GENERAL REQUIREMENTS FOR PERSONAL AND LABORATORY SAFETY

Be aware of safety hazards , follow policies and procedures designed to help protect you, report all incidents and accidents so that steps may be taken to prevent reoccurrence and to protect yourself.

Eating and drinking: Prohibited in all technical work areas. A source of contamination, and specimens (blood, urine, feces, sputum) containing a variety of pathogens are handled daily in the technical areas are stored in the laboratory refrigerators. Food is not permitted in any technical refrigerators. Contact lenses are acceptable eye wear, user of contact lenses must wear eye protectors when necessary, also must have eye glasses as back-up in the event of contamination.

Shoes: Should be comfortable, with rubber soles and cover the entire foot. Shoes with open toes or negative heels are not allowed.

Hair: Shall be secured back and off the shoulders, prevent it from coming into contact with contaminated materials or surfaces and also to prevent shedding of organisms into the work area. It is also important to keep hair out of moving machinery such as a centrifuge.

Washing hands: Hands should be washed frequently during the day, before leaving the laboratory, before and after contact with patients and before eating or smoking.

GLASSWARE: Do not use broken or chipped glassware. Do not leave pipettes sticking out of bottles, flasks or beakers. Do not pick up broken glass with bare hands - use some mechanical aid to pick up broken glass. Dispose of broken or discarded pieces of glass in a specially marked separate container. Disposal of broken glass along with paper and trash is a hazard to the custodial staff.

CENTRIFUGE: Do not operate centrifuges unless the covers are closed. Keep hair, neck ties, hair ribbons or other frilly or dangling items out of the way. Do not centrifuge uncovered tubes or specimens (blood, urine, sputum) or flammable liquids. (Contaminated items can produce aerosols, flammables become bombs, etc.)

PATIENT ASSESSMENT: Assess patient personality and demeanor. Does the patient appear to be aggressive, arrogant or combative? Always ask for assistance with an aggressive or combative patient. As the phlebotomist, you always have the right to refuse drawing a patient who may cause injury to you or him/herself.

PATIENT IDENTIFICATION: Call the patient by name and then have the patient spell his/her name and/or verbally provide their date of birth or SS#

PROPERLY COMPLETED ORDER/REQUISITION: Orders for lab work must be submitted in the form of a written prescription, a written physician referral or a valid requisition.

TEST REQUISITIONS: Information required on any of these forms includes: Patient's full name. Date of birth, Ordering Physician's name, tests to be performed.

UNIVERSAL PRECAUTIONS: Blood and body fluids from all patients should be considered potentially infectious and adequate barrier techniques should be used to prevent contact with skin or mucous membranes of personnel.

Be careful at all times!

Blood spill: absorb with gauze pads or paper towels and discard in red biohazard trash bags. Disinfect the spill site with bleach, diluted 1:10

Use SPILL KIT for all liquid spills: blood, vomit, urine etc

INCIDENTS: Complete an injury report and have the supervisor sign. Follow-up with Infection Control and Student/Employee Health immediately. Prophylactic treatment may be indicated.

VENIPUNCTURE SUPPLIES/EQUIPMENT

• Sharps Container: Check that it's **not full**. Needles should **not be bent, broken or recapped**. Never stick fingers into sharps container.

• Alcohol Wipes - 70% isopropyl alcohol. Gauze sponges – not cotton.

• Adhesive bandages / tape - protects the venipucture site after collection.

• Tourniquet.

• Tape.

• Vacutainer/syringe.

• Needle.

• Vacuum Tubes.

• Emesis basin

• **WINGED INFUSION SYSTEM BUTTERFLY NEEDLE:** Needle used primarily for difficult draws and pediatric patients. Consists of a needle on one end with "wings" which will allow for easy insertion and manipulation or the needle. The opposite end is a fitting for attachment to a syringe or vacutainer holder. Multisample adapter is attached to butterfly fitting for drawing multiple tubes using a tube holder

• **VACUTAINER HOLDER:** The needle or butterfly screws into one end of this holder while the opposite end accommodates the sample tube. The holder guides the tube into place so that the proximal end of the needle can puncture the stopper of the tube.

NEEDLE GAUGE: Venipuncture is performed with needles ranging from 21 to 25 gauge. The large the number (gauge), the smaller the needle.

- 21 ga. used primarily for large antecubital veins (yellow)
- 23 ga. for smaller antecubitals, medium size forearm, hand and foot veins. (green)
- 25 ga. only for the smallest veins, usually in the forearm, hand and foot. (black) (small bore), such as 25 gauge, is more likely to be a cause of hemolysis hemolysis

MULTISAMPLE NEEDLE: Needle that is designed to screw into a needle/tube holder and allows for the draw of multiple number of evacuated sample tubes. Leave the needle cover on until just before you are ready to insert. Always inspect the needle before performing the venipuncture. Do not use the needle if the tip is bent, curved or you can see spurs.

VACUTAINER vs SYRINGE

Use the VACUTAINER System for:

• Multiple samples (3+) .

• Medium to large veins antecubital region to the wrist.

• Moderately small to medium size veins (with butterfly needle)

Use a syringe for:

• VERY difficult draws such as drug abusers.

• VERY small veins, such as hand and foot/ankle.

It is helpful to have an extra tube of each type within reach or in your pocket as a tube might be lacking sufficient vacuum or in case you lose tube vacuum on a difficult stick.

ORDER OF DRAW

1. Blood culture tube (yellow- black stopper) always drawn first to reduce bacterial contamination.

2. Plain tube, non-additive (red stopper)

3. Coagulation tube: SODIUM CITRATE (blue stopper)

4. Additive tubes:

    1. Gel separator tube (black/red speckled stopper)
    2. Heparin (green stopper)
    3. EDTA (lavender stopper)
    4. Oxalate/fluoride (gray stopper)

Tubes with anticoagulants should be drawn last so that they can be properly mixed as quickly as possible. It is ESSENTIAL that any tube with anticoagulants be inverted 6-8 times to mix the blood.

Invert tubes within 30-6 0 seconds of draw

TRANSFERRING FROM SYRINGE TO TUBES: Place the tube(s) in a tube holder or rack. Do NOT handhold a tube while you are pushing the needle through the stopper. As soon as the needle is penetrated the stopper, it is fine to hold the tube in your hand. Push the needle into the tube stopper and allow the vacuum in the tube to draw the blood in.

NEVER PUSH the blood in. It may hemolyze the specimen. If blood is clotted in the syringe DO NOT force the blood through the needle into the sample tube. Remove the needle and the tube stopper; then deliver the blood to the tube.

ORDER OF DELIVERY SYRINGE TO VACUUM TUBE: When a syringe has been selected for the draw adjustments must be made to the order of filling the tubes (order of delivery). This is due to the fact that clotting may be initiated during the time it takes to draw the specimen. Therefore, anticoagulant tubes must be filled first. Deliver blood to specimen tubes in the following order:

1. Blood culture bottles and tubes
2. Citrate tubes (coagulation tests)
3. Other anticoagulant containing tubes
4. Tubes without anticoagulants (red tops)

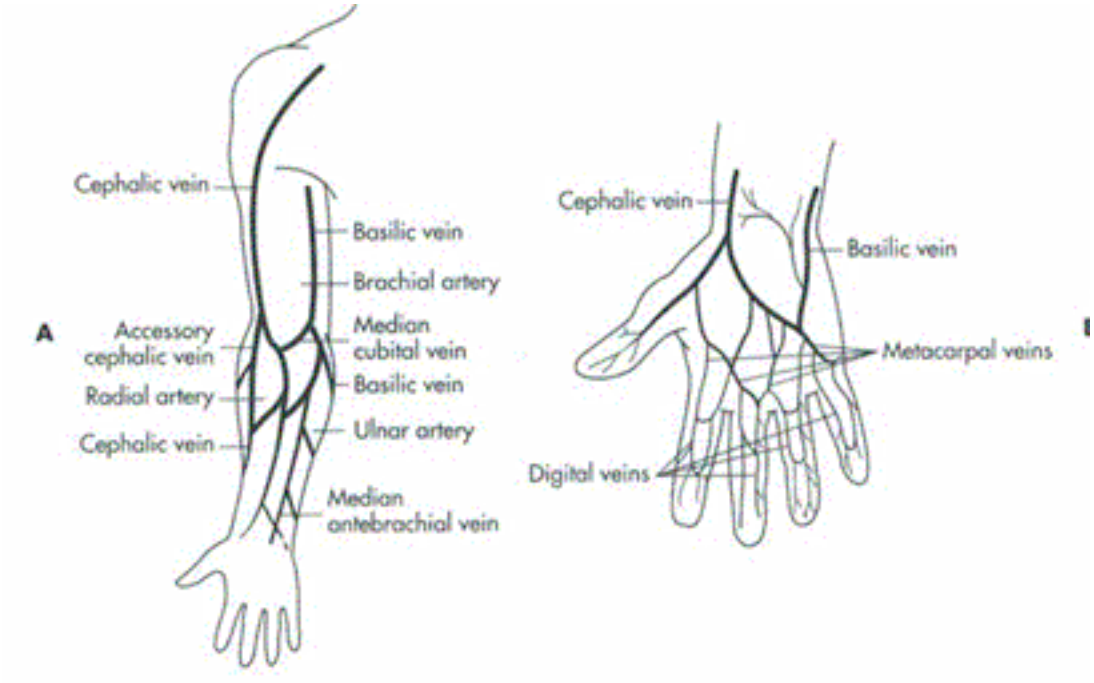
LOCATING VEINS

The veins most often used for venipuncture are located in the antecubital area. ASK THE PATIENT

VEIN SELECTION: Inspect the site. Determine the type of needle and drawing system to be used. Whether to use a hub/vacuum tube, needle/syringe is determined by the site and vein quality. The actual **feel of the vein is key** in selecting the vein which will most likely result in a successful venipuncture. With the tourniquet appropriately tied, a good vein should feel resilient or slightly bouncy when palpated slowly. If the vein rolls away when you palpate it, be sure to anchor it well if you choose to draw from that vein. A vein that feels hard is often sclerosed and should not be used. Also do not attempt to perform a venipuncture in an area that has a hematoma.

WHEN CHOOSING A SITE:

- Avoid a site above an indwelling IV.
- Avoid a site on the side of a mastectomy.
- Avoid a site on the arm of the fistula of a dialysis patient.
- Avoid a site with a hematoma or bruise.
- Avoid scars from burns and surgery it is difficult to puncture the scar tissue.



CUBITAL VEIN: Largest and fullest vein and is best anchored by the surrounding musculature of the arm. Located in the front of the elbow joint

CEPHALIC VEIN Next largest and next better anchored by the surrounding musculature of the arm. Located on the radial side.

BASILIC VEIN Smaller Not well anchored by musculature. Close to brachial artery. More sensitive and painful. Located on the ulnar side

PALPATION: Gently and firmly push down on the skin with your index finger, then slowly release the pressure. If you are palpating a vein, you will feel the vein bounce back as you release the pressure. If you are palpating a tendon, it will feel like a rope or thread that is pulled tightly. If you are in doubt, release the tourniquet and palpate the area again. If the "tight rope" is still there, you were palpating a tendon. If the vein rolls away when you palpate it, be sure to anchor it well if you choose to use that vein. Arteries pulsate, are most elastic, and have a thick wall.

PALPATION TECHNIQUES If superficial veins are not readily apparent, you can force blood into the vein by massaging the arm from wrist to elbow. Tap the site with index and second finger. Apply a warm, damp washcloth to the site for 5 minutes. Lower the extremity, gravity holds blood in peripheral vessels. Use blood-pressure cuff inflated to 40 mm Hg for obese patients. Prevents rubber from cutting into skin and allows more even distribution of compression.

PREPARATION OF SITE: Extend the patient's arm. Place towel under arm as cushion.. Apply tourniquet and palpate for vein location. Release the tourniquet then re-tie immediately prior to the actual venipuncture.

CLEANING THE SKIN

ALCOHOL

- Clean the site with 70% isopropyl alcohol. Circular motion inside to outside.
- Skin should be WET for 30-60 seconds. Allow the site to air dry.
- "Wet" alcohol left on the skin can cause an unpleasant stinging sensation for the patient.

BETADINE

- Povidone-iodine (Betadine) may be used as an alternative to alcohol. Normally used for blood cultures bleeding times and arterial punctures, it is a good alternative for those allergic to alcohol.
- Use for drawing blood alcohol (ETOH) levels.
- Iodine solutions can irritate the skin of some patients and may interfere with some tests. They may also deteriorate some rubber materials and, therefore, should be wiped off stoppers of tubes and bottles with alcohol.
- Wipe the solution off the skin with a sterile gauze before the puncture.

APPLY TOURNIQUET

The total time a tourniquet may be tied is ONE Minute because:

- affects results by hemoconcentration
- becomes uncomfortable for the patient
- potentially could cause inaccurate results

Do not place too tightly. Restrict the flow of blood, don't stop arterial flow. Tourniquet allows for filling of the veins. Pressure of blood distends veins and the veins swell.

Tie a half bow knot: 2-4 inches above the venipuncture site, with the ends pointing upwards, away from the site.

The patient should make a fist, open and close once or twice only. DO NOT HAVE THEM PUMP.

Overpumping causes hemoconcentration and **may raise potassium** level in the sample.

ANCHOR THE VEIN

- If you need to palpate the vein one more time before inserting the needle, you must clean your gloved finger just as you did the venipuncture site.
- Stabilizing the vein is critical to keep it from "rolling" away from the needle and reduces the pain of the puncture.
- Pulling the skin taut reduces resistance allowing a cleaner entry of the needle.
- Using gentle pressure, place your index finger or thumb just below the insertion point.
- Pull skin taut and anchor vein.
- Use a swift forward movement with the needle.
- Anchoring the vein above and below the insertion point poses a greater risk of an accidental needle stick.

NEEDLES

• Stabilizing the needle apparatus is essential in performing a relatively pain-free venipuncture.

• If the equipment is unstable during engaging and disengaging tubes, the needle will be moving in and out of the site creating unnecessary pain for the patient.

• Insert the needle with the bevel facing up at a 15-20 degree angle. Use quick, fast insertion.

• The needle should be placed in the same direction as the vein.

ENGAGE EVACUATED TUBE

• Hold the needle/hub steady or you may lose the vein or cause pain or injury to the patient. The hand holding the needle/hub may be steadied by lightly resting your hand on the patient's arm.

• With your other hand, hold onto the hub flange and gently engage the tube. If you do not see blood being pulled into the tube as soon as you engage the tube, you may need to adjust the position of the needle slightly.

• Release the tourniquet. Difficult sticks may require that you leave the tourniquet on until the last vial is drawn

CHANGING TUBES

• If multiple tubes are to be drawn, mix each tube when you remove it from the needle/hub assembly; engage the next tube and etc., until you have drawn all the required tubes.

• You must follow the correct tube draw order to prevent a risk of contamination between tube types.

REMOVING THE NEEDLE

• Disengage the final tube before withdrawing the needle reduces the probability of blood leakage from the needle tip.

• Remove the needle from the patient's arm using a swift backward motion.

• Press down on the gauze dressing only after the needle is fully removed. Pressure over the site at the time of needle withdrawal causes a cut from the bevel.

• Apply adequate pressure to avoid formation of a hematoma. Raise arm up in the air 3-5 minutes.

• Ask the patient to hold the gauze in place for you and apply pressure.

• Discard needle BEFORE applying a dressing/bandage.

NEVER allow the patient to simply flex their arm. This does not create sufficient pressure to control bleeding and may easily result in a hematoma. Also, when the patient does extend the arm, the blood clot may disengage and bleeding will resume.

If the patient is on blood thinners such as Coumadin™ or heparin and extend the time of pressure to be certain that the bleeding has ceased completely. These patients may tend to bleed excessively and for a prolonged period.

DISPOSAL

• Safety infusion set: slide the safety cover over the needle and discard the set.

• Butterfly: Hold the base of the wings as you remove the needle, NOT the tubing. (prevent stick)

• DO NOT let go of the wings (butterfly) until it is being placed in the biohazard sharps container.

• NEVER HAND OFF A NEEDLE TO ANOTHER PERSON OR LAY IT DOWN ON TABLE OR COUNTER. Dispose of contaminated materials/supplies in designated containers.

WOUND DRESSING: Check the patient's arm and apply a bandage as necessary. Assure there is no tape allergy!

SPECIMEN LABELING: The following information is required on all specimens received in the laboratory:

- Patient name
- (MR #) (SS#) (D.O.B.)
- Date/Time drawn
- Initials of the phlebotomist

VENIPUNCTURE via SYRINGE

Syringes are used when the patient's veins are small or fragile and the evacuated tube suction could cause the vein to collapse. Using a syringe allows control the amount of suction applied to the vein.

The venipuncture procedure using a syringe follows the same steps as the evacuated tube system procedure.

It differs slightly in equipment preparation and assembly, pulling the blood into the syringe, and transferring of blood into evacuated tubes.

Be sure to attach the needle to the syringe tightly enough so that no frothing of blood occurs at the connection when you apply the suction. Pooling and frothing will cause hemolysis.

- When preparing the needle/syringe needle assembly, pull back on the syringe plunger before attempting to draw with a syringe. It often takes a significant amount of pull to release the plunger from the base of the syringe barrel the first time. After the plunger has been pulled back once, it can be pulled back fairly easily and smoothly and is ready for use.

- The entry into the skin and the vein is exactly the same as with the evacuated tube system. Once you feel that the needle is in the vein, pull back gently on the syringe plunger while holding the syringe barrel securely to keep the needle in place in the vein.

- Use the syringe flange to brace against as you pull back on the plunger just as you do when changing tubes using a needle/hub system.

- Fill the syringe with the desired amount of blood, release the tourniquet and complete the procedure exactly as you would using an evacuated tube system.

TRANSFER OF SPECIMEN TO BLOOD TUBES VIA SYRINGE

- To transfer the blood from the syringe to the appropriate tubes, remove the needle from the syringe and replace it with an 18 or 19 gauge needle. Using a large bore needle will help prevent hemolysis of the blood and maintain the integrity of the sample.

- Place the tube(s) in a tube holder or rack. Do NOT handhold a tube while you are pushing the needle through the stopper.

- Do NOT place any pressure on the syringe plunger when transferring blood from a syringe to evacuated tubes. The tube's vacuum will provide the negative pressure to pull the blood into the tube. Excess pressure may cause hemolysis.

- Since there is the possibility of the formation of micro clots, the blood should be transferred in the appropriate order as quickly as possible into the tubes containing anticoagulant and mixed immediately.

SYRINGE ADVANTAGES: This is the RECOMMENDED method for drawing from small veins.

• They are less likely to collapse under a vacuum which is controlled by the technician.

• This method requires less manipulation than the Vacutainer System for small volume draws (1-2 tubes).

SYRINGE DISADVANTAGES

• VERY labor intensive for large volume draws.

• VERY expensive. This method should not be used routinely.

• Relatively slower method than the Vacutainer System.

• After draw is complete, this method requires transfer of specimen to sample tubes.

• This is more manipulation and more chance of accidents.

VENIPUNCTURE VIA BUTTERFLY

• Needle and plastic "wings" are attached to a length of flexible tubing which is, in turn, attached to a luer adapter/hub assembly. As soon as the needle is in the vein, blood is visible in the tubing.

• Requires a low angle of needle entry of 10-15 degrees.

• Check the integrity of the tubing for defects in the tube or the connection between the tubing and the needle.

• Straighten the tubing and prepare the syringe.

• Attach tubing to vacutainer securely

BUTTERFLY in the hand: Grasp the wings between your thumb and index or middle finger, hold the skin and vein taut with your other hand, and enter the skin with the needle.

TROUBLESHOOTING

Adjust Needle Position:

1. Re-directing the needle is better than immediately withdrawing the needle.

2. Re-adjusting the needle may eliminate a second venipuncture.

3. Do not attempt to stick the patient more than twice. Ask another trained person to help.

Re-direct the Needle:

1. Move it forward (it may not be in the lumen)

2. Move it backward (it may have penetrated too far)

3. Adjust the angle (the bevel may be against the vein wall)

If blood stops flowing:

1. Change to a new tube of the same tube type (tube may have lost the vacuum)

2. Loosen the tourniquet. (it may be too tight and be obstructing blood flow)

3. Re-anchor the vein. (veins sometimes roll away from the point of the needle and puncture site)

4. The vein may have collapsed; re-secure the tourniquet to increase venous filling.

5. If this is not successful, remove the needle, take care of the puncture site, and re-stick.

PROBLEMS

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

- If the blood is bright red (arterial) rather than venous. Apply firm pressure for 5 minutes.

DIFFICULT DRAWS:

Obesity:

· Veins are very deep and, thus, difficult or impossible to visualize or palpate.

· Any puncture under such circumstances may have to be made only through the phlebotomist's knowledge of venous anatomy.

· Since this is essentially a "blind stick", it should be made only by the most experience personnel.

Edema:

· Never attempt to draw blood from a sight which is regionally edematous.

· This can result in contamination of the specimen with accumulated fluids.

Scars and burns:

· Fresh scars and burned areas of the skin should be avoided for venipuncture.

· After the scarred areas have completely healed, visualizing and palpating veins may be very difficult.

· If a vein is quite evident located under a healed scar, there should be no reason why an attempt should not be made.

Damaged veins:

· Patient's requiring repeated venipuncture (once per day or more over a long period of time) may have veins that are scarred, making them very difficult to penetrate.

· This is often the case with drug abusers, who can often be the most difficult patients to draw.

· Other patients may have sclerosed veins as the result of disease. These veins, instead of feeling pliable or rebounding upon palpation, may feel hard and may tend to roll excessively.

SYNCOPE (Fainting)

1. Fainting may be caused by a psychological aversion to needles or the thought or sight of blood.

2. It is the result of a temporary blood loss to the brain.

3. The patient may feel cool and clammy and perspiration may be evident.

4. The patient may complain of dizziness or may become nauseated.

5. If any of these signs appear release the tourniquet and withdraw the needle immediately.

IMMEDIATELY NOTIFY EMERGENCY MEDICAL PERSONNEL

If the patient is seated:

· Instruct him to bend over, putting their head between the knees.

· This position will help to return blood to the brain.

· Instruct the patient to take some slow deep breaths.

· As soon as the patient has recovered sufficiently have the patient lie down for 10-15 minutes.

· A cold, wet towel applied to the forehead or back of the neck may help in recovery.

· A health care worker should remain with the patient during this period.

· When recovery appears complete, suggest that the patient drink some cold water, a soda or orange juice.

If the patient is lying down:

· Be very cautious. Your patient could be undergoing any number of other physical problems that put him into a state of unconsciousness.

· If a patient appears to faint while in the prone position CONTACT A NURSE OR PHYSICIAN IMMEDIATELY.

· Though fainting is normally a self-limiting disorder, DON'T DIAGNOSE unless you are qualified to do so.

· If your patient has lost consciousness, to wait 3 or 4 minutes for them to recover could mean death to a heart patient.

HEMATOMAS AND BRUISES

A hematoma occurs:

1. as the result of going through a vein with the needle
2. not having the bevel of the needle completely in the lumen of the vein
3. not holding the puncture site tight enough or for a long enough period of time.
4. This will create a swelling around the site which may turn blue (ecchymosis).

**A bruise is much the same result but it is acquired usually through blunt trauma.

Patients on anticoagulant therapy such as Coumadin or heparin may bleed excessively and for a longer period of time.

Not applying sufficient pressure for a long enough period of time may result in serious hematomas or hemorrhaging.

HEMATOMAS DURING VENIPUNCTURE

- Immediately release the tourniquet and withdraw the needle.
- Hold a gauze compress on the site for at least 5 minutes.
- Locate another site and attempt another draw.

HEMATOMAS AFTER VENIPUNCTURE

- It is the result of not holding the site tight enough or long enough.
- If you ask a patient to hold the gauze pad, make sure that you stress the word tightly and demonstrate what you mean.
- Pressure should be held for at least 5 minutes.

PREVENT A HEMATOMA

- Puncture only the uppermost wall of the vein.
- Use the major superficial veins.
- Make sure the needle fully penetrates the upper most wall of the vein. (Partial penetration may allow blood to leak into the soft tissue surrounding the vein by way of the needle bevel)
- Apply pressure to the venipuncture site

BRUISES

- Do not select sites where obvious bruising has occurred.
- You may create unnecessary discomfort for the patient and some test results may be slightly altered.

HEMOLYSIS: Is the release of hemoglobin into the fluid portion of the blood as the result of breaking apart the cell walls of red blood cells.

• Hemolysis may occur through mechanical means or may be the result of some disease or physical disorder.

• creates a red color in the serum.

• is the release of hemoglobin into the serum as the result of lysis of the red blood cells.

• may alter laboratory results.

• is usually the result of poor blood collecting or processing technique.

Hemolysis Prevention:

• When drawing with a syringe, DO NOT draw back on the plunger forcefully. A nice even, slow draw is preferred.

• Use the appropriately sized needle for the vein.

• When forced to use a smaller 25 gauge needle, your best approach is to use a syringe so that you can control drawing the blood slowly.

• If a syringe is used and blood is injected into an evacuated tube, use a 21 gauge needle and NEVER force the blood into the tube by pushing the plunger. Allow the vacuum to draw the blood from the syringe.

• Alternatively, remove the stopper from the sample tube, remove and dispose of the needle then slowly force the blood out of the syringe by pushing on the plunger. Allow the blood to flow down the side of the tube.

MASTECTOMY OR LUMPECTOMY: Women who have had a breast removed will also have had adjacent lymph nodes removed.

This will greatly reduce lymph flow to the arm on the side of the mastectomy which may increase the possibilities of infection or it may result in lymphedema

When encountering a mastectomy patient with a single breast involved, evaluate and use the opposite arm.

If the patient has had a radical (both breasts removed):

- Is a fingerstick feasible?
- Ask the physician or nurse for direction.
- Other options may be feet and legs or arterial.

CHILDREN - AS PATIENTS

The major difference with venipuncture in children is that everything is in miniature.

Special restraining techniques may be required.

Putting a needle in a child's arm can be traumatic for the parent, but for the child it is sometimes the worst thing that could possibly happen.

Both child and parent may have to be psychologically prepared.

CHILDREN AND PARENT PREPARATION

- Set up equipment:
- Have all equipment ready and out of sight.
- Drawing trays should be secured somewhere out of sight
- Drawing stations should have all invasive equipment such as needles, syringes, etc. out of sight.

Anxiety:

- Both child and parent will undoubtedly be anxious.
- The child will be afraid of the needle and the parent will be afraid of hurting the child.
- Be friendly, maintain direct eye contact, remain calm but speak with confidence.
- Talk to the parent:
- Discuss with the parent what is going to happen and that you would like them to help you.
- Let mom or dad know that they can be of great assistance in just comforting the child.
- You can also use their help in steadying or restraining their child's arm.
- Under no circumstance will more than two attempts be made.
- If parents are hesitant to assist, don't force the issue. Enlist some additional assistance.

Cope with the child:

• Tell them what you are going to do.

• Be honest. Let them know that there will be a "pinch".

• Tell them that if they need to say "ouch or cry that it is fine, but it is most important to **hold still.**

• Make sure they know that you will be very quick and it will be all over.

Unmanageable children:

Even after all this physical and mental preparation, you may still encounter a child that requires more restraining than the parent alone can offer. GET HELP.

If additional assistance is still inadequate, DO NOT PERFORM THE PROCEDURE.

CHILDREN'S PROCEDURAL NOTES

• Always use a butterfly on youngsters. The butterfly is easier to control with a struggling child.

• The needle is less likely to pull out of the arm because of the long length of tubing.

• Selection of needle size (gauge) should be made based on vein size.

• Never use a needle larger than 23 ga. on a small child.

• Release the tourniquet when flow appears restricted.

• Since children's veins are small, they sometimes tend to collapse. This is because we are drawing blood out of the vein quicker than it is being allowed to return.

Releasing the tourniquet may improve circulation and blood flow.

RESTRAINING CHILDREN

• ASK FOR ASSISTANCE

• Restraining devices often leave an irreversible negative impression on a young child regarding venipunctures (so should only be used as a last resort).

• They may be uncontrollable the next time and, in fact, may never be comfortable with the procedure, even as an adult.

TRAINING THE PHLEBOTOMIST

1. Training of a phlebotomist to perform venipunctures on youngsters should be done with a step-wise approach.

2. Gain experience with the older children first, 7-12 years old.

3. Then graduate to youngsters around 2-7 years old.

4. Begin selectively picking infants (6 mo. to 1 year), doing only those with reasonably good vascularity, leaving the more difficult infant for the more proficient phlebotomist.

5. Newborns should be drawn only by the most experienced and proficient blood drawer.

SPECIMEN TUBES

Numerous varieties of tubes are available. Selecting the correct tube for the test(s) ordered is essential. Tubes selected for general use should be displayed on a wall chart in one or more locations in the venipuncture area to assure proper information for various types of collections. Lab forms will tell you what tube to use for each particular test ordered. Evacuated tubes are manufactured to withdraw a predetermined volume of blood and are typically sterile. They have an expiration date beyond which they should not be used as the vacuum may not be accurate or the anticoagulant may not be effective.

RED TOP

- ADDITIVE: None Silicone-coated interior (blood doesn't stick to inside of tube)
- MODE OF ACTION: Blood clots, and the serum is separated by centrifugation
- USES: Chemistries, Immunology and Serology, Blood Bank (Crossmatch), Therapeutic drugs or many of the general chemistry tests

GOLD TOP

- ADDITIVE: None
- MODE OF ACTION: Serum separator tube (SST) contains a gel at the bottom to separate blood from serum on centrifugation
- USES: Chemistries, Immunology and Serology

LIGHT GREEN TOP

- ADDITIVE: Plasma Separating Tube (PST) with Lithium heparin
- MODE OF ACTION: Anticoagulates with lithium heparin; Plasma is separated with PST gel at the bottom of the tube
- USES: Chemistries (often-times STAT chemistries, as no need to wait for specimen to clot as with SST)

DARK GREEN TOP

- Volume: 3.0 mL draw, 10.0 mL draw
- ADDITIVE Sodium heparin or lithium heparin
- MODE OF ACTION Inactivates thrombin and thromboplastin
- USES: For lithium level, use sodium heparin. For ammonia level, use sodium or lithium heparin

RED-GRAY TOP

Specialized "clot" tube, used to isolate serum from suspended blood cells.

- Volumes: 4.0 mL, 9.5 mL
- ADDITIVE: Serum Separating Tube (SST) with clot activator
- MODE OF ACTION: Forms clot quickly and separates the serum with SST gel at the bottom of the tube (a silicone to keeps blood from adhering to the glass)
- USES: Chemistry (should be fasting), electrolytes, BUN, creatinine, total protein and albumin
- Tube purposes: With only a few exceptions, can be used whenever serum is required for testing.
- NEVER draw this tube for Blood Bank use, since both serum and cells are required for performing testing.
- A very limited number of highly specialized therapeutic drug levels may require the use of plain red top tubes.
- Pseudonyms: Tiger top, SST, Separator tube, speckled top, camouflaged tube.

PURPLE/LAVENDER TOP

- Volumes: 3.0 mL draw, 5.0 mL draw
- ADDITIVE: EDTA
- MODE OF ACTION: Forms calcium salts to remove calcium
- USES: Hematology (CBC) and Blood Bank (Crossmatch);
- Requires full draw -
- Invert 8 times to prevent clotting and platelet clumping

LIGHT BLUE TOP

- Volumes: 2.7 mL and 4.5 mL draws
- ADDITIVE: Sodium citrate
- MODE OF ACTION: Forms calcium salts to remove calcium
- USES: Coagulation tests (protime and prothrombin time), full draw required there is a dilution factor that must be maintained for accurate and reproducible result.
- Pseudonyms: Blue top, citrate tube, coag tube

DARK BLUE TOP

- ADDITIVE Sodium EDTA
- MODE OF ACTION Forms calcium salts. Tube is designed to contain no contaminating metals
- USES: For lithium level, use sodium heparin. Trace element testing (zinc, copper, lead, mercury) and toxicology

LIGHT GRAY TOP

- ADDITIVE Sodium fluoride and potassium oxalate
- MODE OF ACTION Antiglycolytic agent preserves glucose up to 5 days
- USES: Glucose, requires **full draw** (may cause hemolysis if short draw)

YELLOW TOP

- ADDITIVE ACD (acid-citrate-dextrose)
- MODE OF ACTION Complement inactivation.
- USES: HLA tissue typing, paternity testing, DNA studies
- **NOTE:** Contact the laboratory before drawing this tube.

YELLOW-BLACK TOP

- ADDITIVE Broth mixture
- MODE OF ACTION Preserves viability of microorganisms
- USES Microbiology - aerobes, anaerobes, fungi

BLACK TOP

- ADDITIVE Sodium citrate (buffered)
- MODE OF ACTION Forms calcium salts to remove calcium
- USES: Westergren Sedimentation Rate; requires **full draw**

ORANGE TOP

- ADDITIVE Thrombin
- MODE OF ACTION Quickly clots blood
- USES: STAT serum chemistries

BROWN TOP

- ADDITIVE: Sodium heparin (OR EDTA - check tube label)
- MODE OF ACTION: Inactivates thrombin and thromboplastin
- USES: Serum lead determination, lithium level