Venipuncture Procedure

**Purpose:**

To ensure proper collection of venous blood specimens

**Principle:**

By establishing a procedure for the correct collection of blood by venipuncture, many pre-analytical errors and patient management complications may be avoided. Patient safety is the ultimate goal above all other considerations. The quality of the patient results is directly dependent upon the quality of the specimen.

**Materials:**

- Single use tourniquet
- Gloves
- Syringe or single use needle holder (vacutainer)
- Appropriate antiseptic:
  - 70% isopropyl alcohol
  - Iodine (for alcohol tests)
  - Chlorhexidine (for Blood Cultures)
- Evacuated blood collection tubes or Blood Culture bottles
- Venipuncture needle (21G or 23G) or winged collection device (21G, 23G, or 25G)
- Labels or laboratory request form
- Biohazard Specimen Transport Bag
- 2” x 2” gauze pads
- Tape or adhesive bandage
- Gloves (Discard after each use)
- Optional: ice or cold pack, sterile gloves, gown, mask with face shield or mask and goggles

**Preparation of Equipment:**

If you're using evacuated tubes, open the needle packet or winged collection device and attach the needle or winged device to the needle holder. If you're using a syringe, attach the appropriate needle to it. Be sure to choose a syringe large enough to hold all the blood required for the test. Gather the appropriate collection tubes for the ordered laboratory tests (See Laboratory Test Directory). Check the expiration date on the blood collection tubes; obtain a new tube if any are expired. Inspect the collection tube additives; don't use the collection tubes if additives are discolored. Gently tap collection tubes containing additives to dislodge any material that may be adhering to the stopper. Inspect the needle to make sure its integrity is intact.
Collection Tube Guide:

Blood collection tubes come in various sizes and fill by vacuum when a needle is inserted through the stopper. The amount of blood collected in each tube is predetermined by the tube type and the test for which the tube is intended. Filling to 50% capacity is sufficient for most testing; however, for coagulation studies (Light Blue tubes), you must fill the tube completely to ensure accurate test results.

Most tube types contain additives in varying concentrations. When performing venipuncture, it's important to obtain samples in the correct order because contamination from the additive in the previous collection tube can cause erroneous test results. In addition, you must mix the additive in the tube with the blood sample by holding the tube upright and gently inverting it 180 degrees and back immediately after drawing the sample. The number of inversions varies by tube type. The table below shows commonly used collection tubes, the recommended collection order, stopper or closure color, and the number of inversions needed at blood collection. Consult with laboratory personnel for information concerning less commonly ordered testing.

<table>
<thead>
<tr>
<th>Closure Color</th>
<th>Collection Tube</th>
<th>Color</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Blood Culture Vials:</td>
<td>Blue, Yellow, Gray, Pink, Red</td>
<td>Minimum Volume: 8-10 cc, 5-7 cc, 8-10 cc, 1-3 cc, 5 cc</td>
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<tr>
<td></td>
<td>Aerobic</td>
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<tr>
<td></td>
<td>Anaerobic</td>
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<td></td>
<td>Aerobic Plus (Patients on antibiotics)</td>
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<td></td>
<td>Pediatric Plus</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>MycoF/Lytic (AFB, Obtain from Lab)</td>
<td></td>
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</tr>
<tr>
<td>2.</td>
<td>No Additive</td>
<td>Clear/Red</td>
<td>Used only as a discard tube</td>
</tr>
<tr>
<td>3.</td>
<td>Buff. Na Citrate 0.109M, 3.2% or Plus Plastic 109M, 3.2%</td>
<td>Light Blue</td>
<td>Tube must be filled to capacity Mix 3 to 4 times *See Note</td>
</tr>
<tr>
<td>4.</td>
<td>SST Serum</td>
<td>Red-Grey Red</td>
<td>Mix 5 times</td>
</tr>
<tr>
<td>5.</td>
<td>PST Gel and Lithium Heparin 83 Units</td>
<td>Light Green</td>
<td>Mix 8 to 10 times</td>
</tr>
<tr>
<td>6.</td>
<td>Sodium Heparin 75 USP Units</td>
<td>Dark Green</td>
<td>Mix 8 to 10 times</td>
</tr>
<tr>
<td>7.</td>
<td>K₂EDTA 7.2 mg (4.0 mL) K₂EDTA 3.6 mg (2.0 mL)</td>
<td>Lavender</td>
<td>Mix 8 to 10 times</td>
</tr>
<tr>
<td>8.</td>
<td>Sodium Fluoride Potassium Oxalate 15 mg/12 mg</td>
<td>Gray</td>
<td>Mix 8 to 10 times</td>
</tr>
</tbody>
</table>
Procedure:

A. Patient Preparation

1. Review the patient’s medical record for allergies to antiseptics, adhesives, and latex. Use an alternative product if necessary to avoid adverse reactions.

2. Verify the practitioner’s order.

3. Check the labels to verify the patient and testing information. If specimen labels are not available, verify the information on the paper order.

4. Gather the appropriate equipment.

5. Perform hand hygiene.

6. Confirm the patient’s identity using at least two patient identifiers (Full Name and Date of Birth).

7. Tell the patient that you are about to take a blood sample; then explain the procedure to ease anxiety and ensure his cooperation.

8. If an ordered test requires fasting, confirm that the patient has fasted. Some tests require dietary restrictions, so verify the patient implemented such restrictions, as applicable.

9. Put on gloves and other personal protective equipment, if needed, to comply with standard precautions.

10. If the patient is on bedrest, ask him to lie supine with his head slightly elevated and his arms at his sides. Ask an ambulatory patient to sit in a chair and support his arm securely on an armrest or table. If possible, position the patient’s arm in a dependent position.

11. Assess the patient’s veins to determine the best puncture site and needle size. Limit 25 G needles to situations in which veins are too fragile to use a larger-size needle; however, keep in mind that improper technique may cause hemolysis. The most commonly used veins include the median cubital, the cephalic, and the basilic veins in the antecubital area.

12. Never draw blood above an IV. Use the extremity opposite an intravenous infusion. If you must perform the venipuncture in the extremity with a vascular access device infusion, use a vein below the device or infusion. Avoid venipuncture on the side of breast surgery with axillary node dissection, after radiation therapy to that side, or with lymphedema. Also avoid performing venipuncture in an extremity with an actual or a planned fistula access or one affected by stroke, injury, or deformity.
13. Assess the patient for such factors as easy bruising, increased risk of bleeding, compromised circulation, or fragile veins or skin. *These factors indicate that you should loosely apply or avoid a tourniquet.*

14. Apply a tourniquet, if appropriate, at an adequate location (about 2” [5 cm] above the intended insertion site). Apply the tourniquet so that you can easily palpate an arterial pulse distal to the tourniquet *to prevent circulatory impairment.*

15. If the tourniquet fails to dilate the vein, have the patient open and close his fist and lightly stroke the vein downward to promote vascular distention. *Do not have the patient pump the fist because doing so may adversely affect test results.*

16. Clean the venipuncture site with an antiseptic swab according to the manufacturer's instructions and allow it to dry completely before performing venipuncture. Do not touch the intended venipuncture site after preparation unless you're wearing sterile gloves *to prevent contamination.*
B. Venipuncture Procedure

1. Immobilize the vein by pressing 1” to 2” (2.5 cm to 5 cm) below the venipuncture site with your thumb and drawing the skin taut.

2. Position the needle holder or syringe with the needle bevel up and the shaft parallel to the path of the vein and at a 30-degree angle to the arm. If you're using a winged collection device attached to a needle holder, grasp the wings and position the bevel up. Insert the needle into the vein. If you're using a syringe, venous blood will appear in the hub; withdraw the blood slowly, pulling the plunger of the syringe gently to create steady suction until you obtain the required sample. Pulling the plunger too forcibly may collapse the vein. If you're using a needle holder and an evacuated tube, grasp the holder securely to stabilize it in the vein, and push down on the collection tube until the needle punctures the rubber stopper. Blood will flow into the tube automatically.

3. If you're using a winged collection set and a coagulation tube is the first specimen tube you will draw, draw a discard tube first. The discard tube fills the blood collection set tubing’s dead space with blood to ensure proper blood-to-additive ratio in the coagulation tube. You do not need to completely fill the discard tube; you must only clear the dead space.

4. Remove the tourniquet as soon as blood appears in the tube or syringe to prevent stasis and hemoconcentration, which can impair test results. You shouldn't leave the tourniquet on the arm for more than 1 minute.

5. When the first tube fills to its stated volume and blood flow ceases, remove the tube from the holder. Continue to fill the required tubes using the correct order of draw, removing one and inserting another. Gently invert each tube and then return it to an upright position as you remove it to help mix the additive with the sample. Doing so counts as one complete inversion for each tube.

6. After you've drawn the samples, place a gauze pad over the puncture site, and slowly and gently remove the needle from the vein. When you're using an evacuated tube, remove it from the needle holder to release the vacuum before withdrawing the needle from the vein.

7. Activate the needle protector safety device if necessary.

8. Apply gentle pressure to the puncture site for 2 or 3 minutes or until bleeding stops to prevent extravasation into the surrounding tissue, which can cause a hematoma.

9. After bleeding stops, apply an adhesive bandage.
10. If you've used a syringe, transfer the sample to a collection tube immediately using a needleless device. Be careful to avoid foaming, which can cause hemolysis.

11. *To be sure to mix tube additives properly with the blood sample*, carefully invert each tube the appropriate number of times indicated by the tube's additive. Don't shake the collection tubes; *vigorous mixing may cause foaming and hemolysis.*

12. Label all specimens in the presence of the patient *to prevent mislabeling.* Label the specimens with the patient's full name and date of birth, date and time of collection, and your initials or clock code (MHS associates). If you're obtaining a blood bank specimen, a second person must verify the patient's identity. The verifier's initials or clock code (MHS associates) must be on the specimen.

13. Place all tubes in a laboratory transport bag.

14. Discard syringes, needles, used gloves, and other personal protective equipment, if worn, in the appropriate containers.

15. Last, check the venipuncture site *to see if a hematoma has developed.* If it has, apply pressure until you are sure the bleeding has stopped; then you may apply warm soaks to the site *to help reabsorption.*

16. Perform hand hygiene.

17. Send the specimen tubes and the completed laboratory request form (if applicable) to the laboratory in a laboratory transport bag.

18. Provide ice or a cold pack for transport if required.

**References:**

1. Lippincott Procedures: Venipuncture, Revised: April 03, 2015