puncture site for a minimum of five minutes and until active bleeding has stopped.

2. Nerve injury

   The following symptoms suggest possible nerve injury:

- Shooting, electrical pain
- Severe or unusual pain
- Tingling or numbness in the limb
- Onset of tremor of the limb

If any of these symptoms is observed or verbalized, remove the needle immediately.

3. Hemolysis
4. Monitoring blood volume collected

Maximum blood volume information is intended to guide the health care team in effectively coordinating test orders and blood collection to minimize the risk of iatrogenic anemia.

Maximum Blood Draw Amounts

Refer to the *Maximum Blood Draw Amounts from Patients Younger than 14 Years* table below to determine the maximum amount of blood that can be drawn from pediatric patients by weight. Contact Pathologist/ Physician to review and approve any amount exceeding the volume listed.

Table - Maximum Blood Draw Amounts From Patients Younger than 14 Years

Patient Weight Pounds	Patient's Weight Kilograms (approx)	Maximum Amount drawn at one time (mL)	Volume which can safely drawn per day (mL)	Maximum Amount of blood –cumulative to be drawn during a given hospital stay (1 month or less-mL)
6-8	2.7-3.6	2.5	4.6-6.1	23
8-10	3.6-4.5	3.5	7.0 – 7.8	30
10-15	4.5-6.8	5	8.5 – 10.8	40
16-20	7.3-9.1	10	11.6 – 13.1	60
21-25	9.5-11.4	10	13.9 – 15.5	70
26-30	11.8-13.6	10	16.3 – 17.9	80
31-35	14.1-15.9	10	18.5 – 20.1	100
36-40	16.4-18.2	10	23.2 – 24.7	130
41-45	18.6-20.5	20	23.2 – 24.7	140
46-50	20.9-22.7	20	25.5 – 27.1	160
51-55	23.2-25.0	20	27.8 – 29.4	180
56-60	25.5-27.3	20	30.1 – 31.7	200
61-65	27.7-29.5	25	32.5 – 34.0	220
66-70	30.0-31.8	30	34.8 – 36.3	240
71-75	32.3-34.1	30	37.1 – 38.6	250
76-80	34.5-36.4	30		270
81-85	36.8-38.6	30		290
86-90	39.1-40.9	30		310
91-95	41.4-43.2	30		330
96-100	43.6-45.5	30		350

5. Dizziness, syncope, or unexpected nonresponsiveness

If a patient has fainted or is unexpectedly nonresponsive

a. If the needle is in the patient's arm, remove the tourniquet. Then, remove the tube and needle, activate the safety feature, discard the needle, and apply pressure.
b. Where practical, lay the patient flat or lower their head and arms, if the patient is sitting. If the patient is seated in an adjustable chair, recline the patient.
c. Loosen tight clothing.
d. Maintain the patient in a recumbent position until fully recovered.
e. Call for assistance.

6. Nausea
    a. Make the patient as comfortable as possible and provide an emesis container.
    b. Instruct the patient to breathe deeply and slowly.
    c. Apply cold compresses to the patient's forehead.
    d. Call for assistance.
7. Vomiting
    a. Give the patient an emesis container.
    b. Give the patient water to rinse out their mouth.
    c. Call for assistance
8. Convulsive seizures
    a. Remove the tourniquet and collection tube, withdraw the needle, and apply pressure.
    b. If possible, move patient to the floor or support them on the chair.
    c. Move sharp objects and furniture away from the patient.
    d. Cushion the patient's head if they have collapsed onto the floor.
    e. Call for assistance.
    f. Stay with the patient until they are fully recovered.
    g. Talk calmly and reassuringly to the patient during and after the seizure.
    h. Allow convulsions to happen. Do not restrain the patient.
9. Blood and body fluid exposures
    a. Report all exposures per procedure.

PROCESSING SERUM AND PLASMA TUBES

Centrifuging serum or plasma (lithium or heparin) separator tubes

1. The tube contains a silicone barrier gel with a specific gravity intermediate to serum and the cell clot. Tubes should be stored at room temperature. Temperatures over 25ºC (77ºF) can cause gel breakdown and subsequent test interference.
2. After drawing, gently invert the tube 5-10 times to activate the clotting mechanism.
3. Allow the serum sample to clot in a vertical position for 15-20 minutes but should be centrifuged within 30 minutes after collection.
4. All plasma separator tubes can be centrifuged immediately after collection.
5. Centrifuge tubes for the recommended speed and time for the model of centrifuge used at that location.
    a. Megafuge: 1500 xG for 10 minutes
6. If blood and gel does not separate well, transfer the serum to a clean tube, centrifuge, and pour off serum. Do not spin a serum separator tube more than once.
7. Pour off serum specimens that require transfer and freeze appropriate samples. See HealthPartners' Laboratory Test Directory and label logic
8. Store specimen vertically at the required temperature for the test ordered. See HealthPartners' Laboratory Test Directory and label logic.

Sodium citrate tubes for special coagulation testing

1. Platelet-poor plasma (ppp)
    a. Ensure adequate fill-volumes for all tubes.
    b. Check tubes for clots.
    c. Immediately centrifuge all specimens
        i. PT/INR and D-dimer testing performed in clinic labs
            1) Hettich Centrifuges (models 200 and 280) have been validated to spin samples at 8000 RPMs for 3 minutes to obtain ppp. Do not double spin.
        ii. Special coagulation testing sent to Regions
            1) Centrifuge at 1,500 xG (rcf) for 15 minutes.
            2) Carefully remove plasma from cells, avoiding the platelet/buffy coat.
            3) Dispense plasma from all tubes into a labeled single, plastic tube using a transfer pipette. Do not pour off.
            4) Centrifuge the plasma in the plastic tube a second time at 1,500 xG for 15 minutes.
            5) Remove the top portion of plasma leaving approximately 250 µL in the bottom to discard. The double-centrifuged plasma should be aliquoted: 1 mL per aliquot into clearly labeled plastic, polypropylene, tubes.
            6) Specimens should be frozen immediately and sent to Regions with the routine courier on dry ice. It is important that samples remain frozen throughout transport.
    d. After centrifugation, examine the plasma for fibrin clots and the RBC portion for small red cell clots. Clotted specimens must be discarded and recollected.

REFERENCES

1. Garza D. Becan-McBride K. *Phlebotomy Handbook: Blood Collection Essentials, 7th Edition*, Pearson Prentice Hall, Upper Saddle River, NJ; 2005.
2. Dennis Ernst; Center for Phlebotomy Education, COLA Symposium; May 2006.
3. CLSI. *Collection of Diagnostic Venous Blood Specimens*. 7th ed. CLSI standard GP41. Wayne, PA; Clinical Laboratory Standards Institute; 2017.
4. CLSI. *Collection of Capillary Blood Specimens*. 7th ed. CLSI standard GP42. Wayne, PA: Clinical Laboratory Standards Institute; 2020.
5. CLSI. *Procedures for the Handling and Processing of Blood Specimens for Common Laboratory Tests*; *Approved Guideline-Fourth Edition.* CLSI document GP44/4A. Wayne, PA: Clinical Laboratory Standards Institute; 2010.
6. Regions Hospital procedures; *Collection of Diagnostic Specimens by Venipuncture* and *Collection of Diagnostic Specimens by Capillary Method*; 2019.

AUTHOR/REVIEWER(S)

Barb Johnson
Gail Brors
DABergo
NAKlausen
NJButala

JAGayken
AKHoward
GCardinal
DEaton
LMKappenman\MLLaFromoboise

COMPLIANCE

Failure to comply with this policy or the procedures may result in disciplinary action, up to and including termination.

ENDORSEMENT

Laboratory Administration