# BLOOD COLLECTION

Blood collection supplies will be provided upon request for outpatient testing performed by our laboratories. Vacutainer tubes are available in a variety of sizes and contain various types of additives. The additive can be easily identified by the color of the stopper in the tube. Each test in the test list section has specifications for the appropriate types of vacutainer tube to use when obtaining a blood specimen. The following chart has been provided for your assistance.

<table>
<thead>
<tr>
<th>STOPPER COLOR</th>
<th>ADDITIVE</th>
<th>COMMON USAGE</th>
<th>DIRECTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red (GLASS)</td>
<td>No additive</td>
<td>All drugs indicated &quot;NO SST&quot; may be substituted for gold stopper tubes.</td>
<td>Do not mix. Allow the specimen to clot for 30 minutes prior to centrifuging if available.</td>
</tr>
<tr>
<td>Lavender</td>
<td>EDTA</td>
<td>Most tests in Hematology</td>
<td>Immediately invert tube 5-6 times after phlebotomy to mix blood and additive.</td>
</tr>
<tr>
<td>Pink</td>
<td>EDTA</td>
<td>Most tests in Transfusion Service</td>
<td>Immediately invert tube 5 or 6 times after phlebotomy to mix blood and additive.</td>
</tr>
<tr>
<td>Green</td>
<td>Heparin</td>
<td>Specialized tests</td>
<td>Immediately invert tube 5-6 times after phlebotomy to mix blood and additive.</td>
</tr>
<tr>
<td>Blue</td>
<td>Sodium Citrate</td>
<td>Most coagulation studies</td>
<td>Immediately invert tube 5-6 times after phlebotomy to mix blood and additive.</td>
</tr>
<tr>
<td>Grey</td>
<td>Potassium Oxalate and Sodium Fluoride</td>
<td>Glucose determinations</td>
<td>Immediately invert tube 5-6 times after phlebotomy to mix blood and additive.</td>
</tr>
<tr>
<td>Gold (SST)</td>
<td>Contains an inert barrier material and a clot activator</td>
<td>Most tests in Clinical Chemistry and Serology. <em>This tube should not be used for drug tests, or transfusion services.</em></td>
<td>Immediately invert tube 5-6 times. Allow specimen to clot prior to centrifuging if available. Do not freeze.</td>
</tr>
<tr>
<td>Navy Blue</td>
<td>Sodium Heparin</td>
<td>Heavy Metal Screens Lead Levels</td>
<td>Immediately invert tube 5-6 times after phlebotomy to mix blood with additive.</td>
</tr>
<tr>
<td>Yellow</td>
<td>SPS in Sodium Chloride</td>
<td>Used for blood cultures</td>
<td>See blood culture specimen collection procedure.</td>
</tr>
<tr>
<td>Red (PLASTIC)</td>
<td>Clot activator</td>
<td>For serum determinations in Chemistry and Serology. Not recommended for Blood Banking.</td>
<td>Immediately invert 5-6 times after phlebotomy to ensure mixing of clot activator with blood and clotting within 60 minutes.</td>
</tr>
</tbody>
</table>
The following order-of-draw is recommended when drawing multiple specimens for clinical laboratory testing during a single venipuncture. Its purpose is to avoid possible test result error due to cross contamination from tube additives.

1. Yellow top tube (Blood Culture)
2. Red top tube (Glass) No additive
3. Blue top tube (Coagulation)
4. Gold top tube (SST Gel Sep)
5. Red top tube (Plastic) With clot activator
6. Green top tube (Heparin)
7. Lavender top tube (EDTA)
8. Pink top tube (Blood bank tube)
9. Grey top tube (Glycolytic inhibitor)

NOTE: The order of draw has been revised to reflect the increased use of plastic blood collection tubes. Plastic serum tubes containing a clot activator may cause interference in coagulation testing. Glass non-additive serum tubes may be drawn before the coagulation tube.

NOTE: In instances where a winged blood collection set (butterfly) is utilized and a coagulation tube is the first tube drawn, a discard tube should be drawn first. The discard tube is necessary to fill the butterfly tubing dead space and to assure maintenance of the proper anticoagulant/blood ratio. The discard tube should be a nonadditive or a coagulation tube and does not need to be completely filled.

NOTE: When a syringe system is utilized and a large specimen is collected, blood from the second syringe should be used for the coagulation specimen. In the case of unexplained abnormal coagulation test results, a new specimen should be obtained and the test repeated.

OBTAINING BLOOD SPECIMENS BY VENIPUNCTURE

Equipment Needed:

- Blood collection tubes
- Needle
- Single-use tube/needle holder
- Syringe
- Syringe transfer device
- Tourniquet
- 70% Alcohol prep pads
- 1% to 10% Povidone-iodine if blood cultures are to be drawn
- Gauze pads, adhesive bandages, or tape (including hypoallergenic adhesives)
- Gloves
- Sharps container, consistent with OSHA regulations
- Nonalcohol-based cleanser if blood alcohol is to be drawn
I. Patient Position

The patient should be seated in a chair or lying down on a flat surface (e.g. bed).
Venipuncture should NEVER be done while a patient is standing.

The chair should have arms to provide support and prevent falls if the patient loses consciousness. Chairs without arms do not provide adequate support for the arm or protect fainting patients from falls.
Have the patient position his/her arm on the slanting armrest and extend the arm to form a straight line from the shoulder to the wrist. The arm should be supported firmly by the armrest and should not be significantly bent at the elbow. A slight bend may be important in avoiding hyperextension of the arm.

II. Approach and Identify the Patient

1. The phlebotomist should identify himself or herself, establish a rapport, and gain the patient’s confidence. Information given to the patient regarding testing to be performed and the specimen to be drawn must be in accordance with hospital policy. The phlebotomist must NOT perform blood collection without the patient or guardian consent. Report the patient’s objections to the appropriate physician/nurse station. If the phlebotomist gets called away, the positive patient identification must be reconfirmed before venipuncture is performed.

2. For inpatients, match the name and date of birth on the collection list to the patient’s wristband. **NO PATIENT SHOULD BE DRAWN WITHOUT A WRISTBAND.**

3. If the wristband is absent, notify the patient’s nurse to place one on the patient.

4. In an outpatient setting where there are no wristbands, positive identification is performed by the patient stating their first and last name and date of birth to confirm the identity of the patient.

5. In an extreme emergency situation where there is not time to secure a wristband, it is acceptable to draw a patient without a wristband if the physician or nurse identifies the patient. Please record the name of the person identifying the patient on the requisition or the collection list.

**PROPER IDENTIFICATION IS CRUCIAL TO SPECIMEN INTEGRITY. PLEASE FOLLOW STEPS WHEN IDENTIFYING THE PATIENT.**

III. Site Selection

1. Examine both arms. Select the arm with the best access to the antecubital area.

2. Wrap the tourniquet around the arm 3 to 4 inches (7.5 to 10.0 cm) above the venipuncture site. If a blood pressure cuff is used as a tourniquet, inflate it to 40 mm Hg. The tourniquet should be on the arm no longer than 1 minute. If the patient has a skin problem, the tourniquet should be applied over the patient’s gown, piece of gauze pad or paper tissue to reduce pinching of the skin.

3. Have the patient make a fist. Using your index finger, palpate and trace the path of the veins. Make sure you know which way the vein is running before you perform the venipuncture. Please review a diagram of the venous structure of the arm to familiarize yourself with the veins present in the arm.

4. If the veins are not readily visible, tap the area sharply with your index and second
fingers. This will cause the veins to dilate and become more visible.

5. **NEVER USE YOUR THUMB TO PALPATE A VEIN.**
6. If no veins are located on the one arm, remove the tourniquet and try the other arm. If no suitable veins are present it is acceptable to use a vein in the patient’s hand. Hand veins can be very delicate: **Use extreme caution when accessing these sites.**
7. An artery is identified with pulsation. **NEVER STICK AN ARTERY.**

**SITES NOT TO BE USED FOR VENIPUNCTURE:**

A. Areas of extensive scarring including healed burn areas.

B. Mastectomy - A physician must be consulted before drawing blood from the side on which a mastectomy was performed due to the potential for complications due to lymphostasis.

C. Hematomas - Specimens collected through a hematoma may cause erroneous test results. Phlebotomy must not be performed on any size hematoma. If another vein site is not available, the specimen is collected distal to the hematoma.

D. Intravenous Therapy - Ask the responsible caregiver for the intravenous infusion to be turned off for at least two minutes before venipuncture. Care should be taken to ensure that the flow has been completely discontinued. It should be documented that the venipuncture was performed proximal or distal to an infusion site and from which arm. However, it has been shown that blood drawn proximal to the intravenous site can be contaminated with the fluid being administered.

E. Cannula, Fistula, Vascular Graft - Should not be used unless directed by a physician.

F. Feet – NO phlebotomy will be performed on feet or legs at any St. Peter’s Bender Laboratory Patient Service Center due to the potential risk for complications. The ONLY possible exception to this rule would be for patients without arms.

G. Blood Cultures cannot be drawn from indwelling intravenous or intraarterial catheter unless specifically ordered by a physician.

**ALWAYS FOLLOW VENIPUNCTURE INSTRUCTIONS POSTED ABOVE THE PATIENT’S BED.**

**IV. Venipuncture Procedures**

1. For both the safety of the patient as well as the safety of the phlebotomist, put on a new pair of gloves for each patient. (Refer to Standard Precautions Guidelines).
2. Select proper blood collection tubes by referring to the patient’s requisition or physician prescription.
3. Assemble the equipment needed to perform the procedure, including the patient labels.

4. Approach and identify the patient. See Part II for further description of this process.

5. Position the patient. See Part I for a further description of this process.

6. Apply the tourniquet and select the vein. See Part III for a further description of this process.

7. Cleanse the site with a 70% alcohol pad. Use a circular motion starting at the center and working to the periphery. **DO NOT TOUCH THE SITE AFTER IT HAS BEEN CLEANSED.** If you repalpatate the vein, you must recleanse the site.

   PLEASE FOLLOW PROTOCOL FOR BLOOD CULTURE COLLECTION IF BLOOD CULTURES ARE TO BE DRAWN. (See Blood Culture Procedure).

8. Let the site air dry. Recheck your tubes and equipment while the site is drying. Assemble the needle and the Sims Portex needle holder (Hub). Place the first tube into the Sims Portex Hub and onto the needle to the recessed guideline. Do not push the tube too far or premature loss of vacuum will result.

9. Unsheathe the needle and inspect for defects.

10. Hold the patient’s arm firmly distal to the intended puncture site. The phlebotomist’s thumb should be used to draw the skin taut. This anchors the vein. The thumb should be 1 to 2 inches (2.5 to 5.0 cm) below the venipuncture site.

11. With the bevel up, puncture the vein with the needle at an angle of insertion of 30 degrees or less. Keeping the needle as stable as possible in the vein, push/connect the first tube onto the needle. Maintain the tube below the site while the needle is in the vein.

12. The tourniquet may be removed when adequate blood flow begins. Do not change the position of the tube until it is removed from the needle.

13. Have the patient release his/her fist. Do not have the patient pump his/her fist. This action can cause inaccurate results.

14. Allow the tube to completely fill, until the vacuum is exhausted and blood flow ceases. For tubes that contain additives, this will ensure a correct ratio of blood to additive.

15. When the blood ceases to flow, remove/disconnect the tube from the needle hub assembly. The sleeve re-covers the needlepoint that pierces the tube closure, stopping blood flow until the next tube is inserted/connected to the needle hub assembly. To obtain additional specimens, insert/connect the next tube to the assembly and repeat the collection procedure. Always remove the last filled tube from the needle hub assembly prior to withdrawing the needle from the vein.

16. Please follow the order of draw for multiple tube collection.

17. Immediately after drawing each tube, mix the blood gently and thoroughly by inverting the tube five to ten times. To avoid hemolysis, do not mix vigorously.

18. Remove the needle from the patient’s arm. Press the needle into the sheath using a one-handed technique. Perform the one-handed technique by gently pressing the sheath against a hard surface. As the sheath is pressed, the needle is firmly engaged into the sheath. **DO NOT** use a free hand to press sheath over the needle. Ensure that the needle is fully engaged in the protective sheath before disposal into a sharps container. Discard the entire assembly.

19. Apply pressure with a clean gauze pad to stop the bleeding and avoid unnecessary bruising. Use hypoallergenic tape to hold gauze on puncture site. Inform patient to
leave bandage on for 15 minutes.

20. If excessive bleeding occurs and a hematoma develops or bleeding persists for longer than 5 minutes, a nurse should be alerted so the attending physician can be notified. Pressure, applied with a gauze pad, must continue at the site as long as necessary to stop the bleeding.

21. **Label** all tubes at the bedside with full name of patient, date of birth, medical record number if possible, date drawn, and phlebotomist’s initials. The computer label if available, should then be affixed to each of the tubes except for the tubes for transfusion services. Record the **date and time collected** and the **phlebotomist’s initials** on the collection list or A2K slip.

22. Dispose of needle in a proper sharps container. Gather any other waste and dispose in the proper waste-receptacle.

23. Remove gloves and wash hands.

V. **Troubleshooting Techniques--Blood Does Not Flow During Venipuncture**

1. Change needle position:
   
   A. Penetration too deep - retract needle slightly
   B. Penetration not deep enough - advance needle slightly
   C. Bevel against vein wall - rotate needle one quarter turn

2. Tube lacks vacuum pressure - replace tube with a new one

3. Tourniquet too tight - release the tourniquet

4. **PROBING IS NOT RECOMMENDED.** It is advised to perform another venipuncture using the other arm or directly below the previous site.

5. Do not attempt more than **TWO VENIPUNCTURES ON THE SAME PATIENT.** If unable to access blood after the second attempt, ask another phlebotomist to attempt the venipuncture.

**REFERENCES:**

1. NCCLS - Procedures for the Collection of Diagnostic Blood Specimens by Venipuncture; Approved Standard—Fifth Edition H3-A5, Vol.23 No.32

2. [www.phlebotomy-tutorial.com](http://www.phlebotomy-tutorial.com), The Venipuncture Tutorial

3. [www.bd.com](http://www.bd.com)

4. [www.phlebotomy.com](http://www.phlebotomy.com)