BLOOD COLLECTION: ROUTINE VENIPUNCTURE AND SPECIMEN HANDLING

VENIPUNCTURE PROCEDURE

The venipuncture procedure requires both knowledge and skill to perform. Each phlebotomist generally establishes a routine that is comfortable for her or him. Several essential steps are required for every successful collection procedure:

1. Identify the patient.
2. Assess the patient's physical disposition (i.e. diet, exercise, stress, basal state).
3. Check the requisition form for requested tests, patient information, and any special requirements.
4. Select a suitable site for venipuncture.
5. Prepare the equipment, the patient and the puncture site.
6. Perform the venipuncture.
7. Collect the sample in the appropriate container.
8. Recognize complications associated with the phlebotomy procedure.
9. Assess the need for sample recollection and/or rejection.
10. Label the collection tubes at the bedside or drawing area.
11. Promptly send the specimens with the requisition to the laboratory.

Equipment

The following are suggested supplies for blood specimen collection.

- Non sterile exam gloves
- Puncture resistant sharps container
- Alcohol wipes
- Tourniquet
- Appropriate specimen collection lab tubes
- 2 x 2 gauze
- Tape
- Evacuated tube holder
- Multisample blood collection needle

ORDER FORM / REQUISITION

A requisition form must accompany each sample submitted to the laboratory. This requisition form must contain the proper information in order to process the specimen. The essential elements of the requisition form are:
- Patient's surname, first name, and middle initial.
- Patient's ID number.
- Patient's date of birth and sex.
- Requesting physician's complete name.
- Source of specimen. This information must be given when requesting microbiology, cytology, fluid analysis, or other testing where analysis and reporting is site specific.
- Date and time of collection.
- Initials of phlebotomist.
- Indicating the test(s) requested.

LABELING THE SAMPLE

- A properly labeled sample is essential so that the results of the test match the patient. The key elements in labeling are:
  - Patient's surname, first and middle.
  - Patient's ID number.
  - NOTE: Both of the above MUST match the same on the requisition form.
  - Date, time and initials of the phlebotomist must be on the label of EACH tube.

EQUIPMENT

THE FOLLOWING ARE NEEDED FOR ROUTINE VENIPUNCTURE

- Evacuated Collection Tubes - The tubes are designed to fill with a predetermined volume of blood by vacuum. The rubber stoppers are color coded according to the additive that the tube contains. Various sizes are available. Blood should NEVER be poured from one tube to another since the tubes can have different additives or coatings (see illustrations at end).
- Needles - The gauge number indicates the bore size: the larger the gauge number, the smaller the needle bore. Needles are available for evacuated systems and for use with a syringe, single draw or butterfly system.
- Holder/Adapter - use with the evacuated collection system.
- Tourniquet - Wipe off with alcohol and replace frequently.
- Alcohol Wipes - 70% isopropyl alcohol.
- Povidone-iodine wipes/swabs - Used if blood culture is to be drawn.
- Gauze sponges - for application on the site from which the needle is withdrawn.
- Adhesive bandages / tape - protects the venipuncture site after collection.
- Needle disposal unit - needles should NEVER be broken, bent, or recapped. Needles should be placed in a proper disposal unit IMMEDIATELY after their use.
- Gloves - can be made of latex, rubber, vinyl, etc.; worn to protect the patient and the phlebotomist.
- Syringes - may be used in place of the evacuated collection tube for special circumstances.

**PROCEDURAL ISSUES**

**PATIENT RELATIONS AND IDENTIFICATION**

The phlebotomist's role requires a professional, courteous, and understanding manner in all contacts with the patient. Greet the patient and identify yourself and indicate the procedure that will take place. Effective communication - both verbal and nonverbal - is essential.

Proper patient identification is MANDATORY. If an inpatient is able to respond, ask for a full name and always check the armband for confirmation. **DO NOT DRAW BLOOD IF THE ARMBAND IS MISSING.** An outpatient must provide identification other than the verbal statement of a name. Using the requisition for reference, ask a patient to provide additional information such as a surname or birth date.

If possible, speak with the patient during the process. The patient who is at ease will be less focused on the procedure. Always thank the patient and excuse yourself courteously when finished.

**PATIENT'S BILL OF RIGHTS**

The Patient's Bill of Rights has been adopted by many hospitals as declared by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO). The basic patient rights endorsed by the JCAHO follow in condensed form are given below.

The patient has the right to,

- Impartial access to treatment or accommodations that is available or medically indicated, regardless of race, creed, sex, national origin, or sources of payment for care.
- Considerate, respectful care.
- Confidentiality of all communications and other records pertaining to the patient's care.
- Expect that any discussion or consultation involving the patient's case will be conducted discreetly and that individuals not directly involved in the case will not be present without patient permission.
- Expect reasonable safety congruent with the hospital practices and environment.
- Know the identity and professional status of individuals providing service and to know which physician or other practitioner is primarily responsible for his or her care.
• Obtain from the practitioner complete and current information about diagnosis, treatment, and any known prognosis, in terms the patient can reasonably be expected to understand.
• Reasonable informed participation in decisions involving the patient's health care. The patient shall be informed if the hospital proposes to engage in or perform human experimentation or other research/educational profits affecting his or her care or treatment. The patient has the right to refuse participation in such activity.
• Consult a specialist at the patient's own request and expense.
• Refuse treatment to the extent permitted by law.
• Regardless of the source of payment, request and receive an itemized and detailed explanation of the total bill for services rendered in the hospital.
• Be informed of the hospital rules and regulations regarding patient conduct.

VENIPUNCTURE SITE SELECTION

Although the larger and fuller median cubital and cephalic veins of the arm are used most frequently, wrist and hand veins are also acceptable for venipuncture.

Certain areas are to be avoided when choosing a site,

• Extensive scars from burns and surgery - it is difficult to puncture the scar tissue and obtain a specimen.
• The upper extremity on the side of a previous mastectomy - test results may be affected because of lymphedema.
• Hematoma - may cause erroneous test results. If another site is not available, collect the specimen distal to the hematoma.
• Intravenous therapy (IV) / blood transfusions - fluid may dilute the specimen, so collect from the opposite arm if possible. Otherwise, satisfactory samples may be drawn below the IV by following these procedures:
  1. Turn off the IV for at least 2 minutes before venipuncture.
  2. Apply the tourniquet below the IV site. Select a vein other than the one with the IV.
  3. Perform the venipuncture. Draw 5 ml of blood and discard before drawing the specimen tubes for testing.
• Cannula/fistula/heparin lock - hospitals have special policies regarding these devices. In general, blood should not be drawn from an arm with a fistula or cannula without consulting the attending physician.
• Edematous extremities - tissue fluid accumulation alters test results.

PROCEDURE FOR VEIN SELECTION

• Palpate and trace the path of veins with the index finger. Arteries pulsate, are most elastic, and have a thick wall. Thrombosed veins lack resilience, feel cord-like, and roll easily.
• If superficial veins are not readily apparent, you can force blood into the vein by massaging the arm from wrist to elbow, tap the site with index and second finger, apply a warm, damp washcloth to the site for 5 minutes, or lower the extremity over the bedside to allow the veins to fill.
PERFORMANCE OF A VENIPUNCTURE

- Approach the patient in a friendly, calm manner. Provide for their comfort as much as possible, and gain the patient's cooperation.
- Identify the patient correctly.
- Properly fill out appropriate requisition forms, indicating the test(s) ordered.
- Verify the patient's condition. Fasting, dietary restrictions, medications, timing, and medical treatment are all of concern and should be noted on the lab requisition.
- Position the patient. The patient should sit in a chair, lie down, or sit up in bed. Hyperextend the patient's arm.
- Apply the tourniquet 3-4 inches above the selected puncture site. Do not place too tightly or leave on more than 2 minutes.
- The patient should make a fist without pumping the hand.
- Select the venipuncture site.
- Prepare the patient's arm using alcohol prep. Cleanse in a circular fashion, beginning at the site and working outward. Allow to air dry.
- Grasp the patient's arm firmly using your thumb to draw the skin taut and anchor the vein. The needle should form a 15 to 30 degree angle with the surface of the arm. Swiftly insert the needle through the skin and into the lumen of the vein. Avoid trauma and excessive probing.

- When the last tube to be drawn is filling, remove the tourniquet.
- Remove the needle from the patient's arm using a swift backward motion.
- Press down on the gauze once the needle is out of the arm, applying adequate pressure to avoid formation of a hematoma.
- Dispose of contaminated materials/supplies in designated containers.
- Mix and label all appropriate tubes at the patient bedside.
- Deliver specimens promptly to the laboratory.

Note: The Bevel

The bevel of a needle is the angled opening at the tip of the needle. The bevel must always face upward, towards the person holding it, so as to obtain a blood return.
It is also very important to remember that if the bevel is exposed during a venipuncture, before manually withdrawing the needle at the completion of the entire procedure, the needle is then considered contaminated, and cannot be re-inserted into the patient. The whole procedure must be stopped, and restarted elsewhere.

Note that when the bevel is exposed, leakage from the site may occur. Never panic, simply release the tourniquet, remove the needle, and apply pressure with cotton. Immediately dispose of the needle in the sharps container. This is another reason it is so important to keep your eyes on the needle, and not on other things around the room!

PROTECT THE PATIENT

- Place blood collection equipment away from patients, especially children and psychiatric patients.
- Practice hygiene for the patient's protection. When wearing gloves, change them between each patient and wash your hands frequently. Always wear a clean lab coat or gown.

TROUBLESHOOTING GUIDELINES

IF AN INCOMPLETE COLLECTION OR NO BLOOD IS OBTAINED

- Change the position of the needle. Move it forward (it may not be in the lumen)

- Or move it backward (it may have penetrated too far).
- Adjust the angle (the bevel may be against the vein wall).

- Loosen the tourniquet. It may be obstructing blood flow.
- Try another tube. There may be no vacuum in the one being used.
- Re-anchor the vein. Veins sometimes roll away from the point of the needle and puncture site.

**Corrective Technique**

The corrective technique is performed when there is no blood return. After two unsuccessful attempts, the rule for Phlebotomists is to call in another Phlebotomist to perform the venipuncture. However, you must try to successfully obtain the sample before giving up. The proper procedure to do this is called Corrective Technique.
Corrective Technique

Step 1: Pull the needle out until the bevel is just under the skin.

Step 2: Palpate. Gauge the depth and location of the vein. Always palpate above the insertion site (about 1/4” above), not on top of the site! Never press down on the needle!
Corrective Technique

Step 3: Go to the vein. This means you can readjust the needle, the angle, the direction of the needle, etc.

Example: Increase the angle

Step 4: Check for a blood return. If using a Vacutainer, the tube will begin to fill as soon as the vein is punctured. If using a syringe, you will have to manually aspirate the plunger to check for a return.

Fully punctured vein. Blood will flow into tubes, or when aspirated with plunger.
Corrective Technique

Note! If the bevel is exposed, the needle is considered contaminated, and cannot be re-inserted. The procedure must be stopped, altogether, and restarted elsewhere.

Exposed bevel: Minimal to no leakage from site, but procedure still must be stopped!

Skin Layer

or

Exposed bevel: At this point, blood will begin to leak out from the site!

Skin Layer
**IF BLOOD STOPS FLOWING INTO THE TUBE**

- The vein may have collapsed; re-secure the tourniquet to increase venous filling. If this is not successful, remove the needle, take care of the puncture site, and redraw.

- The 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.

**PROBLEMS OTHER THAN AN INCOMPLETE COLLECTION**

- A hematoma forms under the skin adjacent to the puncture site - release the tourniquet immediately and withdraw the needle. Apply firm pressure.

- The blood is bright red (arterial) rather than venous. Apply firm pressure for more than 5 minutes.
POSSIBLE COMPLICATIONS FROM PHLEBOTOMY

PROBLEMS OBTAINING A SPECIMEN

_Blood Sample That Cannot Be Obtained_

Probing is not recommended. Probing is painful to the patient. In most cases another puncture in a site below the first site, or use of another vein on the other arm, is advisable.

It is advisable not to attempt a venipuncture more than **twice**. Notify the patient’s Registered Nurse

Another person should attempt to draw the specimen

If another person is asked to draw a patient, the new person must re--identify the patient.

*If an incomplete collection or no blood is obtained*

Ø Change the position of the needle. Move it forward (it may not be in the lumen)
Ø or move it backward (it may have penetrated too far).
Ø Adjust the angle (the bevel may be against the vein wall).
Ø Re-anchor the vein. Veins sometimes roll away from the point of the needle and puncture site.

*If blood stops flowing into the syringe/tube*

Ø The vein may have collapsed; resecure the tourniquet to increase venous filling. If this is not successful, remove the needle, take care of the puncture site, and redraw.
Ø The 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.

PATIENT COMPLICATION

_Problems other than an incomplete collection_

**Hematoma**

A _hematoma_ forms under the skin adjacent to the puncture site - release the tourniquet immediately and withdraw the needle. Apply firm pressure.
To prevent a hematoma

- Puncture only the uppermost wall of the vein (just under the skin)
- Remove the tourniquet before removing the needle
- Use the major superficial veins (the large veins just under the skin)
- Make sure the needle fully penetrates the uppermost wall of the vein. (partial puncture may allow blood to leak into the tissues just under the skin)
- Apply pressure to puncture site

Petechiae

Little red spots, ranging in size from pinpoint to several millimeters in diameter. Petechiae consist of extravasated blood. This complication may be a result of a coagulation abnormality, such as a platelet defect and should be brought to the attention of the patient’s healthcare provider.

Syncopy (fainting)

Patients may become dizzy and faint at the thought or sight blood, this is the most common complication phlebotomy. It is caused because of rapid fall in blood pressure. An automatic nervous system reaction, (psychosomatic trigger), usually based on fear. Treatment and safe handling of an unconscious patient is a necessity of any qualified Phlebotomist.

- Abort draw: Remove tourniquet, needle and bend arm
- Call for assistance
- Using good body mechanics, slide patient to floor, keeping hand firmly behind the cervical spine area. Protect head and neck from injury!
- Elevate feet above heart and monitor blood pressure, breathing, etc.
- Use ammonia only if patient is not responsive within 5 minutes and blood pressure remains low.
- Assist to upright position in stages (monitor B/P with each change in position) this is a gradual process. If patient stands up quickly, he will most likely to faint again due to drop in B/P.

Scarred Vein

Areas that have been burned or scarred should be avoided during phlebotomy. Burned area is very sensitive and susceptible to infection, whereas veins under scarred area are difficult to palpate.