

Fairview Health Services
 Department Laboratory /Nursing
 Section Acute Care: Collection
 Category Provision of Care

Subject BLOOD COLLECTION BY VENIPUNCTURE

Purpose Ensure consistency of practice to preserve condition and availability of patient's veins.
 Ensure accurate results through collection of quality blood specimen.

Policy Only personnel competent in venipuncture should perform this procedure.

Procedure BLOOD COLLECTION

1. Identify the Patient

All patients must be positively identified before the specimen collection is performed.

- a. For inpatients, the patient's ID band must exactly match the full name and identification number on the request forms and all specimen labels or a match must be performed using barcode technology.
- b. For outpatients, ask the patient to state his or her full name and birthdate.

2. Considerations

- a. Respect patient and physician confidentiality. Ask permission to collect the blood specimen if the physician or nurse is consulting with the patient.
- b. Identify allergies to latex, bandaids, iodine, alcohol or tape.
- c. Check communication board in patient's room for special needs, such as hard of hearing or directions to avoid left or right arm.
- d. Wait a minimum of five minutes after infusion of blood products is complete before performing collection.
- e. Evaluate appropriateness of timing for blood collection, e.g., fasting, posture, drug dosing, etc.
- f. Refer to Age Related Guidelines for additional information.
- g. Minimize blood loss on all patients. Collection of volumes in excess of guidelines listed below must be approved by patient's physician.

MAXIMUM BLOOD COLLECTION VOLUME

Patient Body Weight		Inpatient [^]	Outpatient [^]
lbs.	kg	mL/collection	mL/24 hours
3	1.4	1.5	5
5	2.3	2.5	8
10	4.5	7	15
15	6.8	11	22
20	9.1	15	30
30	13.6	22	45
40	18.2	30	60
50	22.7	35	75
75	34.1	55	110
≥100	≥45.5	70	135

[^]Outpatient maximum collection volume represents 4% of total blood volume; inpatient maximum collection volume represents 1.3-2% of total blood volume. (Total blood volume assumes 85 mL/kg for infants, 80 mL/kg for children, and 75 mL/kg for adults.) **Inpatient maximum collection/24 hours should not exceed outpatient limits.**

- h. Precautions when performing the venipuncture:
 - If swelling is noticed during venipuncture, immediately release tourniquet, remove needle and apply pressure using gauze pad.
 - On patients with a bleeding disorder (Hemophilia or von Willebrand's Disease), use a 21 gauge butterfly needle or smaller. Do not probe if blood is not obtained immediately. Remove needle and start over.

- If your first attempt fails, pull needle back *slowly*, relocate vein, pull skin taut (anchor vein), and redirect needle. Lateral needle relocation should never be attempted to access the basilic vein, since nerves and the brachial artery are in close proximity.
- Do not attempt to stick patient more than two times; contact another phlebotomist.
- If patient feels a shooting, electric-like pain, tingling, or numbness, remove the needle, notify nurse or physician, and document the incident.
- If blood flow ceases:
 - Raise or lower angle of needle, this may free bevel of needle from wall of vein.
 - Pull needle back *slowly*. (Needle may have penetrated wall of vein while changing tubes.)
 - Pull skin taut from above or below site. (This may also help to free the needle from wall of vein.)
 - Rotate needle one half turn.
 - If venipuncture attempt fails, a new sterile needle/butterfly must be used.

3. Properly Position the Patient

- a. Hospitalized patients should lie in bed in comfortable position. Extend arm so as to form a straight line from shoulder to wrist. Add support under arm with a pillow if necessary. Practice self care to prevent injuries, i.e., raise the bed to perform collection; remember to return the bed to its former position when collection is complete.
- b. Ambulatory patients should sit in a chair with arms to protect fainting patients from falls. Place arm on a table or armrest in a straight line from shoulder to wrist. The arm should be slightly bent at the elbow. If support is needed, ask patient to form a fist with the other hand and place it under elbow.
- c. Confirm the patient does not have anything in his/her mouth.

4. Assemble Supplies

- a. Gloves (non-sterile)
- b. Chlorhexidine gluconate scrub or povidone-iodine prep (<2 months old) if blood culture is to be collected.
- c. Alcohol prep pad or povidone-iodine prep
- d. Gauze
- e. Tourniquet
- f. Evacuated collection tubes
- g. Evacuated tube holder
- h. Multisample needle with safety guard -or- safety-lock butterfly needle
- i. Adapter used with butterfly and evacuated system (if necessary)
- j. Syringes used with butterfly (if necessary)
- k. Multi-sample blood transfer device (if necessary)
- l. Band-aids, tape or pressure bandages

5. Infection Control for Blood Collection

CAUTION: Always wear gloves and observe standard precautions when collecting biological specimens.

- a. Perform hand hygiene before patient contact.
- b. Change gloves between each patient. Perform hand hygiene after glove removal.
- c. Discard or clean tourniquet after collection.

d. Never take venipuncture trays into isolation rooms.

6. Apply the Tourniquet

A tourniquet is used to occlude venous flow and cause the vein to swell, making the vein more prominent. A tourniquet should *not* stop arterial flow.

a. Apply tourniquet 3-4 inches above venipuncture site. If the patient has prominent veins, tourniquet application can wait until after cleansing, just prior to needle insertion.

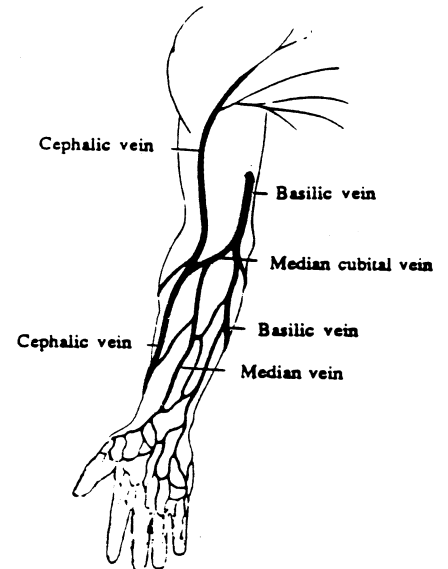
b. Precautions when using a tourniquet:

- Do not apply tourniquet above a central venous catheter or midline, on arm with a kidney access device (Cannula, Fistula, Shunt), or the side of a mastectomy.
- The tourniquet should not be left on the site for longer than one minute during the actual collection due to the possible occurrence of hemoconcentration and infiltration of blood into tissue.
- If the patient is sensitive to the tourniquet, apply over sleeve or towel.

7. Select the Vein Site

a. The larger median cubital **and** cephalic veins (in the antecubital area) are used most frequently. The wrist, hand, lower extremity, ankle and foot veins are also acceptable for venipuncture. The vein sites should be examined and considered in the following order:

- Median Cubital
- Cephalic
- Basilic (avoid if possible because it is closest to the brachial artery and median nerve)
- Wrist Area (top and side only)
- Back of the Hand
- Lower Extremity/Foot/Ankle (obtain permission documented within the patient's chart from the physician for patients greater than one year of age; avoid performing on diabetic patients or those with obvious circulatory problems)
- Scalp (performed only by highly experienced phlebotomists)



b. Using index finger, palpate (feel) for vein. Even if the vein can be seen, palpate to determine exact location and direction. A vein feels much like an elastic tube and "gives" under pressure. Veins do not pulsate like arteries. If the vein is difficult to locate, examine other arm. *Never leave the tourniquet on longer than one minute during the examination.* If more time is needed, release the tourniquet and then re-apply.

If a vein is not readily apparent, a number of techniques may be used to make palpation easier:

- Massage arm or apply warm cloth to dilate vein.
- Bend arm very slightly, relaxing the muscles of the antecubital.
- Lower arm below the heart to allow veins to fill to capacity.
- Close patient's hand to dilate vein. *Avoid having the patient "pump" the hand as this will falsely elevate some tests.*

c. Factors to consider in site selection:

- Avoid areas with extensive scarring.
- **Avoid veins in close proximity to an artery, as indicated by presence of a pulse.**
- Avoid areas on side mastectomy was performed because of lymphostasis and susceptibility to infection. If patient has had a mastectomy on both sides obtain physician's permission documented within patient chart **before using either side for collection.**
- Avoid puncturing through a hematoma area that may cause erroneous test results, perform venipuncture distal to (below) hematoma.
- Do not perform venipuncture in an arm with a cannula, fistula, or shunt. These are venous access devices reserved for kidney dialysis. If the device is no longer used or not working, venipuncture may be performed on that arm with physician consultation.
- Venipuncture may be performed using cannula, fistula or shunt only by trained personnel with physician's written order.
- If only available site is arm with intravenous Infusion (IV), **request IV infusion to be turned off for at least two minutes.** Apply tourniquet **below IV site** and perform venipuncture in top or side of wrist or hand. **Request IV infusion to be resumed. Document that venipuncture was performed below infusion and from which arm.**
- Venipuncture performed **above IV site is not recommended and should be attempted only with physician or nurse permission. All other alternatives such as hot packing and evaluation by experienced phlebotomists should be exhausted before choosing this site. Avoid in particular if analyte to be measured is infusing.** Ask patient's nurse to turn off IV for 2 minutes. Perform collection and ask patient's nurse to turn on IV. Document that venipuncture was performed **above the** infusion site and from which arm.
- If only available site is arm with heparin locked catheter apply tourniquet distal to (below) catheter and perform venipuncture in top or side of wrist or hand. If catheter is too close to wrist/hand, perform venipuncture proximal to (above) catheter. *Avoid applying the tourniquet above the catheter.*

8. Cleanse the Venipuncture Site

If the tourniquet was applied during vein selection, release during the cleansing process. Cleanse the site to prevent any chemical or microbial contamination of either the patient or the specimen using one of the following methods:

a. Cleansing for routine specimen collection:

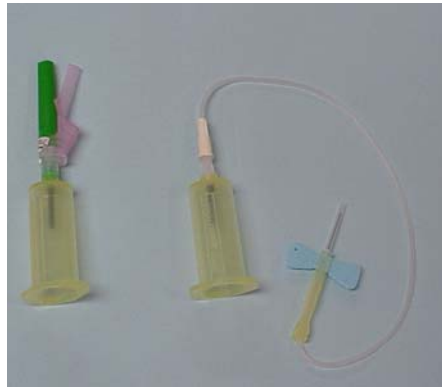
- 1) Using sterile alcohol prep pad (70% isopropyl alcohol), cleanse site using concentric outward-moving circles.
- 2) Allow site to air dry. Do not blow on site.

- b. Cleansing for blood culture collection: Refer to the "Blood Specimen Collection for Blood Culture" procedure.
- c. Cleansing for volatile (alcohol) screen:
 - 1) *Do not alcohol prep to cleanse site.*
 - 2) Cleanse site using povidone-iodine prep.

If puncture site must be touched prior to venipuncture, site should be cleansed again. A gloved finger used to palpate just above puncture site should first be cleansed in same manner as site.

9. Perform the Venipuncture

- a. Reapply tourniquet being careful not to touch cleansed area.



- b. Using an evacuated system and needle with safety-guard method:
The evacuated system is preferred.
 - 1) Thread appropriate needle into tube/needle holder until it is secure.
 - 2) Insert collection tube into holder. Do not push tube onto needle as it will cause a loss of vacuum.
 - 3) Hold needle with bevel up, at approximately 30° angle to skin in a direct line with vein.
 - 4) Anchor vein well from below puncture site. (Inform patient venipuncture is about to occur.)
 - 5) Insert needle into vein with one smooth motion.
 - 6) As soon as needle enters vein, push collection tube into holder as far as it will go. Do not allow contents of the tube to contact the stopper.
 - 7) Steady tube holder so needle is not inadvertently removed from vein.
 - 8) If multiple tubes are collected, remove tube as soon as blood flow stops, gently invert tube 5-10 times to mix additive, and insert next tube into holder. The recommended order of collection is outlined in Step 10.
 - 9) Always remove the last tube collected from tube/needle holder prior to withdrawing the needle from the vein.
- c. Using a butterfly needle with safety lock:
The butterfly needle is generally used when collecting blood from an individual with small, fragile, "rolly" veins or when collecting from veins in wrist, hand, ankle, or foot. A butterfly needle is *always* used when collecting blood from a patient with known bleeding disorder.
 - 1) Attach tube holder and adapter to end of butterfly needle tubing.
 - 2) Hold butterfly needle with bevel up, at approximately 30° angle to skin and in a direct line with vein.

- 3) Anchor vein well from below puncture site. Inform patient venipuncture is about to occur.
- 4) Insert needle into vein with one smooth motion.

If evacuated system is used, as soon as needle enters vein, insert collection tube into holder as far as it will go. If multiple tubes are collected, remove tube as soon as blood flow stops, gently invert tube 5-10 times to mix additive, and insert next tube into holder.

If syringe is used, do not pull on plunger too rapidly or forcefully. Because the clotting process is activated immediately, it is important to transfer blood quickly. The recommended order of collection is outlined in Step 10.

10. Recommended Order of Tube Collection

- a. Collect a coagulation lead discard tube:
 - Prior to collecting any special coagulation testing
 - Prior to collecting any coagulation testing (routine and special) if using a butterfly/evacuation system. This is to fill the butterfly tubing first and avoid collecting an underfilled coagulation tube.
- b. Fill collection tubes in recommended order to prevent false results, e.g. contamination with another tube's additive, or activation of clotting process prior to fill.
- c. Invert tubes containing additive 5-10 times to mix.
- d. The following order of draw is recommended for both evacuated tubes, and syringe transfer of blood to multiple tubes:

ORDER OF COLLECTION		
1 st	Blood, Fungal, AFB Culture	Aerobic, anaerobic or mycobacterial 13A bottles, or Yellow/black fungal culture tube
2 nd	Coagulation	Light blue (3.2% buffered citrate) tube
3 rd	ESR	Black tube for ESR at some sites
4 th	Serum	Gold or red/black (gel) tube, red (plain) tube
5 th	Heparin	Green (Na heparin) tube Green (Li heparin) tube
6 th	EDTA	Purple (EDTA) tube
7 th	NaF	Gray (NaF + K-Oxalate) tube
8 th	ACD	Yellow (ACD, Solution A or B) tube
9 th	Blood Gas	Dry heparin syringe
10 th	Trace Metal	Dark Blue (nonadditive or EDTA) tube

11. Release the Tourniquet

Release tourniquet as soon as blood enters tube, *within one minute*. Exception: On patients with fragile veins that might collapse or other situations where release of tourniquet might result in stoppage of blood flow, tourniquet is sometimes left on until last tube is filled.

12. Remove the Needle

- a. Place clean gauze over venipuncture site and remove needle quickly with one smooth motion.
- b. Contaminated needles may not be recapped or removed. For vacutainer needle, click needle into safety guard by pressing guard on a hard surface. For butterfly needle, activate safety lock.
- c. Immediately dispose of needle and evacuated tube holder or syringe into puncture resistant plastic sharps container.

13. If Syringe Was Used, Transfer Specimen to Collection Tubes

- a. Attach syringe to a multi-sample blood transfer device. Insert blood culture bottle(s)/collection tube(s), allow vacuum to fill and gently invert tube 5-10 times (do not remove stoppers of evacuated tubes to transfer blood to multiple tubes);or
- b. Remove plastic cap on microcontainer tubes and slowly expel blood down side of tube. Securely replace cap and gently invert tubes 5-10 times.

14. Apply Pressure to the Puncture Site

- a. Apply direct pressure to puncture site for 30-60 seconds or until bleeding stops. If patient is willing and able, it is acceptable to allow patient to apply pressure. DO NOT allow patient (or yourself) to place gauze on site and then bend arm. This method does not provide adequate pressure and may result in formation of a hematoma.
- b. If puncture site continues to bleed slightly, apply a pressure bandage to site using clean folded gauze underneath band-aid or paper tape. Tell patient to leave the bandage on site for at least 15 minutes. Use precaution with infants and young children who could aspirate the bandage and choke.
- c. If puncture site bleeds heavily, apply direct pressure for an additional 1- 2 minutes or until bleeding stops or slows down. Apply pressure dressing to site using gauze pad underneath elastic pressure dressing (e.g., Coban or Co-Flex). Report extended bleeding time to patient's nurse.
- d. For patients with a known bleeding disorder (Hemophilia, von Willebrand's Disease, or Hemophilia Clinic patient), immediately after removing butterfly needle apply direct pressure to puncture site until bleeding stops for up to 10 minutes, even if blood was not obtained. Apply clean gauze pad underneath elastic pressure dressing (e.g., Coban or Co-Flex) on all puncture sites. Use figure eight pattern when wrapping the elastic bandage.
 - For inpatients, dressing must remain for at least 2 hours (12 hours is preferred). Notify patient's nurse elastic pressure dressing must remain on puncture site(s) for at least 2 hours.
 - For outpatients, elastic pressure dressing must remain on site(s) for 12 hours.

15. Label the Specimen Containers

Apply the labels to the containers at the collection site after the blood has been collected. Check the name on each label to verify again that the name on the label matches the patient's name or use barcode technology. Sign each tube with phlebotomist initials or identification number to identify person collecting specimen and taking responsibility for correctly identifying patient and labeling tubes. Refer to the specimen labeling procedure.

16. Handle Blood According to Specimen Requirements

Handle blood specimens according to specimen requirement, e.g., place specimen tube on ice, at 37 C, or protect from light as needed. Remove air from blood gas syringe.

17. Prepare the Specimen Containers for Transport to the Lab

Transport the labeled blood specimen containers with the required request forms to the laboratory using a sealed specimen transport bag.

- References
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