

## COLLECTION OF BLOOD SPECIMENS BY VENIPUNCTURE

### I. PRINCIPLE:

The principle of the venipuncture procedure is to obtain quality blood specimens upon which the laboratory can perform testing.

### II. SPECIMEN COLLECTION AND HANDLING: N/A

### III. REAGENT: N/A

### IV. CALIBRATION: N/A

### V. QUALITY CONTROL: N/A

### VI. PROCEDURE:

#### A. Accessioning:

Specimen request forms are generated by order entry into SCM. These include the following information: patient name, age, medical record number, ordering physician, laboratory test requested, required collection tube type, and department or unit where patient is located. SCM orders interface with LIS generating a barcode label for each laboratory test that is not collected by lab personnel (i.e. non-blood specimens, outpatient orders). SCM orders interface with LIS to generate orders in Sunquest Collection Manager for specimens to be collected by lab personnel. These orders include: patient name, age, sex, medical record number, laboratory test requested, required collection tube type, and department, unit, or room number where patient is located, specific test accession number, date, and time of order. For further explanation of accessioning process, refer to Computer Services Manual.

#### B. Properly identify the patient:

Refer to Patient Care Services (PCS) Policy # 0715 for proper patient identification. For Pathology employees, this policy is in the Pathology Department General Policy Manual. For employees of other departments, the policy would be in their department specific policy manual or accessible on the Facility's Intranet site.

For Blood Bank specimens, refer to Blood Bank Policy Manual for acceptable protocol of patient identification.

#### C. Verify the patient diet restrictions, as appropriate (e.g. fasting glucose).

#### D. If patient has any type restraint that would hinder blood collection, do not remove restraints and contact nursing personnel before performing phlebotomy procedure. Restraint removal/reapplication can only be done by trained nursing personnel.

#### E. Wash hands and put on gloves and any other personal protective equipment that is necessary to follow the hospital's biohazard and infectious disease policies.

- F. Place within reach the necessary specimen procurement supplies (blood collection tubes, tourniquet, alcohol pads, etc).
- G. Select the correct types and sizes of evacuated blood collection tubes. Before using, tap all tubes that contain additives to ensure that all the additive is dislodged from the stopper and the wall of the tube. When drawing for blood cultures, refer to the Blood Culture Procedure in the Specimen Collection Manual.
- H. Select the appropriate type needle according to the patient's physical characteristics:
  - 1. 21 Gauge needle: the most common needle used for adults, but should not be used for children.
  - 2. 22 Gauge needle: provides a good blood flow with less discomfort than the 21 gauge needle, can be used for children.
  - 3. 23 Gauge needle: choice for pediatric draws, hand veins, or veins that appear fragile or problematic. **NOTE:** Needles smaller than 23 gauge should not be used for phlebotomy procedures as the small bore may result in hemolysis of the red blood cells as they pass through.
- I. Select the appropriate blood drawing system according to the patient's physical characteristics:
  - 1. Vacutainer tube holders: should be used if the vein selected is prominent and in the antecubital area.
  - 2. Syringes: should be used in veins of small diameter and veins that appear fragile or otherwise difficult to access.
  - 3. Winged-infusion "butterfly" sets: should be used on more difficult venipunctures where a lower angle and greater control on insertion is needed, often the choice for pediatric venipunctures
- J. Preparing the patient for venipuncture:

In order to gain the patient's confidence, the phlebotomist should at all times maintain a helpful and professional manner. The phlebotomist should identify themselves and their purpose. The phlebotomist should explain that although the venipuncture will be slightly painful, it will be of short duration. Always prepare the patient by saying, "There will be a stick." The phlebotomist should never tell the patient the venipuncture will not hurt.

If the patient is semiconscious or comatose, the phlebotomist must take special care to anticipate any unexpected movements or jerks either while inducing the needle, or while it is in place in the arm. A gauze pad should be readily available and the tourniquet quickly released in the event the needle is violently removed or repositioned. If the needle accidentally goes much deeper in the arm, the phlebotomist must inform the physician who will examine the area for possible damage. Assistance is always necessary for performing venipunctures on infants and small children. Always stabilize the child's arm or venipuncture site. Under no circumstances should a puncture be attempted on an infant or child without the assistance necessary to immobilize intended puncture site and to protect the patient and collector from injury. If a venipuncture is performed on a child < 2 years old, the site should be limited to superficial veins.

If the patient questions what tests are being ordered, the phlebotomist should suggest the patient refer to the nurse or ordering physician for clarification.

If the patient objects to having the venipuncture procedure, the phlebotomist must not proceed to draw blood against the patient's wishes. The objections should be reported to a member of the patient's care team.

K. Position the patient:

1. Procedure for seating the patient:

- a. Ask the patient to be seated comfortably in a chair.
- b. Have the patient position his/her arm on the armrest.
- c. Have the patient extend his/her arm so as to form a straight line from shoulder to the wrist. The arm should be supported firmly by the armrest and should not be bent at the elbow.

2. Procedure for having patient lie down or if patient is already lying down:

- a. Ask the patient to lie on his/her back in a comfortable position.
- b. Place a pillow (if additional support is needed) under the arm to be used in drawing the specimen.
- c. Have the patient extend his/her arm so as to form a straight line from the shoulder to the wrist.
- d. Avoid startling the patient unnecessarily, such as awakening suddenly, to prevent changes in test results.

**NOTE:** No food, chewing gum, or thermometer should be in the patient's mouth at the time the specimen is drawn.

L. Verify paperwork and tubes to ensure no mistakes have been made during the preparation and selection of the tubes:

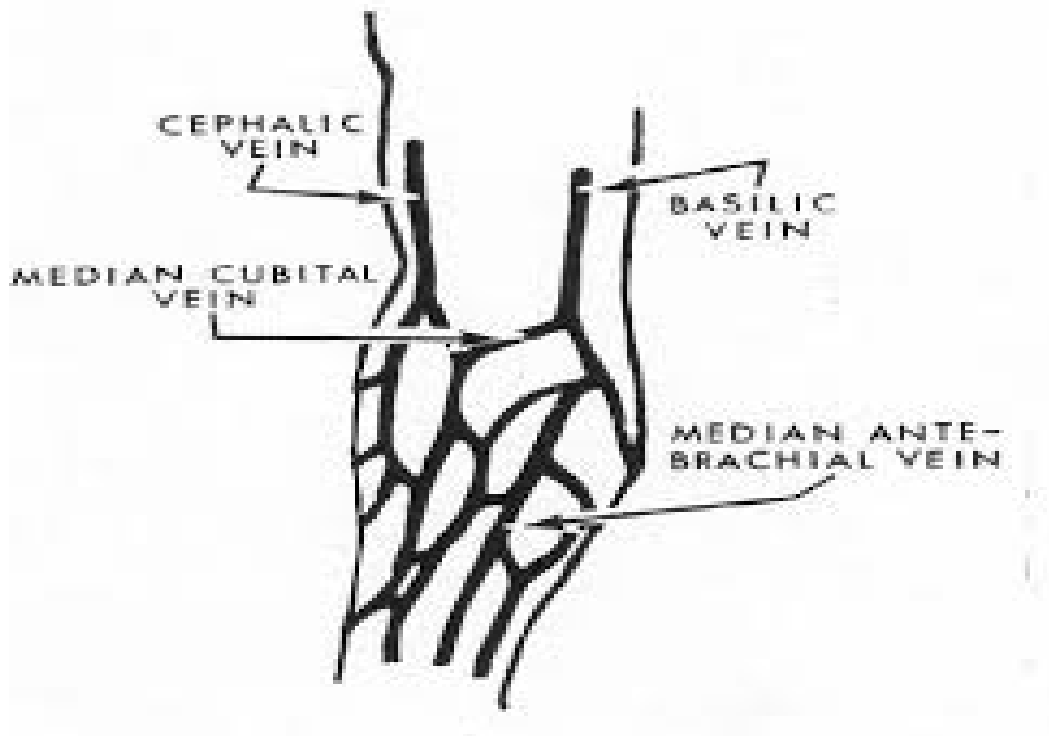
1. For Outpatient Collections: Compare the identification number on the identification armband with the identification number on the blood request slip/barcode label and ask the patient to state his/her name and DOB. If the information does not match, check further to determine which one is correct and notify the nurse. Do not draw blood until proper identification has been made.
2. For Inpatient Collections: Using the Collection Manager system, scan the patient's armband. The confirmation screen requires verification of patient name and DOB before proceeding with specimen collection. If name and DOB cannot be confirmed, contact the patient's nurse to ensure the proper armband with correct information has been given.
3. Check the tubes to assure that the appropriate kinds and sizes have been selected.

M. Venipuncture site selection:

1. Have the patient form a fist. The blood veins become more prominent and easier to enter when the patient forms a fist. However, a vigorous hand exercise ("pumping") should be avoided because it can cause changes in the concentration of certain analytes in the blood. Make sure the patient's elbow is locked (unless the arm is

incapable of hyperextension because of a stroke or other physical condition), so as to bring the veins to the surface of the skin where they can be easily detected.

2. Selecting the appropriate vein is very important. The life of a patient may sometimes depend on vein patency. The veins provide an avenue of entry for various therapeutic agents as well as blood transfusions. It is important, therefore, that the phlebotomist select the vein site carefully in order to preserve vein patency. Veins just under the anterior surface of the arm opposite the elbow, are most commonly used to obtain blood. This area is known as the antecubital area. Because this site contains several large veins that are often close to the surface of the skin, and therefore, easily accessible, this site is the area of choice for venipunctures. Identify the most prominent of the three acceptable veins in the area, the *median cubital*, *basilic*, and *cephalic*. See figure below:



Palpate each vein by pushing lightly on the skin with increasing pressure using the index finger. Veins will feel spongy, resilient, and have a tube-like curvature. Unlike veins, arteries pulsate, are more elastic, and have a thick wall. Attempt to locate the median cubital vein first. Tendons and bone will be hard and distinctively different. Repeat palpation on the lateral (outer) aspect of the arm where the cephalic vein lies. Complete the survey by palpating the skin on the medial (inner) aspect of the

antecubital area where the basilic vein lies. If veins are not obvious by sight or touch, repeat the survey on the opposite arm if it is accessible. You may not be able to locate all three veins; more than likely only one or two will be identifiable or perhaps none at all. If it can be located, the vein of choice is the median cubital vein for several reasons. It is closest to the skin's surface, making it readily accessible. It is the most stationary of the three and punctures to it pose the least risk of injuring underlying structures. It also brings less discomfort when punctured.

In the absence of a prominent median cubital vein, the cephalic vein should be considered next. Drawing blood from the basilic vein brings the greatest risk to the patient because of underlying structures. Branches of the median cubital antebrachial cutaneous nerve can nestle against this vein and its proximity to the brachial artery subjects the patient to the risk of an arterial nick and subsequent hemorrhage.

If veins are not readily apparent, blood can be forced into the vein by massaging the arm from wrist to elbow. Tapping sharply at the vein site with index and second finger a few times will cause the vein to dilate. Applying a warm, damp washcloth (about 40° C) to the proposed site for five minutes may have the same result. Alternately, commercial warming devices may be used following the manufacturer's instructions. Also, lowering the extremity over the bedside will allow the veins to fill to capacity.

Many times veins in the opposite arm will prove more suitable for venipuncture. Alternate sites such as the dorsal wrist or hand veins may be required for patients with difficult access. Veins in infants (birth-12 months) are more developed and pronounced on the back side of the hand than in the antecubital area. However, special care should be taken when procuring blood in this manner. The following factors must also be taken into consideration before the venipuncture site is selected.

- a. Follow any special instructions. Some patients have special instructions at the bedside or posted on the door to indicate the need for restricted or careful use of a patient's arm when drawing blood. This is especially true of the renal dialysis patients who have shunts, cannulas, fistulas, or vascular grafts. Blood should not be drawn from arms with any of these present.
- b. Emotional and mental status of the patient. If restraint is necessary, veins in areas that are most easily immobilized offer the greater chance of obtaining specimens successfully. Because the antecubital area is in the joint of the arm, it may be difficult to immobilize. Thus, it may be prudent to draw from an alternative site.
- c. Prior mastectomies. If the patient has had a mastectomy, punctures in the arm on the same side are not permitted without physician approval.
- d. Presence of hematomas. Specimens collected from a hematoma area 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.
- e. Presence of injuries. Punctures in an arm that is injured, burned, scarred, or otherwise traumatized should be avoided. Likewise, infected or inflamed antecubital areas should not be considered. In geriatric patients, strokes may limit hyperextension of the arm, thereby preventing access to the antecubital areas.

- f. Presence of edema. Swelling makes locating veins more difficult and can prolong healing and closure of the puncture site. Excessive swelling can also alter the composition of the blood passing through the affected limb.

N. Cleanse Venipuncture Site:

The venipuncture is cleansed to prevent chemical or microbiological contamination of either the patient or the specimen.

1. Use a gauze pad with 70% isopropyl or ethyl alcohol, or a commercially prepared alcohol pad.
2. Cleanse the vein site with a circular motion from the center to the periphery. If the condition of the patient's arm necessitates excessive cleaning, several alcohol preps may be necessary.

**NOTE:** After cleansing the site with alcohol, for blood cultures, it is necessary to then scrub with a ChloroPrep One Single Swabstick. Iodine pads are used instead of ChloroPrep if the infant is less than 3 months when collecting blood cultures. Allow to air dry before collecting blood.

**NOTE:** For Blood Alcohol collections, do not cleanse the sample draw site with alcohol or other volatile disinfectants. Use only non-alcohol aqueous disinfectants, such as iodine based disinfectants.

3. Allow the area to dry to prevent hemolysis of the specimen and to prevent the patient from experiencing a burning sensation when the venipuncture is performed.
4. Once the site has been cleansed, do not contaminate it by repalpating for the vein. If the vein's location has been lost, repalpation can be performed only if the site is cleansed again before puncture.

O. Tourniquet Use:

Tighten the tourniquet 3-4 inches above the antecubital area. To assure patient comfort, the tourniquet should not roll into a rope-like constrictor, but remain flat against the skin around the circumference of the upper arm. It should be tight, though not uncomfortable. A loop of the tourniquet should be tucked between the tourniquet and the arm to provide an easy, one handed release. The patient should continue to make a fist, but pumping of the fist should be avoided. If the patient has a skin problem, the tourniquet should be applied over the patient's gown or a piece of gauze pad or paper tissue should be used so that the skin is not pinched. For infants and children, a smaller tourniquet should be utilized. A blood pressure cuff can be used in place of a tourniquet and inflated to 40 mm Hg.

**NOTE:** The tourniquet should be released after no more than one minute. If the tourniquet must be applied for the preliminary vein selection, it should be released and reapplied after two minutes. Localized stasis can occur with hemoconcentration and the possible formation of a hematoma due to infiltration of blood into tissue. This may result in erroneously high values for all protein-based analytes, packed cell volume, and other cellular elements. Tourniquets are discarded after use.

P. Inspect Needle and Blood Drawing System:

1. The needle should be visually inspected to determine that it is free of hooks at the end of the point, and that the needle opening is clear of small particles that would obstruct

the flow of blood. It is usually best when performing venipunctures on children, that they not be allowed to view the needle.

2. The plunger within the barrel of the syringe should be moved to demonstrate syringe and needle patency and freedom of plunger movement.

Q. Order of Draw:

Arrange tubes to be drawn in the proper order to be filled:

1. Tubes or bottles for blood cultures
2. Light blue stopper tubes that contain sodium citrate
3. Red stopper tubes with or without clot activator, with or without gel plasma separator
4. Green stopper tubes with or without gel plasma separator that contain heparin
5. Lavender stopper tubes that contain EDTA
6. Any other additive tubes (eg. gray stopper, etc.)

**NOTE:** If only blue stoppered tubes are to be drawn, the first blue top tube should be used for routine coagulation and the second and third tube for specialized coagulation testing.

**NOTE:** When using a winged blood collection set for venipuncture and a coagulation tube is the first tube to be drawn, a discard tube should be drawn first. The discard tube must be used to fill the blood collection tubing dead space and to assure maintenance of the proper anticoagulation/blood ratio and need not be completely filled. The discard tube should be a nonadditive or a coagulation tube.

R. Perform Venipuncture:

Always assure the patient's arm or other venipuncture site is in a downward position to prevent reflux or "backflow" before any venipuncture procedure.

1. Using Vacutainer Tube Holder Method:
  - a. Thread the appropriate needle into the holder until it is secure, using the needle sheath as a wrench.
  - b. Insert the blood collection tube into the holder and onto the needle up to the recessed guideline on the needle holder. Avoid pushing the tube beyond the guideline, because a premature loss of vacuum may result. The tube will retract slightly. Leave it in this position.
  - c. Grasp the holder placing the thumb on top and two or three fingers underneath the barrel. Rest the back of the finger firmly on the patient's forearm so that the bevel of the needle faces up and lies just off the skin at the intended puncture site. To keep the open end of the holder accessible for an unhindered exchange of tubes during the draw, grasp the holder at the fingertips, with the wrist turned, so that the open end of the holder remains visible and accessible.
  - d. Grasp the patient's arm firmly. The thumb should be used to draw the skin taut. This anchors the vein. The thumb should be 1-2 inches below

the venipuncture site. When the skin is taut, the needle passes through it much easier and with significantly less sensation.

- e. A verbal warning of the imminent puncture is appropriate, even if the patient appears unconscious or sedated.
- f. With a forward motion, guide the needle (bevel up) into the skin and the vein with a steady advance at an angle of 15-30 degrees. Avoid a slow, timid puncture as this will increase the patient's discomfort. Likewise, don't use a rapid, jabbing motion as this will make passing entirely through the vein likely.
- g. Once the needle is anticipated to be within the vein, it is no longer necessary to stretch the skin. Advance the collection tube fully forward so that the interior needle punctures the stopper of the tube. This must be accomplished using the "flanges" or "wings" of the tube holder. If the tube is pushed forward without using these extensions, the pushing pressure may drive the entire assembly forward and advance the needle through the other side of the vein. Therefore, to counteract the pushing pressure exerted on the tube, position the index and middle finger of the free hand on either side of the holder and push the tube onto the needle with the thumb on the bottom of the tube. When the thumb and fingers are squeezed together, the tube advances and the stopper is pierced without disturbing the placement of the needle.
- h. Release the tourniquet as soon as the blood begins to flow or after no longer than one minute.
- i. While the tube is filling, do not change the position of the tube until it is withdrawn from the needle. Do not allow the contents of the tube to contact the stopper. Movement of the fluid back and forth in the tube can cause reflux of blood into the venous system and possible adverse patient reaction.
- j. Keep constant, slight forward pressure (in the direction of the needle) on the end of the tube. This prevents release of the shut-off valve and stopping of blood flow. Do not vary pressure or reintroduce pressure after completing the draw.
- k. Fill the tube until the vacuum is exhausted and blood flow ceases. This will ensure that there is a correct ratio of anticoagulant to blood.
- l. If blood is not obtained, the tube may have lost its vacuum, the needle is improperly positioned in the vein, or the vein is too small for the size of the needle or for a vacuum-assisted draw. Avoid side-to-side manipulation of the needle as an injury can result. Follow the appropriate recovery technique in Step W.
- m. When the blood flow ceases, remove the tube from the holder. This must be done so that the needle is not pulled out of the vein. To counteract the pulling force exerted on the tube, push against the flared wings of the holder with the thumb or index finger while grasping and pulling the tube.
- n. Gently invert tubes that contain an additive 5-10 times as they are removed to prevent coagulation.
- o. If more tubes are required, apply and remove subsequent tubes likewise, making sure they are filled in the proper order.
- p. Remove the last tube from the holder before removing the needle to prevent



blood from dripping from the tip of the needle.

2. Using Syringe Method:

- a. Insert the appropriate needle into the syringe.
- b. Unseat the plunger from the barrel by pulling back on it to break the seal, then return the plunger fully forward expelling all air from the barrel.
- c. Grasp the syringe at the fingertips with the thumb on top and two or three fingers underneath as with a tube holder. The plunger must remain accessible so it can be withdrawn without hindrance, and the barrel of the syringe should remain visible throughout the puncture. Rest the backs of the fingers firmly on patient's forearm so that the bevel of the needle faces up and lies just off the skin at the intended puncture site. Make sure that the bevel side of the needle is in an upward position.
- d. Grasp the patient's arm firmly. The thumb should be used to draw the skin taut. This anchors the vein. The thumb should be 1-2 inches below the venipuncture site. When the skin is taut, the needle passes through it much easier and with significantly less sensation.
- e. A verbal warning of the imminent puncture is appropriate, even if the patient appears unconscious or sedated.
- f. With a forward motion, guide the needle (bevel up) into the skin and the vein with a steady advance at an angle of 15-30 degrees. Avoid a slow, timid puncture as this will increase the patient's discomfort. Likewise, don't use a rapid, jabbing motion as this will make passing entirely through the vein likely.
- g. Once the needle is in the vein, it is no longer necessary to stretch the skin. With the free hand, loosen the tourniquet.
- h. Pull the plunger back to withdraw the appropriate volume of blood needed. To keep the needle in place during the draw, counteract the pulling force by pushing against the flared wings of the syringe with the thumb or index finger of the same hand.
- i. If no blood is obtained, the needle may not be positioned properly in the vein. Because side-to-side manipulation of the needle can cause injury, it should be avoided. Moving the needle deeper into the arm should only be attempted if the collector is confident that doing so will not cause injury. A second cause may be that the pulling pressure may be too great and the bevel of the needle may have attached to the upper wall of the vein. Follow the appropriate recovery technique in Step Y.

3. Using the Winged-Infusion (Butterfly) Method:

- a. If a syringe is coupled to the set, break the syringe seal by pulling back on the plunger to unseat it; then return the plunger fully forward, expelling all air from the barrel. Remove the sheath. Grasp the wings of the set so that the bevel faces up, and squeeze them together with the thumb and index finger. This will allow the other fingers to rest on the patient's forearm and the needle to rest level with the plane of the arm, just above the puncture site. Inform the patient of the imminent procedure.

- b. Stretch the skin by pulling downward on the arm from below the intended puncture site, but not in such a way that it will obstruct the insertion of the needle. This minimizes the pain of the puncture and anchors the vein to prevent it from rolling away from the needle. With a forward motion, guide the needle into the skin and the vein with a steady advance, keeping the angle at less than 30 degrees. Slow, timid punctures will increase the patient's discomfort; rapid, jabbing motions will make passing entirely through the vein likely.
- c. Once the needle is anticipated to be in the vein, release the skin. The tourniquet should be released as soon as the vein is accessed to minimize the effects of hemoconcentration. If using a syringe, pull back on the plunger with gentle pressure using the free hand until a sufficient quantity of blood is obtained. If drawing through a tube holder, push the tubes into the holder and fill in the correct order. Gently invert tubes that contain an additive 5-10 times as they are removed to prevent coagulation.
- d. If no blood is obtained, the needle may not be positioned properly in the vein. Because side-to-side manipulation of the needle can cause injury, it should be avoided. If a vacutainer tube holder is being used, the tube may have lost its vacuum, the needle is improperly positioned in the vein, or the vein is too small for the size of the needle or for a vacuum-assisted draw. Moving the needle deeper into the arm should only be attempted if the collector is confident that doing so will not cause injury. A second cause may be that the pulling pressure may be too great and the bevel of the needle may have attached to the upper wall of the vein. Follow the appropriate recovery technique in Step Y.

S. Removing the Needle:

1. Instruct the patient to unclench his/her fist.
2. Lay a gauze pad lightly on the insertion point without applying pressure.
3. Remove the needle while keeping the bevel in an upward position and increase pressure on the puncture site. Exercise care not to scratch the patient's arm.
4. If using a syringe, immediately engage the needle safety device, then remove needle and place in a sharps container. Attach a blood transfer device to the syringe and fill tubes as appropriate, refer to Order of Draw in Section P above. Blood should enter down the side of the tube rather than striking the glass bottom of the tube at full force. To remove transfer device from tube, grasp the filled tube near the bottom with the free hand and pull the transfer device from the stopper. Gently invert tubes that contain an additive 5-10 times as they are removed to prevent coagulation. Once all tubes are filled, the transfer device and syringe should be placed in a sharps container.
5. For vacuum-assisted draws, the needle safety feature is activated immediately, and then placed in a sharps container.

T. Bandage the Venipuncture Site:

1. Maintain firm pressure on the puncture site until bleeding has stopped. Cooperative patients may be allowed to assist with holding pressure. It is not always effective to have patients bend their arm up as a substitute for pressure. This technique does not apply adequate pressure on all veins of the antecubital area and should not be used.
2. Remove pressure and watch the insertion point long enough to ensure that the puncture site has sealed. While watching for the site to leak, observe the tissue

around the site for any raising or mounding. This could indicate that the skin has sealed, but the puncture in the vein is still open and allowing blood to leak into the surrounding tissue. If you suspect this to be the case, reapply pressure for several more minutes and check again. If bleeding persists longer than five minutes, a nurse should be alerted so that the attending physician can be notified. Pressure must continue at the site as long as necessary to stop the bleeding.

3. Apply a gauze bandage over the venipuncture site after making sure that stasis is complete.
4. Instruct the patient that the bandage should be left on for at least 15 minutes.

U. Labeling the Specimens:

1. It is imperative that specimens be labeled properly and in the patient's presence. Specimens must not be removed from patient's presence until they have been properly labeled. Under no circumstances should specimen tubes be labeled *before* they are filled.
2. With the Collection Manager system, barcodes are printed at the patient's bedside. These labels include the phlebotomist's tech code and collection time.
3. If preprinted barcoded labels are utilized in labeling specimens, the phlebotomist must also make a handwritten entry on the tube of the actual time of collection and their initials and/or personal identification number.
4. If there is no preprinted barcode label, then the phlebotomist must label each specimen tube with the patient's first and last names, unique identification number (e.g. medical record number), date and time of collection, and their initials and/or personal identification number. Any other identifying items, such as patient's age, sex, laboratory test requested, department, unit, or room number where patient is located should be included on the label.

V. Special Collection Conditions:

Some tests require that blood specimens be cooled or warmed immediately after collection. Instant warmers and ice transporters are available to warm or cool specimens.

W. Transport to the Laboratory for Testing:

All specimens should be placed in a biohazard bag and properly transported to the laboratory with consideration given to the effect that time, temperature, and delays in processing will have on test results.

X. Recovering the Failed Venipuncture:

Never attempt a venipuncture more than twice. If unable to obtain an adequate specimen after two attempts, have another health care professional attempt to obtain the specimen. If their attempts are also unsuccessful, then supervisory personnel should be notified.

1. Using a vacutainer tube holder with needle or attached to a winged-infusion set:
  - a. CAUSE: The tube applied may have lost its vacuum

RESOLUTION: Apply another tube

- b. CAUSE: The needle may not be positioned properly.

RESOLUTION: Pull back on the needle slightly. If flow does not commence, continue to pull back farther until the bevel of the needle is just under the surface of the skin. If this fails, pull the tube within the holder back so that the inner needle no longer punctures the stopper and the vacuum is no longer applied. Re-anchor the vein by pulling the skin down with the thumb of the freehand and move the needle deeper toward the vein. Be careful not to go so deep as to damage underlying structures. Excessive manipulation and side-to-side probing should be avoided.

- c. CAUSE: The vacuum may be excessive, causing the vein to “collapse” or adhere to the bevel of the needle. This occurs if the diameter of the vein is too small for the vacuum within the tube.

RESOLUTION: Apply a smaller tube of the same type or terminate the puncture and attempt a second puncture using a syringe and a 23-gauge needle with moderate pulling pressure.

2. Using a syringe with needle or attached to a winged-infusion set:

- a. CAUSE: Excessive pulling pressure on the plunger may force the vein to collapse onto the bevel of the needle

RESOLUTION: Reduce the amount of pulling pressure on the plunger. Minimal pulling pressure can restore the blood flow. If this results in a prolonged draw, however, the specimen may hemolyze or clot within the barrel of the syringe before it can be transferred to tubes and render the specimen unacceptable. To avoid this, complete the draw within 1 minute from the time blood first enters the barrel of the syringe.

- b. CAUSE: Needle size is too large for the vein.

RESOLUTION: If the needle selected for use is too large for the vein, pulling the plunger may result in the bevel of the needle adhering to the upper wall of the vein. To correct this, pull back on the plunger slowly to apply the least amount of vacuum within the vein. If the specimen enters the syringe too slowly, keep in mind the potential of the specimen to clot within the barrel, as mentioned in the previous scenario. If this technique fails to yield a specimen, discontinue the puncture and repeat, using a smaller needle or a larger vein.

- c. CAUSE: The needle may not be positioned properly.

RESOLUTION: While pulling back on the plunger, slowly withdraw the needle until it is just under the surface of the skin. If the needle originally went through the vein, this will salvage the puncture. If blood does not flow into the syringe, stop short of pulling the needle completely out of the skin and release the plunger so that the force of aspiration is no longer applied. With the bevel of the needle resting just under the skin's surface, re-anchor the vein by pulling the skin down with the thumb of the free hand. Then move the needle deeper toward the vein, being careful not to go so deep as to injure underlying structures. Pull back on the plunger. Excessive manipulation and side-to-side probing should be avoided.

Y. Minimum Fill Requirements:

Blood collection tubes with additives are manufactured with carefully calculated quantities of anticoagulants to ensure that a completely filled tube will be effectively

anticoagulated. Underfilling these tubes disrupts the proper blood-to-anticoagulant ratio, which dilutes the specimen, causes excessive anticoagulation, and contributes to erroneous results.

1. Blue top tubes containing sodium citrate MUST be completely filled with their stated volume.
2. Other tubes with additives should be filled to at least 75% of their stated volume.
3. Low-volume draw tubes which are used with difficult venipunctures or infants, children, or geriatrics, contain less vacuum and proportionally less anticoagulant. These tubes may be the same size as regular, full-volume tubes, but will not fill to the same level. Most manufacturers place a line on the label of these tubes to approximate their maximum fill level.

Z. Problems with the Patient:

1. All health professionals should always be watching for signs that the patient might faint during or after a venipuncture. Always observe for signs of vertigo (dizziness), syncope (fainting), or unexpected non-responsiveness. This is especially important for outpatient draws. Pallor, perspiration, anxiety, light-headedness, hyperventilation, and nausea can preempt a loss of consciousness. Make it a habit to ask patients if they feel all right, but don't rely on their answers totally, especially in the presence of any of the above symptoms. If the patient demonstrates any of these signs, do not attempt to walk the patient to a bed. Where practical, lower the patient's head to increase the supply of oxygenated blood to the brain and loosen tight clothing. Ammonia inhalants should be used conservatively as its use can induce an asthma attack if the patient is asthmatic. For Pathology Department at NMMC-Tupelo and Women's Hospital, refer to Patient Care Services Policy Advanced Lifesaving Emergency Response Team (ALERT) and dial 60 to issue the alert.
2. In dealing with a patient with nausea, make the patient as comfortable as possible, instruct them to breathe deeply and slowly, apply cold compresses to their forehead, and for Pathology Department at NMMC-Tupelo and Women's Hospital, refer to Patient Care Services Policy Advanced Lifesaving Emergency Response Team (ALERT) and dial 60 to issue the alert.
3. If a patient is vomiting, give the patient an emesis basin or carton, and have tissues ready. Give them water to rinse out his/her mouth and for Pathology Department at NMMC-Tupelo and Women's Hospital, refer to Patient Care Services Policy Advanced Lifesaving Emergency Response Team (ALERT) and dial 60 to issue the alert.
4. If a patient begins having convulsions, for Pathology Department at NMMC-Tupelo and Women's Hospital, refer to Patient Care Services Policy Advanced Lifesaving Emergency Response Team (ALERT) and dial 60 to issue the alert. Try to prevent the patient from injuring himself/herself. Do not restrain the movements of the patient's extremities completely, but try to prevent him/her from being injured.

AA. Special Situations:

1. Time intervals: Some specimens need to be taken at timed intervals due to medications, fasting requirements, and/or biological variations (circadian rhythms). It is important that collection of specimens for timed tests be obtained at the precisely specified interval. Appropriate directions should be given to obtain these specimens accurately.

2. Isolated patients: Follow the facility's universal precaution procedures.
3. Indwelling Lines or VADs:

The phlebotomist should not draw blood from indwelling cardiovascular (arterial, central venous) or umbilical lines. Cutdowns should not be used either. If the doctor thinks it is necessary to draw from these lines, he/she or other qualified personnel will do so. If the specimen is obtained from any of these lines, the test request should indicate the fact.

An adequate amount of blood must be withdrawn from the line and discarded before a specimen is drawn to ensure that the actual specimen is not diluted or contaminated with flush solution. Discard volume is dependent on the dead space volume of the particular line. Discarding two times the dead space volume is recommended for non-coagulation testing. For coagulation testing, the line should be flushed with saline and the first 5 mL of blood or six times the dead space volume of the catheter being used discarded. The test request should indicate this event.

**NOTE:** Under certain circumstances, blood specimens for clinical laboratory testing may be drawn from a vascular access device (VAD) using a blood collection system or a syringe. When obtaining a blood specimen from a VAD, the components of the blood collection system (VAD, connecting device, syringe, needle, and collection device) should be checked to ensure compatibility to avoid air leaks, which may cause hemolysis and incorrect draw volumes. Collection of the blood through the lines that have been previously flushed with heparin should be avoided, if possible. If the blood must be drawn through a VAD, possible heparin contamination and specimen dilution should be considered. The line should be flushed with 5 mL of saline, and the first 5 mL of blood or six dead space volumes of the VAD discarded.

4. Intravenous Lines:  
Collecting blood from an arm that is being infused with IV fluid carries a potential risk for erroneous and misleading test results. Whenever possible, blood must be collected from the opposite arm when an IV fluid (including transfused blood products) is being administered into a patient's arm. When not possible, collections from an arm in which fluids are being infused should be below the IV site. Specimen collections above an IV site have a very high chance of contamination with fluid and/or medications and are not recommended unless all other options have been exhausted.

- a. Collecting blood below an active intravenous (IV) site:

**NOTE:** These draws should be avoided if at all possible. However, it is conceivable that circumstances can preclude venous access in any other site. In the absence of other acceptable sites, a venipuncture below an active IV can be performed minimizing specimen contamination if the following steps are taken:

1. Tighten the tourniquet below the IV site and above the intended puncture site.
2. Perform the puncture as usual.
3. Document in collection manager that the puncture was performed below an active site.

- b. Collecting blood above an active intravenous (IV) site:

1. Ask the responsible health care personnel to turn off the IV infusion for at least two minutes before venipuncture. Care should be taken to ensure that the flow has been completely discontinued.

2. Apply the tourniquet just above the IV, but not so close that it will impede the procedure or constrict the catheter within the vein.
3. Perform the venipuncture. Alert the responsible health care professional that the specimen collection has been completed and the infusion may be restarted.
4. Document in collection manager that the specimen was obtained above an active IV that had been turned off for two minutes.

BB. Leaving the Room:

1. Upon leaving the room of the patient, take extra care to return the room to its previous arrangement. If bedside trays, chairs, wastebaskets, bedside rails, and other items were moved, return them for the convenience and safety of the patient. If the patient has to stretch or get out of bed to retrieve an item that has been displaced, a fall or injury could occur. Make no attempt to satisfy a patient's request for water, ambulation, and the like without making sure such actions are consistent with the patient care plan and checking with a member of the patient's care team.
2. If the patient is an outpatient, escort the patient from the drawing room.
3. It is imperative that all persons performing specimen collections take extra precautions to retrieve all papers, supplies, and equipment from the crib or bed of a child. Small items can easily be ingested and cause suffocation; used sharps can inflict serious injury. A complete accounting of all items used in the area must be performed before leaving the room.

VII. CALCULATIONS: N/A

VIII. REPORTING RESULTS: N/A

IX. PROCEDURE NOTES:

- A. Certain laboratory tests require that the blood specimen drawn by venipuncture be handled in a very specific manner. These specific requirements are listed in each procedure.
- B. Under no circumstances should a needle be recapped with a two-handed recapping method.
- C. Refer to Infection Control policies for appropriate PPE (Personal Protective Equipment) to wear and procedures to follow when procuring specimens from persons in isolation.

X. LIMITATIONS OF PROCEDURE: N/A

XI. REFERENCES:

Procedures for the Collection of Diagnostic Blood Specimens by Venipuncture, Clinical and Laboratory Standards Institute, 7<sup>th</sup> Edition, 2017.

Ernst, Dennis J and Catherine, Phlebotomy for Nurses and Nursing Personnel, Health Star Press, 2001, pp. 15-147.

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2/13/19