

UCSF Clinical Labs

ROUTINE VENIPUNCTURE & CAPILLARY SAMPLE COLLECTION

PRINCIPLE:

Laboratory test results are only as good as the specimen, and the specimen is only as good as the method by which it is collected, handled, and processed.

The procedures listed below are designed to provide minimum instruction on obtaining a quality blood sample. Consideration is placed on comfort to the patient, safety to patient and phlebotomist, and the integrity of the sample.

Collection procedures are listed for both venous and capillary blood specimens, using vacutainer and capillary methods on adult patients.

PURPOSE

This procedure outlines the steps for collection of clinical laboratory specimen for diagnostic purposes by venipuncture and/or skin puncture.

SCOPE/RESPONSIBILITY

Venipuncture is performed when ordered by the patient's health care provider. Licensed individuals authorized by their scope of practice can perform phlebotomy such as clinical laboratory scientists, registered nurses, licensed physicians, physician assistant, Nurse Practitioner and LVN provided they demonstrate competency in the performance of phlebotomy.

MATERIALS/EQUIPMENT:

Venipuncture only:

- Tourniquet – Latex free, discard after each use
- Gloves-Latex free, discard after each use. Proper fit is important for safety. If too small, the gloves may tear. If too large, items may be more easily dropped. Replace gloves immediately when ripped, torn, or contaminated (soiled or wet). Do not wash or disinfect gloves for reuse.
- Vacutainer safety needles
- Goggles
- 70% isopropyl alcohol wipes
- Sani Wipes
- Winged collection (butterfly) safety needles

- Specimen transport (zip-lock) bag with biohazard label
- Adhesive bandage and/or tape
- Adhesive bandages – Gauze or paper tape preferred should never be applied to patients under two years of age unless the patient is under close observation until the bandage is removed. Small children may choke on bandages.
- Needle holder – Single patient use. Discard adaptor after use.
- Vacutainer collection tube(s)
- Blood culture bottles
- Puncture resistant disposal container
- Ice for transporting specimen when indicated

Capillary collection only:

- Sterile blood lancets (should be < 2.0 mm for newborns)
- Microtainer tube and extender
- Microhematocrit tubes and sealant

Blood Culture collection supplies:

- Chlorhexidine gluconate preps
- Disposable gloves
- Blood culture bottles
- Puncture resistant sharps container

Note that all phlebotomy supplies are kept in a locked cabinet on 9 Long.

PATIENT IDENTIFICATION:

Inpatients: Patients in the hospital should be wearing an identification bracelet that includes their last and first name, date of birth and a hospital number. If the patient does not have an ID bracelet, ask the nurse responsible for the patient to positively identify the patient and to place an ID bracelet on the patient.

1. Ask the patient to verbally state or spell their complete name and date of birth. Do not ask the patient to confirm their identity by requesting a yes/no response. Compare this information with the name on the attached wrist band.
2. Patients who are not capable of giving their name may be identified through verbal verification by another adult who can personally identify the patient or a UCSF staff member providing care to the patient. Each specimen label must then be compared to the attached patient ID band prior to collection. First and last name and MRN must be verified.
3. Use your CareFusion device according to the instruction in the “CareFusion Procedure”

SPECIMEN IDENTIFICATION AND LABELING:

All specimens submitted to the Clinical labs for testing must be appropriately labeled to assure positive identification and optimum integrity of patient specimens from the time of collection until testing is completed and the result reported. All specimens must be labeled at the time of collection; in the presence of the patient, to maintain identity throughout the pre-analytical, analytical, and post-analytical processes.

If there is a question as to the integrity and/or identification of a sample, the laboratory will reject the sample and request recollection. If extenuating circumstances exist that prevent recollection of the sample, and the physician or nurse requests that the test be performed on a sample that cannot be positively identified, the laboratory will analyze the sample by having the ordering nurse or physician come to the laboratory to personally identify and relabel the request slip and patient sample.

PATIENT PREPARATION:

Hands must be washed prior to and after all phlebotomy procedures. Use soap and work up a generous lather, scrub vigorously for 10 to 15 seconds, rinse well. A hand sanitizer product also can be used.

Examine the patient's arms and obtain information from the patient as to phlebotomy restrictions (i.e., patient's choice of arms, limitations due to surgeries, nerve damage, mastectomies, etc.).

A physician order is required to draw from the same side as a mastectomy.

Inform the patient of the procedure(s) that you are about to perform and obtain their permission and cooperation. Situations/conditions where the patient is uncooperative should be referred to patient nurse.

Scan the patient ID barcode using your PDA for the morning draws. **For proper use of the PDA (MC-70), refer to the CareFusion (PDA) procedures.**

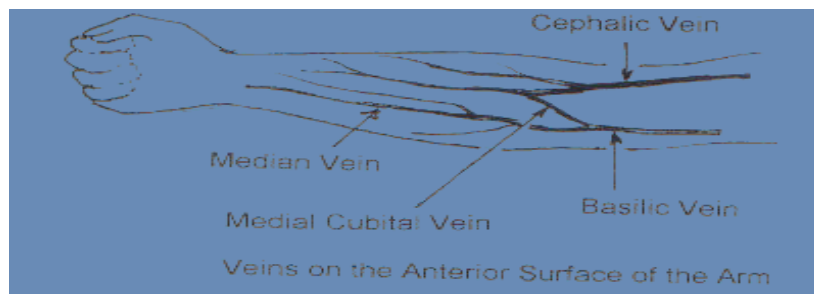
PHLEBOTOMY SAFETY:

- Gloves are to be worn when performing all phlebotomy procedures. Only phlebotomy supplies that are approved by UCSF Clinical Labs should be used.
- All sharps used in phlebotomy must meet OSHA safety standards.
- Dispose of all sharps immediately after use into a sharps container. Needles are to be used only once and never recapped. Do not bend or break needles or remove them from disposable syringes or holders.

PROCEDURES:

Venipuncture Specimens

1. Prepare patient as defined under “Patient Identification” and “Patient Preparation” sections.
2. Scan the patient ID barcode using your PDA for the morning draws. **For proper use of the PDA (MC-70), refer to the CareFusion (PDA) procedures.**
3. Position or instruct the patient so that the patient’s arm is comfortably extended. Phlebotomy should never be performed while the patient is standing.
4. Wash hands. Put on properly fitting gloves.
5. Apply the tourniquet three to four inches above the venipuncture site with enough tension to compress the vein, but not the artery.
6. Palpate or feel for the vein even when it can be seen.
7. If a vein is difficult to find, it may become easier to see after massaging the arm from the wrist to elbow which forces blood into the vein. A warm moist towel (warm to the touch but not hot) can also be used. You may need to examine the patient’s other arm if you are having difficulty finding a vein. You may select a dorsal hand or wrist vein and collect with a smaller gauge needle (22g or 23g).
8. Release the tourniquet.
Note: Hemoconcentration will occur after one minute. If a tourniquet has been applied for longer than 1 minute while you searched for a vein, release it for at least 2 minutes, reapply the tourniquet and relocate the vein.
9. Cleanse the area for venipuncture in a circular motion from the center outward with a 70% isopropyl alcohol pad. Use betadine or soap and water for ETOH (alcohol) draws. Do not use 70% Alcohol or Chlorhexidine. Allow to air dry.
10. Reapply tourniquet.
11. Anchor one of the veins in the antecubital area of the arm as shown below by placing your free thumb below the venipuncture site where the needle is to enter and pull skin taut.
12. Label drawn tubes and then scan them with your PDA in patient’s room.
13. Rescan the patient ID barcode when you finish drawing the patient. This step will indicate that all ordered patient’s blood has been drawn.



Method: Vacutainer

All needles should be visually inspected for burrs or rough edges before being used.


1. Introduce the Vacutainer needle apparatus with the bevel up at a 15°-25° angle to the skin and parallel to the vein.
2. Once the needle is properly positioned in the vein, anchor the needle by grasping the holder with thumb on top and other fingers under the holder, resting securely on the patient's arm. Push the appropriate Vacutainer tube into the holder with gentle pressure in order to puncture the cap. The tube will fill with blood.
3. If blood flow cannot be established you may:
 - Change the position of the needle, but without probing to see if you can establish blood flow
 - Select another tube in case the first one has lost its vacuum
 - If unable to obtain blood, release the tourniquet, remove the needle and start over in the other arm
4. Watch the blood as it flows into the Vacutainer tube until collection is complete.
5. Gently invert all tubes 5-10 times after filling.
6. Release tourniquet within one minute.
7. When all tubes are filled, withdraw the last tube, place gauze square over the site and withdraw the needle. Activate the safety device.
8. Apply pressure to the site until bleeding has stopped.
9. Discard the activated needle and holder into the puncture resistant sharps container. Never re-cap the needle.
10. Inspect the puncture wound. When bleeding has stopped, apply a bandage. If bleeding continues, apply pressure for an additional 3-5 minutes. Prolonged bleeding may be related to the patient's disease.
NOTE: Adhesive bandages – Gauze or paper tape preferred should never be applied to patients under **two** years of age unless the patient is under close observation. Small children may choke on bandages.
11. Label specimen tubes before leaving the patient room.
For Blood Bank samples sign and date the tube label. For MDs, the signature criteria is first initial and last name or last name and 5 digit MD number. For all others – first initial and last name.
12. Place the label on the drawn tubes as indicated in the picture below:



- Fill all tubes completely

13. Compare the labeled specimen to the patient's ID bracelet and Req.

For multiple draws, the order of tubes is as follows:

Plastic Tube (Stopper Color)		Additive
1.		Blood Cultures Broth mixture
2.		Light Blue top tube Sodium Citrate
3.		Gold Stopper Gel separator + clot activator
4.		Red top tube Activated clot tube without gel
5.		Light Green top tube Lithium Heparin + gel separator
6.		Green top tube Sodium Heparin
7.		Lavender top tube EDTA
8.		Gray top tube Oxalate/fluoride
9.		Yellow top tube Acid citrate dextrose A
10.		Royal Blue top tubes • EDTA - Purple strip on label - Draw as #6

** In general, because of the risk of bacterial contamination, if blood cultures are needed they should always be drawn first, the only exception is if trace metal determination(s) (Navy blue top) are requested along with blood culture. In this circumstance, draw the Navy blue top first from one venipuncture, and proceed to perform the remaining collections from a second venipuncture.*

Method: Winged Collection (Butterfly) with evacuated tubes or syringe

Note: This method is used primarily for difficult draws, hand draws, and possibly blood culture collections.

1. Prepare patient as defined under “Patient Identification” and “Patient Preparation” sections. Perform phlebotomy with winged butterfly set using a Vacutainer holder or remove the luer lock at the end of the butterfly tubing and attach a syringe.
2. Wash hands. Put on properly fitting gloves.
3. Holding the wings of the butterfly with your dominant hand and smoothly insert the needle with the bevel up, parallel to the vein, at approximately a 10°-15° angle.
4. Once the needle is properly positioned in the vein, hold one wing of the winged collection set and insert evacuated tubes using the Vacutainer holder according to the order of draw.

NOTE: When using a winged blood collection set (butterfly) 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 butterfly tubing dead space and to assure maintenance of the proper anticoagulant/blood ratio and need not be completely filled. The discard tube should be a coagulation tube.

- For syringe draws**, gently pull on the plunger to allow blood to flow into syringe. Pulling on the plunger too fast may cause possible collapse of the vein and restrict blood flow into the syringe and/or hemolyze the sample.
5. When sufficient blood has been collected, release tourniquet: within one minute. Place gauze over the site and activate the safety feature of the device.
 6. Apply pressure to the site until bleeding has stopped.
 7. Discard the holder and butterfly device into a sharps container.
 8. If a syringe was used with the butterfly, properly discard butterfly device into a sharps container, and attach a transfer device to the syringe. Fill the appropriate tubes without applying force on the plunger. The order in which Vacutainer tubes are filled from the syringe is the same as for the Vacutainer system.
 9. Inspect the puncture wound. When the bleeding has stopped completely, apply a bandage. If bleeding continues, apply pressure for an additional 3-5 minutes. Prolonged bleeding may be related to the patient’s disease or medication.
 10. Label specimen tubes before leaving the patient room.
For BB samples sign and date the tube label. For MDs, the signature criteria is first initial and last name or last name and 5 digit MD number. For all others – first initial and last name.
 11. Compare the labeled specimen(s) to the patient’s ID band and requisition
 12. Wash hands or use hand gel thoroughly before and after every patient encounter.
 13. Don a new pair of gloves for each patient. This is a requirement of OSHA and infection control guidelines.

Blood Drawing Procedure for Patients in Isolation

1. Keep your phlebotomy cart at least 3 feet away from patient arm.
2. Stock your cart with Sani-Plus wipes to clean and disinfect the cart should you get the cart closer than 3 feet of the patient and or soiled with blood.
3. Keep a pair of goggles in your cart in case you have no access to “fluid shield masks”
4. Wash hands thoroughly either with soap and warm water or alcohol gel.
5. Put on required barriers- gloves, gown, mask, etc. The barriers required will be indicated on the isolation sign posted on the patient’s door.
6. Obtain a clean towel or a disposable Chux pad from the linen cart or isolation cart.
7. Gather all of the supplies you will need for the blood draw. Be sure to include extra alcohol wipes. A tourniquet, holder, needles, gauze, and tape may already be in the room. These supplies are considered “dedicated” equipment; once this equipment has been used for this patient it should remain in the room for the remaining time the patient is in isolation.
8. Enter the room and place the towel on the bedside stand or other convenient location. Place your drawing supplies on the towel.
9. Identify the patient by comparing the label name and Medical Record number with the patient’s wristband.
10. Obtain the blood samples- place each tube drawn on the towel as it is collected.
11. Place used needle in the Sharps container in the room.
12. Discard any used disposable supplies in the waste basket.
13. Remove your gloves and discard them in the waste basket.
14. Place labels on each tube at the bedside.
15. Put drawn tubes in biohazard bag. (Use paper towels to open the door when exiting.)
16. Place the towel in the dirty linen bag or in the waste basket if disposable.
17. Wash your hands thoroughly with alcohol gel before leaving patient room.
NOTE: If you see a “GREEN SIGN” on patient door, it means patient is on Contact Precautions for Clostridium difficile, in this case wash your hands with soap and water **NOT** alcohol gel.
18. For further information about our precaution policies, visit this site:
<http://infectioncontrol.ucsfmedicalcenter.org/ICMANUAL2007/Section1/Sec%201.1%20STD%20&%20Trans%20Precautions.pdf>

General Policies and Guidelines

1. Never attempt a venipuncture more than twice. After two attempts, have another phlebotomist attempt venipuncture. After two phlebotomists have attempted to obtain the blood specimen, service is to be notified.
2. Never draw in any area that contains a hematoma, edema, burns, scars and **AV fistulas**.
3. Any patient who inquires about his/her laboratory tests or results should be referred to his/her physician.
4. The patient has the **right to refuse** laboratory tests. Forceful restraining of a patient for the purpose of obtaining a blood specimen may be interpreted as assault and battery.
5. If patient has **no armband** do not draw specimen until charge nurse has identified the patient or nurse caring for the patient and an armband has been placed on patient's wrist.
6. The patient must be treated with considerate and respectful care.
7. Identify yourself to the patient. Hospital identification badges must be worn so that they are visible to the patient.
8. The patient must be assured of his/her own safety. Bed rails that have been lowered to facilitate the venipuncture must be raised before leaving the bedside. Restraints that have been placed on the patient should not be removed by the phlebotomist
9. Needles should not be bent, broken, or recapped.
10. All accidental needlesticks **MUST BE REPORTED** to the supervisor or designate as soon as possible after the occurrence. The employee will report to the Occupational Health Service (or Emergency Department if after hours) for treatment and documentation.

Avoiding Common Collection Errors

Careful attention to routine procedures can eliminate most of the errors outlined in this section. Materials provided by the laboratory for specimen collection can maintain the quality of the specimen only when they are used in strict accordance with the instructions provided. To ensure a sufficient quantity of each type of specimen indicated for the procedures to be performed, please consult the volume requirements published in the Test Library.

GENERAL COLLECTION ERRORS

Some of the common errors affecting all types of specimens include:

- Failure to label a specimen correctly and to provide all pertinent information required on the test request form.
- Insufficient quantity of specimen to run test or QNS (quantity not sufficient). Failure to use the correct container/tube for appropriate specimen preservation.
- Inaccurate and incomplete patient instructions prior to collection.

SERUM PREPARATION ERRORS

The most common serum preparation errors include:

- Failure to separate serum from red cells within 60 minutes of venipuncture.
- Failure to allow the specimens to clot before centrifugation.
- Hemolysis: red blood cells break down and components spill into serum. Causes and prevention are discussed under the section on hemolysis below.
- Lipemia: cloudy or milky serum sometimes due to the patient's diet (discussed under the section on lipemia).

PLASMA PREPARATION ERRORS

The most common errors in the preparation of plasma include:

- Failure to collect specimen in correct additive.
- Failure to mix specimen with additive immediately after collection.
- Hemolysis or damage to red blood cells breakdown.
- Incomplete filling of the tube, thereby creating a dilution factor excessive for total specimen volume (QNS).
- Failure to separate plasma from cells within 30-45 minutes of venipuncture for those specimens requiring this step.
- Failure to label transport tubes as "plasma".
- Failure to indicate type of anticoagulant (eg, "EDTA", "citrate", etc.)

HEMOLYSIS

In general, grossly or even moderately hemolyzed blood specimens may not be acceptable for testing. Hemolysis occurs when the red cells rupture and hemoglobin and other intracellular components spill into the serum. Hemolyzed serum or plasma is pink or red, rather than the normal clear straw or pale yellow color.

Grossly hemolyzed samples may be rejected. A sample visibly hemolyzed will be rejected for the following analytes: Acid Phosphatase, Alkaline Phosphatase Isoenzymes, Alkaline Phosphatase, Amylase, Amylase Isoenzymes, ALT, AST, Bilirubin, CK Isoenzymes, CK-MB, CPK Folate, Glucose, Lipase, LDH, LDH Isoenzymes, Phosphorous, Potassium, RPR, Type and Crossmatch, Type and Screen, VDRL(CSF), Alpha-fetoprotein.

Hemolysis can be caused by:

- mixing tubes too vigorously or using rough handling during transport
- drawing blood from a vein that has a hematoma
- pulling back the plunger on a syringe too quickly
- using a needle with too small of a bore for the venipuncture
- using too large a tube when using a small diameter butterfly needle
- frothing of the blood caused by improper fit of the needle on a syringe.
- forcing the blood from a syringe into an evacuated tube

Most causes of hemolysis can be avoided by observing the steps listed.

- For routine collections, use a 20- to 22-gauge needle. (On occasion, however, it may be necessary to use a 23-gauge needle for patients from elderly and pediatric populations with small or difficult veins.)
- If there is air leakage around the needle or loss of vacuum in the tube, replace the vacuum tube.
- Collect blood in room temperature containers unless the specimen requirement specifies otherwise.
- When there is difficulty accessing a vein or when a vacuum tube fills too slowly due to a difficult venipuncture, damage to the red blood cells may result. Correct by collecting a fresh tube when blood flow is established or select another puncture site and, using sterile/unused equipment, collect a second specimen. Also, a blood pressure cuff will reduce trauma to fragile red blood cells.
- Do not remove the needle from the vein with the vacuum tube engaged. This applies to both the last tube collected during a routine venipuncture and to tubes collected during a difficult procedure.
- Premature removal of the tube causes a rush of air to enter the tube, which may result in damage to the red cells.
- Be as gentle as possible, drawing the blood evenly. Too much pressure in drawing blood into a syringe or forcefully ejecting blood into a collection tube from a syringe may damage red cells.
- Allow collection site to dry after cleaning. Alcohol used to clean the puncture site may cause contamination in a tube.
- Do not collect a specimen in a hematoma.

PROPER COLLECTION OF TUBES WITH ANTICOAGULANT

(eg, anticoagulants, preservatives, clot activators). When using vacuum tubes containing an additive:

Blood collection tubes with anticoagulant should be inverted gently as soon after collection as possible to prevent clotting. All blood collection tubes must be filled to the fill line in order to prevent dilution of blood components. **Improperly filled Citrate (light blue) tubes may be rejected.**

Deliver the samples to the laboratory promptly. Valid measurement of analytes in serum or plasma requires prompt separation from the blood cells and analysis in the laboratory. When left unseparated, analytes shift between the cells and the plasma or serum and glucose, is consumed. In addition, some analytes are unstable at room temperature.

- Tap the tube gently at a point just below the stopper to release any additive adhering to the tube or stopper.
- Permit the tube to fill completely to ensure the proper ratio of blood to additive. There will be some dead space at the top of the tube.
- To ensure adequate mixing of blood with the anticoagulant or preservative, use a slow rolling wrist motion to invert the tube gently five or

six times. Failure to invert tubes may lead to the formation of microscopic clots. Rapid wrist motion or vigorous shaking may contribute to hemolysis.

- Check to see that all the preservative or anticoagulant is dissolved. If any preservative powder is visible, continue inverting the tube slowly until the powder is dissolved.
- If multiple samples are being drawn, invert each specimen as soon as it is drawn. Do not delay. Place the tube upright in a rack as quickly as possible after collection.

Note: The serum-separator tube is an additive tube and should be inverted five to six times after collection. Allow the tube to stand 15-30 minutes for complete clotting to occur prior to centrifugation.

VACUUM TUBES WITHOUT ANTICOAGULANTS

When using vacuum tubes:

- Permit the tube to fill completely.
- Let the specimen stand for a minimum of 30 minutes and not longer than 60 minutes prior to centrifugation. (CLSI Guidelines recommends no more than 2 hours.) This allows time for the clot to form. If the specimen is allowed to stand for longer than 60 minutes, chemical activity and degeneration of the cells within the tube will take place, and test results may be altered.
- Centrifuge the specimen at the end of the waiting period in strict accordance with the manufacturer's instructions for speed and duration of centrifugation (usually 10-15 minutes).

SPECIMEN CLOTTED

Inadequate mixing of the vacutainer tubes as soon as possible after the phlebotomy will result in the blood not mixing with the anti-coagulant. By gently inverting the vacutainer tube 4-10 times, the blood will mix and clotting will **not** occur.

QUANTITY NOT SUFFICIENT

One of the most common and expensive errors in specimen collection is the submission of an insufficient volume of specimen for testing. The laboratory sends out a report marked QNS (quantity not sufficient), and the patient has to be called back for a repeat collection at additional expense and inconvenience to the patient and to the physician. To ensure an adequate specimen volume:

- Always draw whole blood in an amount 2 times the required volume of serum required for a particular test.

For example, if 4 mL of serum are required, draw at least 8 mL whole blood. If there is difficulty in performing venipuncture, minimum volume may be submitted if it is indicated in the test description. For most profile testing, draw at least two 7-mL serum-separator tubes. If pediatric tubes

are used, be sure to collect an adequate volume of specimen to perform the test.

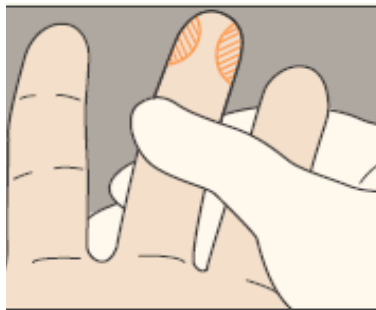
- Provide patients with adequate containers and instructions for 24-hour urine and stool collections.
- For most serum and plasma tests, check to be certain that the drawn tube is half full. Note: Certain tests (eg, prothrombin time) require a 90% to 100% full tube in order to achieve the proper blood-to-anticoagulant ratio; otherwise, the specimen may be found to be QNS.

Skin Puncture for Collection of Capillary Blood Specimens

Method: Finger Puncture

Note: This method is appropriate for pediatric patients who are not walking and for adults. This method is not used on the fingers of infants who are small for their age, premature, or < 3 months of age.

1. Prepare patient as defined under “Patient Identification” and “Patient Preparation” sections.
2. Position or instruct the patient so that the patient’s hand is comfortably extended. Blood collection should never be performed while the patient is standing.
3. Wash hands. Put on properly fitting gloves.
4. Choose a finger that is not cold or swollen. The ring or middle finger is preferred. Cover the site with a warm, moist towel at a temperature no higher than 42 degrees Centigrade (warm but not hot to the touch) for 3-5 minutes. Never use a microwave to heat warming device.
5. With non-dominant hand apply a light massaging motion to the fleshy portion of the finger. The ring or middle finger is preferred.
6. Cleanse the ball or pad of the finger with an alcohol wipe and allow to air dry.
7. With your non-dominant hand, firmly grasp the patient’s finger and firmly place the sterile lancet against the site. Activate lancet to make a cut on the ball of the finger angled toward the outer edge of the nail base. The cut should be across the fingerprint. Cutting along the lines of the fingerprint will cause the blood to stream down the finger.



8. Discard the lancet into sharps container.

9. Wipe away the first drop of blood with gauze. If blood does not flow freely, hold the puncture site downward and gently apply continuous pressure to the surrounding tissue to enhance blood flow. Strong, repetitive pressure (milking) should not be applied as it may cause contamination with tissue fluid or hemolysis.
10. Bring the tip of the capillary specimen collection tube into contact with the drop. Blood will flow by capillary action into the tube. Do not scrape the skin tissue with the tip of the capillary collection tube as specimen hemolysis may occur.
Collect specimens in the following order:
EDTA microtainer, Heparin, Red, SST, PKU's and then all others.
Note: The EDTA is first to draw to avoid specimen clotting, which adversely affect platelet count and red blood cells indices
11. Inspect the puncture wound. When the bleeding has stopped completely, apply a bandage. If bleeding continues, apply pressure for an additional 3-5 minutes. Prolonged bleeding may be related to the patient's disease.
Exception: A bandage should never be applied to patients under two years of age unless the patient is under close observation by an adult until the bandage is removed. Small children may choke on bandages. If a bandage is applied, instruct the adult to remove it within 2 hours.
12. Apply tube extender. Label specimen tubes before leaving the patient as defined in the labeling section of this procedure.
13. Compare the labeled specimen(s) to the patient's ID band, requisition or request patient to confirm
14. Wash hands thoroughly.

Labeling the specimen (non-Blood Bank)

The specimen label must have the following patient information: (either on the label or printed legibly in block letters if hand written)

Required:

- Name
- Medical Record Number (Inpatient)

Preferred:

- Date
- Time
- Location
- The initials of the phlebotomist who collected the specimen

All blood specimens should be immediately labeled by the person who drew the specimen.

Compare the labeled specimen(s) to the patient's ID band, requisition or request patient to confirm

Labeling Blood Bank Specimens

For patients requiring a Type and Crossmatch and Type and Screen, information must include:

- First and last name
- Medical Record (or Date of Birth for outpatients) **TWO IDENTIFIERS**
- Date of draw
- Phlebotomist **Signature** “**For MDs, the signature criteria is first initial and last name or last name and 5 digit MD number. For all other blood drawers first initial and last name is required**”.

Note: Type & Crossmatch and Check specimens should **never** be drawn at the same time.

Check specimen is obtained by another stick drawn by another blood drawer. The purpose of the check specimen is to reconfirm the ABO/Rh type of patients prior to transfusion.

Blood Culture Collection

DOCUMENT SECTION:

VERSION: 1.0

DATE IN USE: 8/18/09

Note: Each set of blood cultures require a separate venipuncture.

PRINCIPLE

Under normal conditions, blood is a sterile substance. Blood Cultures are ordered to rule out or confirm septicemia. Because microorganisms are normally found on the skin special care must be taken when preparing for and performing the venipuncture to avoid contamination of blood cultures. This is accomplished by strict adherence to the steps listed below for skin preparation, venipuncture and handling of the specimen. The intended venipuncture site should never be touched or palpated after cleansing. The rubber stoppers of the blood culture bottles are another possible source of contamination, and must be cleaned with alcohol before inoculating the blood into the bottle.

SCOPE/RESPONSIBILITY

This procedure applies to all UCSF/Mount Zion Clinical Labs staff that performs venipuncture for the purpose of collecting diagnostic blood culture specimens.

SPECIMEN

The specimen consists of a properly collected blood culture(s) sample from a patient, approximately 8-10 mL per bottle for adults. For pediatrics, collect blood sample amount according to weight based scale:

1 – 5 kg = 1 mL for each bottle

5 -15 kg = 1.5 mL per bottle

15 - 40 kg = 3 mL per bottle

>40 kg = 5 mL for each bottle

A blood culture set consists of both the aerobic and anaerobic bottles. Sample volume is extremely important as lower volumes lead to lower bacteria recovery rates and delayed results. Do not overfill bottles (more than 10 mL per bottle) as there is an optimal ratio of blood to media in the culture vials.

MEDIA/SUPPLIES

1. Peripheral blood collection kit containing:
 - a. One set of blood culture bottles: aerobic and anaerobic
 - b. Safety-Lok butterfly needle
 - c. Angel Wing Safety System Adapter

- d. 70% isopropyl alcohol prep pads
 - e. 2 x 2 gauze sponges
 - f. ChloroPrep Single Swabstick (2% CHG and 70% isopropyl alcohol)
2. Gloves
 3. 20 mL syringe (3-10 mL syringe for pediatrics)
 4. Sharps container

PROCEDURE

1. Place tourniquet, find a suitable venipuncture site, and then release tourniquet. If possible, select a prominent vein that is easily visualized, since palpation must be avoided after site preparation.
2. **For adults, children, and infants who are 2 months and older:**
Cleanse the venipuncture site with ChloroPrep Single Swabstick using a back and forth motion for **30 seconds**. Allow it to air dry. **NOTE:** If skin is soiled, clean with 70% isopropyl alcohol before using ChloroPrep.

- For infants under 2 months** do not use ChloroPrep, instead, follow this procedure: Clean skin of venipuncture site with **60-second** friction scrub of 70% isopropyl alcohol to a 5 cm circular area. Apply 10% PVP Iodine to venipuncture site skin in a circular motion to a 5 cm area starting in the center. Allow it to air dry. Following the venipuncture, remove residual iodine from patient's skin with 70% isopropyl alcohol. (Iodine is not included in the blood culture kit)
3. Remove plastic cap of each bottle and wipe top of each bottle with 70% alcohol.
 4. Assemble Safety-Lok butterfly needle and syringe. Avoid touching needle and syringe ends. Put on gloves.
NOTE: A sterile syringe is used to collect the specimen. It should be removed from its packaging at the patient's bedside. The butterfly must also be sterile and protected from contamination after opening. While assembling syringe and butterfly needle, be careful not to touch either the leur-tip of the syringe or the butt end of needle.
 5. Re-apply tourniquet. Do not re-palpate puncture site.
NOTE: If you think you may need to touch the prepared area after the initial skin puncture, put on a pair of sterile gloves. Palpation should occur at least 1 inch above the actual venipuncture site.
 6. **For adults:** Perform venipuncture and collect 20 mL of blood (10 mL for each bottle). If less than 20 mL is obtained, divide volume in half for each culture bottle.

For pediatrics: Collect blood sample amount according to weight based scale:

1 – 5 kg = 1 mL for each bottle

5 -15 kg = 1.5 mL for each bottle

15 - 40 kg = 3 mL for each bottle

>40 kg = 5 mL for each bottle

7. Release tourniquet, remove the needle from the patient's arm, and activate Safety-Lok device.
8. Disassemble the syringe from the needle, attach syringe to the Angel Wing Safety System Adapter, and place needle into a sharps container.
9. Holding the syringe plunger for control of draw, press and hold adapter down over the top of the aerobic bottle and fill with half of the blood obtained (see step #7 for pediatric minimums). **Do not add more than 10 mL into each bottle.** Remove adapter and syringe from aerobic bottle and fill anaerobic bottle with remaining blood. **Do not aspirate air into the anaerobic bottle.** Gently invert bottles to mix contents.
10. Label each bottle with patient's name and medical record number. Do not cover bar code with label.
11. Indicate on requisition that blood was drawn from peripheral site. Noting the site on the requisition is helpful information. Place bottles in biohazard bag (1 set per bag) with requisition.

NOTES:

- If other blood tests are being drawn at the same time as the blood cultures, the blood cultures must be drawn **FIRST** and transferred into their vials before drawing blood for additional tests.
- Blood cultures obtained from centrally placed catheters or arterial lines are **NOT** an acceptable means of assessing septicemia.
- The volume of blood collected is crucial because there is a direct relationship between blood volume and culture yield. The concentration of organisms in the blood is low in the majority of organisms that cause bacteremia.
- Blood should be cultured as early as possible in the course of a febrile episode, and optimally, before antibiotics are administered.
- Blood cultures are usually ordered as two sets and should be drawn from separate venipunctures during the same bedside or outpatient visit, unless otherwise requested by the clinician.

REFERENCES:

Principles and Procedures for Blood Cultures; Approved Guideline M47-A. Clinical and Laboratory Standards Institute. Vol. 27 No. 17, 2007.

GENERAL NOTES ON PHLEBOTOMY:

1. Blood may fail to enter the vacutainer tube for the following reasons.
 - The needle may not have been introduced far enough. Advance the needle slightly.
 - If the needle seems to have gone to the side of the vein, partially withdraw the needle and readjust slightly (back and forth movement only).
 - If you think you have gone completely through the vein, partially withdraw the needle and slightly readjust.
 - Check using another vacutainer tube as the vacuum may be lost.
 - Check to see that the vacutainer needle is securely fitted to the adaptor.
 - If you still cannot obtain the specimen, release the tourniquet, withdraw the needle, activate the safety device, apply pressure (until bleeding has stopped) and an adhesive bandage. Select a vein from the other arm.

After two attempts, enlist the help of another phlebotomist.

2. If you are unable to locate a vein:
 - Ask another phlebotomist, if still unable to collect, inform the patient's nurse.
 - Collect a finger stick specimen if the specimen type is acceptable for the testing ordered.

Management of Adverse Phlebotomy Effects

At the first sign of a reaction, discontinue the phlebotomy and apply pressure to the site. In case of a severe reaction (convulsion, fainting, respiratory arrest, etc.) call for help RN immediately.

1. Hematoma:

- May occur during or after phlebotomy
- Discontinue immediately by removing the tourniquet
- Remove the needle
- Use 3-4 sterile gauze pads to apply firm direct pressure to the site for at least 5 minutes.
- While maintaining pressure, elevate patient's arm above the level of the heart
- Apply ice pack to the phlebotomy site for 5-10 minutes
- Inform patient RN to follow up.

2. Nausea and Vomiting:

- Instruct patient to breathe slowly and deeply
- Apply cold compresses to forehead and neck
- Bring emesis basins and tissues to the patient
- Call the patient's nurse. Do not leave room until nurse is informed about your actions.

3. Dizziness and fainting

- Discontinue the phlebotomy procedure
- Place the patient on his/her back, lower the head and raise feet above the level of the head
- Observe the breathing of the patient. If breathing is shallow call for the RN immediately
- Apply cold compresses to forehead and neck

12. Shooting Pain

If the patient experiences an “electrical” or painful sensation radiating up or down the arm, STOP the venipuncture immediately. Remove the needle, apply pressure to the site and contact a supervisor or patient’s nurse regarding patient description of pain sensation.

Avoid a running IV line

Unless it cannot be avoided, DO NOT withdraw specimens from the arm proximal to a running IV, nor from the IV line itself as this may result in contamination of the sample with the IV fluid. (see instructions below on **(Drawing from Intravascular Catheters)**). If it is necessary to draw proximal to an IV it is important that the IV be stopped and the vein allowed to clear (minimum 1 minute) before the sample is drawn.

Drawing from Intravascular Catheters

Note: Blood is preferably obtained by venipuncture and not from catheters. If blood is to be obtained from a catheter, it must be collected **by nursing staff.**

If blood is obtained from an intravascular line, it is important to clear the line of the fluid which has been infused through it or is "keeping it open" (e.g. heparin or saline). If this is not done, spurious results are likely to be obtained, e.g., an elevated PTT from residual heparin or an unrepresentative elevated glucose or potassium from the remnants of an intravenous solution.

To obtain a representative specimen uncontaminated by the initial contents of the line, a volume of blood at least six times (6x) greater than the catheter dead space should be removed and discarded prior to collecting the sample to be sent to the laboratory.

SPECIMEN TRANSPORT

All laboratory specimens shall be placed in leakproof containers (i.e., culturettes, vacuum tubes), then bagged in single, biohazard specimen bags. Place the requisition slip in the outside pocket of the biohazard specimen bag.

Tubed Specimens: Specimens may be sent through the tube system as follows:

1. Place and seal the specimen in a biohazard bag, with the request slip in outside pocket.
2. Place the biohazard bag into a Zip N' Fold pouch; completely sealing the pouch.
3. Load the Zip N' Fold pouch into a pneumatic tube and send to the lab.

Morning Draws:

Put the specimen in the red bin (4-8 AM) for Morning draw specimen **ONLY** in the dumbwaiter room of each floor to be picked up by the PCA to send to the lab. After 8 AM flip the red bin upside down so no one should put specimen in it.

Do not put any sample in the red bin on weekends and holidays. The laboratory do not sent PCA to pick specimen up.

To ensure the validity of test results and the safety of laboratory personnel, specimens that leak in transit will be discarded, and the sender notified to resend another sample.

REFERENCES:

1. Procedures for the Collection of Diagnostic Specimens by Venipuncture: Approved Standard-Fourth Edition, CLSI (formerly known as NCCLS), H3-4A, Vol. 18 No. 7, 1-18.
2. Vacutainer Brand Evacuated Blood Collection System Product Insert, Becton Dickinson and Company, No. 8001406, June 2000.
3. College of American Pathologists Publications Committee Phlebotomy Editorial Group. *So You're Going to Collect a Blood Specimen: An Introduction to Phlebotomy*. Northfield, IL; College of American Pathologists, 2005.