I. Principle

In order to complete the appropriate testing on patients, blood must be collected to perform the tests. Phlebotomy is the most common method for the collection of blood specimens for the laboratory. Other methods include finger sticks and capillary heel sticks. This procedure describes the sequential manner in which one would progress through the blood collection process.

II. Reagent and Supply Requirements

A. Equipment Requirements
   1. Phlebotomy tray
   2. Phlebotomy cart

B. Supply Requirements
   1. Vacutainer® tube holder
   2. Vacutainer® blood collection needle (21G, 22G)
   4. BacT/ALERT® SA aerobic blood culture bottle
   5. BacT/ALERT® SN anaerobic blood culture bottle
   6. BacT/ALERT® PF pediatric blood culture bottle
   7. Saf-T HOLDER® blood culture device
   8. ChloraPrep® one-step applicator (3mL, 0.67mL)
   9. Alcohol prep pads
   10. Povidone-iodine prep pads
   11. 2” X 2” Gauze
   12. Micropore surgical tape
   13. Disposable tourniquets
   14. Disposable gloves
   15. Vacutainer® SST tube (gold)
   16. Vacutainer® PST tube (mint)
   17. Vacutainer® buffered NaCitrate tube (blue – 2.7mL, 1.8mL)
   18. Vacutainer® K₂EDTA Tubes (pink – see BB1.202 Blood Sample Collection for Possible Transfusion)
   19. Vacutainer® serum tube (red)
   20. Vacutainer® sodium heparin tube (green)
   21. Vacutainer® sodium fluoride tube (grey)
   22. Vacutainer® K₂EDTA trace element tube (dark blue)
   23. Vacutainer® serum trace element tube (dark blue with red label)
   24. Vacuette® K3E EDTA tube (lavender – 4mL, 2mL)
   25. Vacuette® NaCitrate tube (blue – see HE5.104 P2Y12 and Aspirin procedure)
III. Procedure

A. Patient identification and specimen labeling must be completed according to quality manual procedure QM1.301 – Patient Identification and Specimen Labeling

B. Phlebotomist Preparation

1. Review orders and clarify as necessary.
2. Gather all the necessary supplies prior to performing any type of specimen collection. Position supplies on same side as free hand and within easy reach to avoid reaching across patient’s arm to access supplies.
   a. Do not set blood collection tray on patient’s bed or tray.
3. Minimize the amount of blood drawn from the patient.
   b. Use the smallest tube volume applicable for test. (See Exhibit A)
   c. In conjunction with the lab policy the phlebotomist will not draw extra tubes of blood unless the clinical needs of the patient dictate.
4. All phlebotomists must be familiar with the policies concerning precautions for handling blood and body fluids.
5. If the phlebotomist’s skin or clothing is contaminated with a specimen, the contaminated site must be decontaminated before moving to the next patient. Clothing should always appear clean and neat to the patient.

C. Approaching the patient

1. Knock on the patient’s door and wait for response prior to entering the room. If no response, make your presence known before proceeding into the room or opening the curtain.
2. Follow proper AIDET procedures.
   3. Disinfect your hands using either the foaming waterless hand sanitizer or soap and water in front of the patient. Put on new clean pair of gloves.
D. Tourniquet Application
1. Apply the tourniquet tightly around the patient’s upper arm, 3 or 4 in above intended venipuncture site, but not so tight as to cause discomfort to patient.
2. Ask the patient to clench their fist in order to bring the veins to the surface.

Note: Excessive fist clenching can also cause hemoconcentration.

3. Do not leave the tourniquet on for more than 1 minute.

Note: Longer periods of time result in hemoconcentration (i.e. increased blood concentration of large molecules such as proteins, cells, and coagulation factors).

E. Venipuncture site selection (for patients with IV’s, see K. below)
1. Search first for a vein in the antecubital fossa.
2. If you are unable to locate a vein there, you may find a suitable option using either hand or wrist veins. Veins from the underside of the wrist should not be used.
3. Rotate arm slightly to help locate vein
4. Warming the site with a warm wet towel or warming device will increase blood flow and make veins easier to feel
5. After eliminating all other possibilities, you may draw the sample from either an ankle or a foot vein only with a written physician’s order.

F. Decontamination of the site
1. Clean the site of the Venipuncture using a 70% isopropyl alcohol pad. Scrub vigorously using a back and forth motion across the site and allow the alcohol to dry completely.

Note: For alcohol testing, do not use an alcohol pad or ChloraPrep® to cleanse the site. Instead use a Povidone-Iodine prep pad to clean the site.

2. Do not re-palpitate the area once it is cleansed.
3. For blood culture collections, please refer to the Blood Culture Collection policy (LP1.202) for proper decontamination technique.
G. Venipuncture

1. Hold the patient’s arm below the venipuncture site, pulling the skin 1 to 2 in. toward the wrist to anchor (secure firmly) vein. This helps to keep the vein from moving or rolling to the side upon needle entry.
2. Inform patient that you will be inserting needle into their arm at this point.
3. Position your body and the needle in the same direction as the path of the vein.
4. The needle should be inserted bevel up quickly and smoothly in the same direction as the vein at a 15 -30 degree angle depending on the depth of the vein.
5. The tube holder should be held firmly and the flanges of the holder used to insert tubes without causing movement of the needle.
6. Correct order of draw is as follows:
   a. Blood culture (Refer to LP1.202V1 Blood Culture Collection Procedure).
   b. Blue Top – Sodium Citrate – This tube must be filled to stated capacity to assure accurate testing results. To prevent under filling when drawing with a butterfly (and no Blood Culture is being drawn), a waste tube must be drawn to eliminate air in tubing.
   c. Gold Top (SST) or Red Top – with or without clotting activator.
   d. Green Top – Heparin tube
   e. Mint (PST) Top – PST with Lithium Heparin
   f. Lavender Top – EDTA tube
   g. Pink Top – EDTA tube (for blood bank)
   h. Gray Top – K Oxalate (for Lactic Acid)

7. As the blood begins to flow, ask the patient to open their fist.
8. You can either remove the tourniquet as the blood begins to flow, or at the end of the collection (but before needle is withdrawn from arm).
9. Fill the tubes until the vacuum in the tube is exhausted.
   a. If the tube begins to fill and then stops, move the needle slightly forward or backward.
b. Do not probe with the needle as it is not recommended and is painful to the patient.
c. If you are unable to obtain the sample necessary with a slight repositioning of the needle, remove the needle, engage the safety device, and start the process from the beginning.
d. Apologize to patient and inform them of the need to perform venipuncture again.

10. All tubes must be gently inverted 8-10 times after collection
11. Once the specimens have been collected
   a. Remove the tourniquet.
   b. Remove the needle and engage the safety device.
   c. Place clean gauze and apply pressure over the puncture site for 1-2 minutes.
   d. If the patient is able, you may ask them to hold this gauze while you label the tubes.
   e. After 1-2 minutes, evaluate whether or not the bleeding has stopped.
   f. Place a piece of gauze over the site and secure it in place with a piece of paper tape.
   g. Instruct the patient that this is to remain in place for at least 15 minutes.

H. Specimen Labeling
   1. All specimens will be labeled according to the laboratory labeling policy. (QM1.301 – Patient Identification and Specimen Labeling)
   2. Place all labeled tubes into a specimen transport bag.
   3. Dispose all sharps appropriately
   4. All non-sharps waste may be disposed of regular trash.
   5. Before exiting the room, disinfect your hands using either the foaming waterless hand sanitizer or soap and water in front of the patient.

I. Specimen Transport
   1. Tube all STAT specimens to the lab using the pneumatic tube system except for specimens drawn for PFA, P2Y12, and Aspirin testing.
   2. If you have more blood draws to complete, send any routine samples to the lab through the pneumatic tube system.
   3. If you have no other blood draws to complete, bring any routine blood samples back to the lab with you.

J. Notes
   1. There is a limit of 2 venipuncture attempts per phlebotomist per patient per order.
   2. Only 2 phlebotomists will be allowed to attempt to collect a blood sample from a difficult patient.
a. If both are unsuccessful, the patient’s nurse must be notified.
b. The nurse must notify the patient’s physician that the phlebotomists were not able to obtain a blood sample.

3. Ask for assistance from the nursing staff or a co-worker to help you with pediatric patients, geriatric patients, or combative patients as needed.

4. Line draw samples are to be obtained by nursing personnel only.

5. Observe isolation precautions.
   a. Follow the appropriate precautions.
   b. If asked to draw blood from a TB patient, additional precautions must be followed.

6. If a patient refuses to have their blood drawn, do not argue with the patient. Report this to the nurse in charge of the patient and wait for instructions as to whether the test is cancelled or rescheduled.

SPECIAL COLLECTION TECHNIQUES

K. IV lines
   1. It is preferred that blood is not collected from an arm with an IV; an alternate site should be selected.
   2. If it is determined that another suitable site is not available it is recommended that blood be collected from below the IV site only.
   3. Ask nurse to turn off IV for at least 2 min prior to collection.
   4. Choose site several centimeters below IV site by placing tourniquet below IV site but above intended draw site.
   5. In general, collection above an IV is not recommended and should only be attempted when other alternatives have been exhausted.
      a. Ask nurse to turn off IV for at least 2 min prior to collection.
      b. Place tourniquet 3-4 inches above antecubital fossa.

NOTE: Specimens for glucose should never be drawn above an IV if glucose is in IV solution.

6. Collect specimens as in steps F-J listed above.
   a. After you complete your blood draw, inform the nurse so that she can turn the IV back on.
   b. If the nurse is unable to shut off the IV for medical reasons, you can ask the nurse if we can obtain a doctor’s order to draw from the ankle or foot as you are unable to draw a specimen from the arm or hand.
   c. Upon receiving that doctor’s order to draw the foot or ankle, you may then proceed with the Venipuncture in the appropriate location.
L. Capillary (or skin) punctures for adults or children older than 1 year
   1. Capillary punctures can be used to obtain blood from patients whose condition indicates that a venipuncture is not the best option.
      a. There are some patients whose condition indicates that a skin puncture would be the best collection method.
      b. Occasionally you will be faced with a patient who refuses a venipuncture but would accept a skin puncture for collection
      c. A lancet and micro collection tubes are used to facilitate the small amount of blood collected by capillary collection.
      d. Micro collection tubes are color coded corresponding the venipuncture tube tops,
      e. Capillary draws cannot be used for tests that require large amounts of whole blood, plasma or serum such as blood cultures, ESR, and coagulation tests.

2. The procedure for a skin puncture is as follows:
   a. See I. (A. thru C. above) for preparing to collect specimen.
   b. Recommended site for skin puncture is center of middle or ring finger on the fleshy portion and slightly to the side of center.
   c. Warming (using a warming device) may make blood collection easier and faster, and reduces tendency to squeeze site although it is not always necessary.
   d. Cleanse the finger with 70% isopropyl alcohol. Allow the alcohol to dry completely before proceeding with the finger puncture.
   e. Grasp patient’s finger between your non dominant thumb and index finger. Place skin puncture device flat against the skin and perpendicular to the whorls of the fingerprint.
   f. Activate the skin puncture device.
   g. Apply gentle pressure until a blood drop forms, and use a clean gauze pad to wipe away the first drop of blood.
   h. Fill the appropriate microtainers as necessary
   i. The recommended order of draw for skin punctures is as follows:
      1. **Lavender Top** – EDTA tube
      2. **Mint Top** – Plasma separator tube with heparin
      3. **Gold Top** or **Red Top**
j. Care should be taken to avoid clotting of specimens requiring whole blood samples by gently mixing tubes after collection

k. Upon collecting the last drops of blood, apply pressure to the puncture site and observe that the site is no longer bleeding. Apply a bandage when appropriate.

M. Capillary Heel sticks (newborns and infants up to 12 months of age)
   1. See I. (A-C) for preparation before specimen collection.
   2. For newborns and infants up to 12 months of age, a capillary heel stick may be the desired method of collection. Much care must be taken to prevent hemolysis or dilution from tissue fluid of a specimen collected through a capillary heel stick.
   3. Pre-warm the heel of the infant for at least 5 minutes using a heel warmer.
   4. Cleanse the heel with a 70% isopropyl alcohol pad. Scrub vigorously using a back and forth motion across the site and allow the alcohol to dry completely before proceeding with the capillary heel stick.
   5. The site of the puncture should only be the lateral or medial portion of the plantar surface of the heel (see diagram below)

   ![Diagram of Capillary Heel Stick](image)

   6. Using a lancet device, make an incision on the heel and wipe away the first drop of blood with gauze.
   7. Fill the appropriate microtainers or filter paper cards as necessary.
   8. The order of draw for a capillary draw is:
      a. Lavender Top – EDTA tube
      b. Mint Top – Plasma separator tube with heparin
      c. Gold Top or Red Top – with or without clot activator
      d. Filter paper for Newborn Screen – all 7 circles must be filled
   9. Care should be taken to avoid clotting of specimens requiring whole blood samples by gently mixing tubes after collection
   10. After the samples have been obtained, apply pressure to the puncture site and apply bandage once the bleeding has stopped.

N. Butterfly draws for coagulation testing
   1. To prevent under filling when drawing with a butterfly, a waste tube must be drawn to eliminate air in tubing.
   2. The only acceptable type of tubes used for waste tubes are a plain no additive tube or a blue top tube.
   3. This will ensure that the tube drawn for coagulation testing has the proper blood to anticoagulant ratio needed for this kind of testing.
III. References

A. Ernst DJ. *Applied Phlebotomy*. Baltimore, MD; Lippincott Williams & Wilkins; 2005
C. Hospital Policy for washing hands
D. Hospital policy for isolation precautions
E. QM1.301 – Patient Identification and Specimen Labeling
Adventist Lab Partners
Lab Processing Manual

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