

## **EXERCISE 2: VENIPUNCTURE USING VACUUM BLOOD COLLECTION SYSTEM**

Skills 30 points

Objectives

1. Identify 4 potential sites for venipuncture.
2. List the veins of the forearm used for venipuncture, describe where they are positioned, and list the most common ones used for routine venipuncture.
3. Demonstrate concern for the safety and welfare of yourself and others by consistently using appropriate infection control techniques.
4. Demonstrate appropriate concern for your classmate by explaining the procedure.
5. Describe and demonstrate the steps in the preparation of the venipuncture site.
6. State the effect the tourniquet and hand squeezing has on venipuncture.
7. Recognize proper needle insertion and withdrawal techniques including direction, angle, depth and aspiration.
8. List the supplies necessary for performance of the venipuncture.
9. List in chronological order the correct steps in the proper performance of a venipuncture using the vacuum blood collection system.
10. List six anticoagulants, the color of stopper for each and 2 laboratory tests which will be drawn into each.
11. Perform three successful venipunctures on the artificial arm and one live draw with minimum stasis and trauma and no contamination.
12. State the consequences of placing a tourniquet above an IV site.

13. State the problems which may occur if a sample is drawn above an IV and how this will affect the quality of the laboratory samples.
14. State the proper protocol when samples must be collected above an IV.
15. List 6 reasons that a blood sample might be rejected by the laboratory.

## **Discussion**

Clinical laboratories perform blood analyses on venous blood samples collected by phlebotomy. To collect a venous blood sample, the phlebotomist pierces the vein with a hypodermic needle and draws the blood into a syringe or uses a commercially available apparatus specifically designed for collecting venous blood, such as the vacuum blood collection system. The goal of venipuncture is to obtain a blood sample from the correct patient into the correct tube with minimal trauma. Venipuncture is an invasive procedure and requires a certain degree of skill.

## **Vacuum Blood Collection System**

The vacuum blood collection system consists of a double-pointed needle, a plastic holder or adapter, and a series of vacuum tubes with rubber stoppers of various colors, the colors indicate the type of additive present. Blood collection using the evacuated tube collection system will produce the best blood samples for analysis by the laboratory. The blood goes from the patient directly into the appropriate test tube.

## **Needle**

The needle for vacuum blood collection is pointed at both ends, with one end shorter than the other. The long end of the needle is used for insertion into the vein, the shorter end is used to pierce the rubber stopper of the vacuum tube and is usually covered by a rubber sheath. The sheath makes it possible to draw several tubes of blood by preventing leakage of blood as tubes are changed, this is called a multi-draw needle. If the short end is not covered with a rubber sheath, it is a single sample needle and only one tube of blood can be collected.

There are several sizes of needles available, the size depends on the length and gauge of the needle that goes into the vein. Needle length ranges from 1

to 1 1/2 inches. One inch needles are used for routine venipuncture, 1 1/2 inch needles are used for patients with very deep veins. The gauge of a needle is a number that indicates the diameter of its lumen; the lumen, also called the bore, is the circular hollow space inside the needle. The higher the gauge, the smaller the lumen. The most frequently used gauges for phlebotomy are 20, 21 and 22.

The bevel is the slanted opening at the end of the needle. The phlebotomist performs a venipuncture so that the bevel of the needle is facing upward when the needle is inserted into the vein. Needles come in single use, sterile packages, either peel apart envelopes or plastic cases.

### **Holder**

The holder for vacuum blood collection is a plastic sleeve into which the phlebotomist screws the double pointed needle. Holders are available in two sizes, one for adult venipuncture and one for pediatric procedures. The most current guidelines require that all holders are for single use only. Some have the needle safety device attached to the holder, others require the needle with safety device attached be inserted into the holder. Once the needle safety device is activated the entire assembly is discarded.

### **Vacuum Collection Tubes**

Vacuum collection tubes are glass or plastic tubes sealed with a partial vacuum inside by rubber stoppers. The air pressure inside the tube is negative, less than the normal environment. After inserting the longer needle into the vein, the phlebotomist pushes the tube into the holder so that the shorter needle pierces the stopper. The difference in pressure between the inside of the tube and the vein causes blood to fill the tube. The tubes are available in various sizes for adult and pediatric phlebotomies. Adult tubes have volumes of 5, 7, 10 and 15 mL and pediatric tubes are available in volumes of 2, 3 and 4 mL.

Different blood tests require different types of blood specimens. For instance, some specimens require the addition of an anticoagulant in the tube. The anticoagulant prevents blood from clotting, resulting in a whole blood sample, one in which the cells are free in the plasma. If an anticoagulant is not present the blood will clot, coagulation factors present in the fluid portion of the blood cause the cellular components to clump together. It is of critical importance that the phlebotomist knows which type

of tube to draw for each test ordered. The collection of the blood in the wrong type of tube will result in the patient having to be stuck again.

Anticoagulants are already in the tubes in the precise amount needed to mix with the amount of blood that will fill the tube. The color of the stopper on each tube indicates what, if any, anticoagulant the tube contains. It is important to completely fill each tube so that the proportion of blood to chemical additive is correct, otherwise, the test results may not be accurate or the specimen will be rejected and will need to be recollected.

The following table lists the contents of the vacuum tube, the color of the stopper and what each type of specimen is used for. **MEMORIZE THIS TABLE.** This table contains only the most commonly used anticoagulants, there are many more.

STOPPER COLOR	ADDITIVE	SPECIMEN USAGE
Red	No additive in glass; Clot activator in glass No anticoagulant present	Tests using serum which include: most blood chemistries, AIDS antibody, viral studies, serology tests, Blood Bank testing.
Red and black mottled Separates serum from clot (SST)	silicone/gel (serum separating material)	All tests using serum <b>except</b> Blood Bank
Blue	Sodium Citrate	Coagulation studies: PT, PTT and fibrinogen
Lavender	EDTA (ethylenediaminetetraacetic)	Hematology studies: CBC, WBC count, Hemoglobin, Hematocrit, Platelet count, Reticulocyte count, differential.
Green Mottled stopper has gel to separate plasma from cells (PST)	<b>One</b> of the following: sodium heparin, lithium heparin or ammonium heparin.	STAT blood chemistries utilizing plasma.
Gray	Potassium oxalate and sodium fluoride or lithium iodacetate and heparin	Glucose, Blood Alcohol (ethanol) levels, lactic acid
Black	Buffered Sodium Citrate	Westergren sedimentation rate determination
Royal Blue	Color of tube label indicates additive, if any: purple - EDTA green - heparin red - none	Trace metal analysis, nutrients and toxicology studies
Brown/Tan	Sodium Heparin or K <sub>2</sub> EDTA	Lead levels
Yellow	Acid Citrate Dextrose (ACD)	HLA Phenotyping, DNA and paternity testing
Yellow	Sodium Polysulfanetholsulfonate (SPS)	Whole blood Microbiology

In the last few years the order of the draw has changed as we transition from glass to plastic tubes. Initially there were 2 different orders of the draw, one for plastic, one for glass. Due to confusion the national standards were changed to one order of the draw regardless as to whether the tubes were plastic or glass.

The Clinical and Laboratory Standards Institute (CLSI formerly NCCLS) recommends the following sequence of collection of evacuated tubes in a multi-draw should be in this order:

1. Sterile/Blood cultures
2. Blue coagulation tube
3. Red
4. Other additives
  - a. Green
  - b. Lavender
  - c. Gray

This is a posting from the MSN Phlebotomy Newsgroup: “I wanted to share with you an easy way to remember the new NCCLS order of draw. NCCLS had changed the order at the beginning of this year (2004) and it would be best for your patients results if we would all adhere to the new order of draw, after all it would be our family one day getting their blood drawn and we would want the best results for them so lets treat all of our patients like family. Here it is:

BeCause = Blood Cultures

Better = Blue

Specimens = Serum (anything giving serum; sst, red/no additive etc)

Generate = Green

Perfect = Purple, lavender, EDTA

Goals = Gray”

When drawing blood for a blood profile or panel (many different types of laboratory tests are ordered) the phlebotomist fills several tubes, each with a different color stopper appropriate for each test ordered. This is called a multiple draw, or multi-draw. This is necessary to avoid contaminating the blood in one tube with traces of chemicals from a previous tube that might alter the test results. For this reason, red stoppered tubes, those with no anticoagulants or other additives, are filled first.

\*\*Blood for coagulation studies is never drawn first. The first blood taken from a punctured vein may contain a naturally occurring coagulant material from the tissue of the body called tissue thromboplastin. Always draw a red stoppered tube before the blue-stoppered tube for coagulation studies.

### **Patient Identification and Preparation**

It is vitally important that the phlebotomist correctly identifies the patient. Do not offer the patient a name to respond to, since many patients are hard of hearing and will respond affirmatively to any name you give. All hospitalized patients have an identification arm band with their name, hospital identification number and other pertinent information. Always compare the laboratory test request slip name and ID number with the name and ID number on the patient's hospital arm band. If there is any

discrepancy, do not draw the patient's blood. Report the discrepancy immediately to the nurse in charge of the unit. If there is a genuine error on the patient's arm band and the nurse asks you to go ahead and draw the blood before a corrected arm band is available for the patient, let the nurse take the responsibility of the patient identification by initialing the blood tube and the request slip.

For an out-patient, verify the patient's identity by having the patient give you additional identifying information such as a social security number, date of birth or address.

Before beginning a venipuncture, the phlebotomist must wash or disinfect his or her hands and follow Standard Precautions (refer to Exercise 1). Explain the procedure to the patient. This is known as “informed consent”. Phlebotomy is a medical procedure and the patient has the right to know what is involved. Most patients have previously had their blood drawn. An appropriate question to ask is, "Have you ever had your blood drawn before?". If the patient has never had blood collected before, the phlebotomist should help prevent anxiety by explaining the procedure to the patient. Be honest, tell the patient the amount of discomfort that will be felt is like a little pinch. If the patient asks what the test is for tell them that their physician has ordered some laboratory tests to monitor their condition, the results will be available to the physician later and the patient can check with him or her later about the results. You must never tell the patient what tests are ordered or share results of testing.

Choose the appropriate tubes for the tests requested and, after collection of the samples, label the tubes appropriately. **NEVER LABEL TUBES BEFORE COLLECTING THE SAMPLE**, as this may result in a mix up of blood specimens should the first venipuncture be unsuccessful and empty, labeled tubes are left on the tray. Label the tubes at the patient bedside, never take the tubes to another location to label them, this breaks the chain of identity of the blood specimens with the patient.

Most laboratories have instructions for the phlebotomist as to the number and stopper color of tubes needed for all of the tests that they perform.

Position the patient so he or she is comfortable and safe in case the patient becomes faint and falls. Hospitalized patients should always be drawn when they are reclining in bed. Out-patients should be seated in a phlebotomy chair which has a locking arm in front for support of the arm and body.



**Feeling faint is a fairly common problem** for patients when having blood drawn, particularly in out-patient situations. When performing phlebotomy, know where first aid treatment kits are located. If the patient appears pale or complains of feeling faint, immediately remove the needle from the patient's arm and have the patient breathe slowly and deeply. Have the patient lower his or her head below the knees and use an ammonia capsule if the patient loses consciousness. If this treatment is not effective, call for assistance immediately. Remain with the patient until he or she is fully recovered. Be prepared to catch or break the fall of any patient who might faint.

After collecting the required blood samples you must record the patient's full name, ID number, the date and time of collection, and your initials on each tube collected. This **MUST** be done in the presence of the patient. Removing the tubes from the collection area, away from the physical presence of the patient, breaks the chain of identity. It may also result in mislabeling of the samples. Many laboratories utilize computer generated labels to put on the blood specimen. These labels generally contain the patient's name and identification number and the name of the test ordered. When computer labels are used the appropriate label is placed on the tube of blood and the date, time and initials are written on the label. Other information may be required on the tube by the particular laboratory protocol.

### **Site Selection and Preparation**

The selection of the best site to perform a venipuncture is aided by the use of a tourniquet. The most common type of tourniquet used is a thin, rubber strap which is applied above the elbow to constrict blood flow and make the veins more prominent. Velcro tourniquets are also available. The tourniquet is tied in such a way that it can be removed with one hand. Do not apply the tourniquet so tight as to prevent flow of blood in the arteries but just tight enough to stop the flow of blood in the veins.

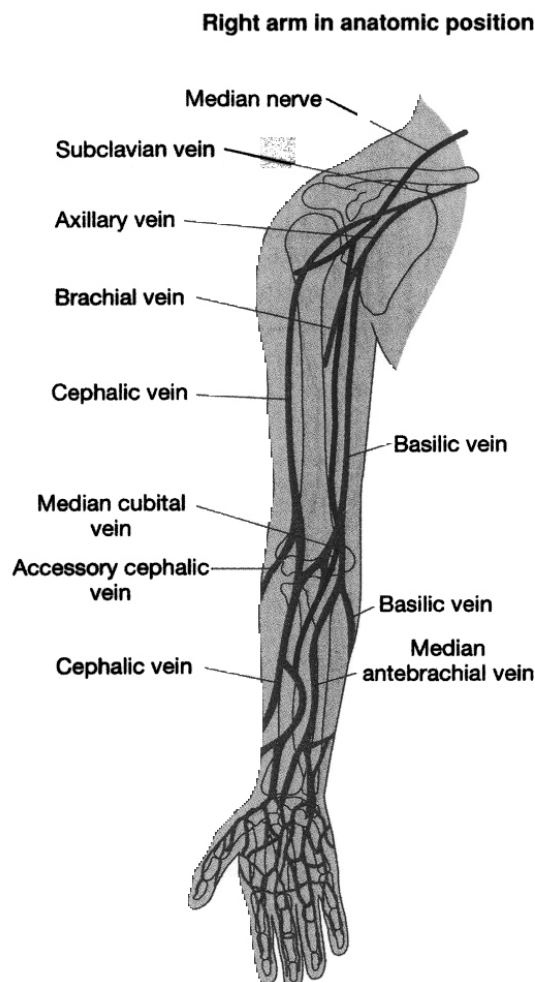
If the skin appears blanched above and below the tourniquet it is too tight. If your finger can be inserted between the tourniquet and the patient's skin it is too loose. Take the tourniquet home and practice on family members. The more you practice applying the tourniquet the easier it becomes.

After applying the tourniquet to the arm, choose the puncture site. The arm has many veins from which to choose a venipuncture site. Use the large veins of the forearm which are the median cubital, cephalic or basilic veins for venipuncture. The basilic vein veers toward the anterior surface of the

forearm and is joined to the cephalic vein by the median cubital vein. These veins are ideal for venipuncture due to their fairly large size and the fact that most are well anchored in tissue and will not "roll". The blue superficial veins of the forearm are not adequate for a venipuncture.

To determine if the site is adequate use the fingertips to palpate the veins to determine their direction, depth and size. Choose the veins that are large and accessible. Large veins that are not well anchored in tissue frequently roll, so if you choose one, be sure to secure it with the thumb of your nondominant hand when you penetrate it with the needle. Do not choose veins that feel hard (sclerosed).

Blood is not easily collected from veins that are scarred or hardened from repeated use, they are difficult to enter, and if obstructed or occluded will not permit blood to flow through them. Study the following diagram for the veins of the arm and memorize them.



**Figure 5-8. A:** Principal veins of the arm, including major antecubital veins subject to venipuncture.

After selecting a vein, clean the puncture site with a cotton ball saturated with 70% isopropyl alcohol or prepackage alcohol swabs. Rub the alcohol swab in a circular motion moving outward from the site. Use enough pressure to remove all perspiration and dirt from the puncture site.

Discreetly look at the swab when finished, if it appears excessively dirty repeat the cleansing process with a fresh alcohol swab. After cleansing do not touch the site, if the vein must be repalpated the area must be cleansed again. Some experts allow cleansing of the index finger before repalpating but this technique is debatable.

Hold the prepared holder with the bevel of the needle facing you in your dominant hand. Use the thumb of the nondominant hand below the puncture site to anchor the vein and pull the skin taut. The needle entering the site should not touch the thumb of the phlebotomist. Position the needle in the same direction as the vein, enter the skin and penetrate the vein at a 15 degree angle in one swift, smooth motion to decrease the patient's discomfort . If you enter too slowly blood will leak out at the puncture site creating a biological hazard as well as obstructing your view of the puncture site. The bevel of the needle should enter and remain in the center of the vein.

When using the vacuum method for multi-drawing, prevent movement of the holder, or the needle may accidentally be pulled from the vein especially while switching tubes. Be sure that the needle is a multi-draw needle, or blood will leak into the holder when the initial tube is removed, creating a biological hazard. It is recommended **in the literature** that the tourniquet should be **released as soon as the blood begins to flow** into the tube. Based on personal experience, **I recommend that the tourniquet be released as the last tube is filling.**

When all tubes of blood have been collected, remove the last tube from the holder, place a cotton ball or gauze over the site and withdraw the needle in a smooth and cautious manner so as not to bruise the vein.

After withdrawing the needle fully, apply pressure to the cotton ball over the puncture site and, if the patient is able, ask him or her to hold pressure on the site for 3 to 5 minutes until the bleeding stops. If the patient is asleep, unconscious or uncooperative, hold the cotton for him or her.

Immediately activate the needle safety device and discard appropriately. Invert gently any tube containing an anticoagulant at least five times or until the anticoagulant is thoroughly mixed with the blood. Refer to the chart in your textbook for the appropriate number of inversions. This may be done while observing the patient for any signs of fainting.

The patient is always the first concern on the phlebotomist. The puncture site must have pressure applied for 3 to 5 minutes to prevent the formation of a hematoma. A hematoma is caused by blood leaking from the vein into the tissues resulting in the formation of a bruise.

### Problems Encountered During the Venipuncture

In the event that you have been unable to puncture the vein immediately, use your free index finger to locate the vein. It may be that the needle has not gone in deeply enough or perhaps it is slightly to the left or right of the vein. This is painful to the patient and may cause tissue damage. Carefully withdraw the needle until the point is almost to the surface of the skin, and redirect the needle.

This procedure is acceptable if the needle is close to the vein, but care should be taken that the patient is not caused too much pain. Never go "digging" for veins. Sometimes a second venipuncture on the opposite arm is necessary. If a second unsuccessful attempt is made it may be best to have a different phlebotomist perform the venipuncture. The policy of most facilities is a maximum of 3 unsuccessful tries. But after you have missed a patient 2 times in a row both you and the patient have lost confidence which will probably lead to a third unsuccessful try.

If a patient is receiving intravenous infusions into both arms, it is acceptable to puncture the vein 3 or 4 inches below the site of the IV device. Never place a tourniquet on an arm above the IV site, because you may dislodge the IV needle placement, resulting in infiltration of tissues with the IV fluid. Never draw blood from above an IV site because the blood will be contaminated with the IV fluids resulting in inaccurate results. If the blood must be drawn above an IV site have the nurse turn the IV off, wait 5 minutes, perform the venipuncture discarding the first tube of blood drawn. After collection of the samples, have the nurse turn the IV back on.

If the area surrounding the puncture site begins to swell during the venipuncture, this usually indicates that the needle has gone through the vein

or that the bevel of the needle is halfway out of the vein and may result in a hematoma. A hematoma occurs when there is a leakage of blood into the tissues resulting in the formation of a bruise. The tourniquet should be released and the needle withdrawn immediately, with pressure applied to the site after needle removal, preferably with the arm raised above the head.

In some instances it is almost impossible to locate a vein in the arm. In such a case, the veins of the lower arm, hand or foot can be used. The student should gain a reasonable amount of skill and confidence and should have observed this type of procedure before attempting a venipuncture in these areas. Special permission from the physician may be required prior to drawing blood from these sites, especially the foot. Check your laboratories policies before proceeding.

Always treat the patient with respect, even when they are not respectful of you. Patients are usually in the hospital because of a severe illness or injury and do not feel good. It seems like people are constantly coming in to poke or prod them preventing them from getting the rest they need. They may be extremely irritable and decide that you are a good target to vent their frustration out on. In this type of situation it is extremely important to act in a tactful, professional manner. If the patient refuses to have his or her blood drawn, speak to them calmly and indicate that the blood tests are important in monitoring their condition.

If they still refuse do not attempt to perform the venipuncture. When patients are uncooperative there is a very real chance that a needle stick injury will occur. Notify the patient's nurse or the charge nurse that the patient refuses to be stuck so that the doctor can be notified.

### **Sources of Error:**

1. Failure to insert the needle completely into the vein. The phlebotomist should feel resistance initially following insertion of the needle. The resistance is almost immediately followed by a sensation of free or easier movement as the needle enters the vein. When the phlebotomist no longer senses that the needle has been inserted into the vein, the evacuated tube should be pushed onto the needle - NOT before.
2. Puncturing the stopper before entering the vein. If the phlebotomist partially pushes the evacuated tube onto the needle before inserting the needle into the vein, he/she risks puncturing the stopper and

- releasing the vacuum.
3. Not anchoring the vein before inserting the needle. The vein must be held in place for successful needle penetration.
  4. "Bouncing" the needle on the skin before guiding it into the vein. During venipuncture, the patient should only be stuck once with the needle.
  5. Not keeping the holder stationary, causing the needle to dislodge from the vein.

### **Rejection of Samples**

The quality of laboratory results are directly affected by the quality of the blood sample obtained from the patient. Samples may need to be rejected as unacceptable for the following reasons:

1. Hemolysis - this is usually caused by a procedural error such as using too small of a needle, or pulling back too hard on the plunger of a syringe used for collecting the sample. The red cells rupture resulting in hemoglobin being released into the serum/plasma, making the sample unsuitable for many laboratory tests. The serum/plasma will appear red instead of straw colored.
2. Clotted - failure to mix or inadequate mixing of samples collected into an additive tube. The red cells clump together making the sample unsuitable for testing.
3. Insufficient sample (QNS) - certain additive tubes must be filled completely. Incorrect blood to additive ratio will adversely affect the laboratory test results. When many tests are ordered on the same tube be sure to know the amount of sample needed for each test.
4. Wrong tube collected for test ordered. Always refer to procedure manual when uncertain.
5. Improper storage - certain tests must be collected and placed in ice, protected from light, or be kept warm after collection.
6. Improperly labeled.

## First Aid Following Accidental Needle stick

Regardless of the disease the patient has, be careful not to stick yourself with a used needle. If an accidental stick does happen, immediately

1. Go to the sink, turn on the water, and bleed the site well by alternating squeezing and releasing the area around the site.
2. Do this for approximately 3 to 5 minutes.
3. Afterwards scrub the site with an alcohol swab.
4. Follow with a thorough hand washing.
5. Report it to your supervisor immediately.

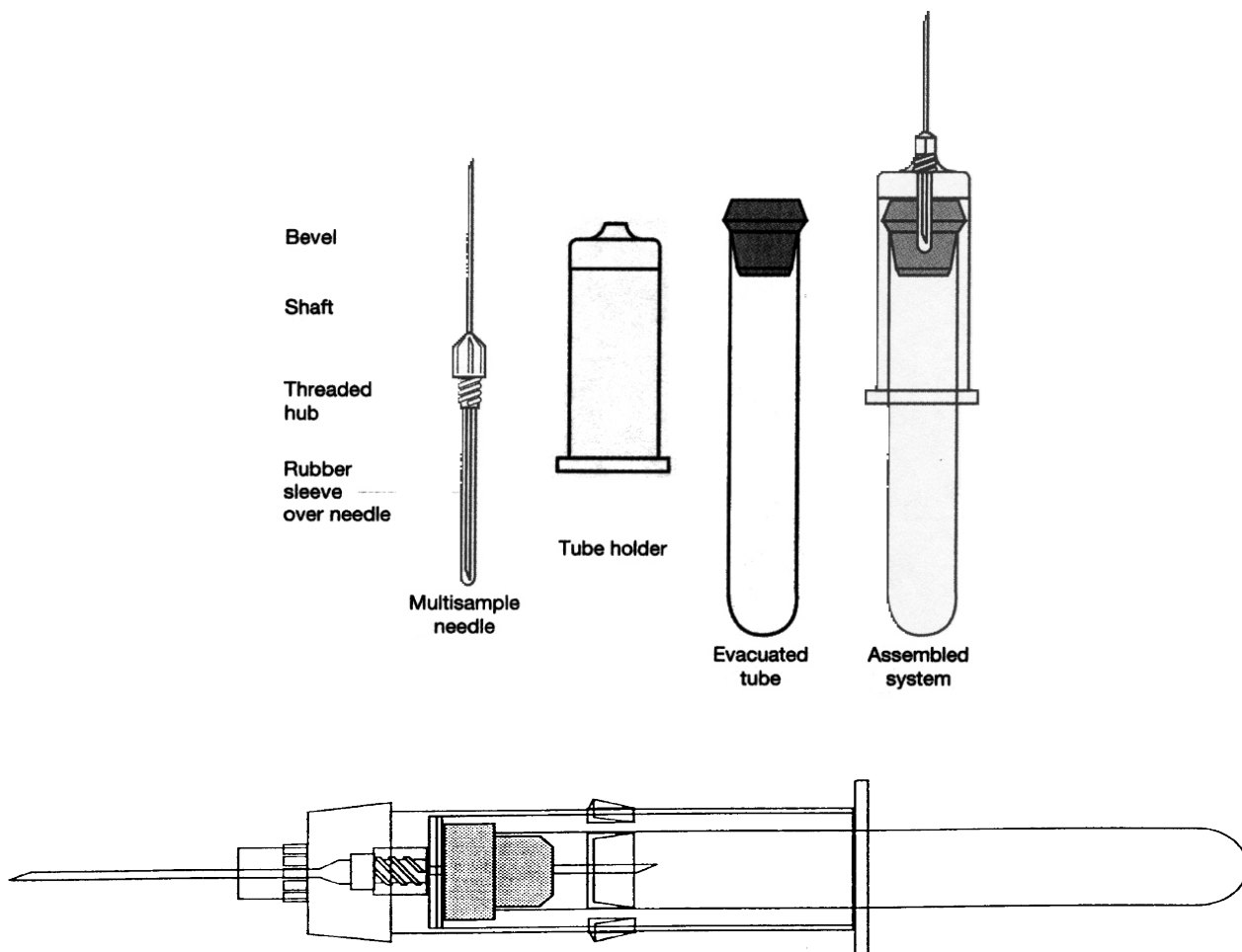
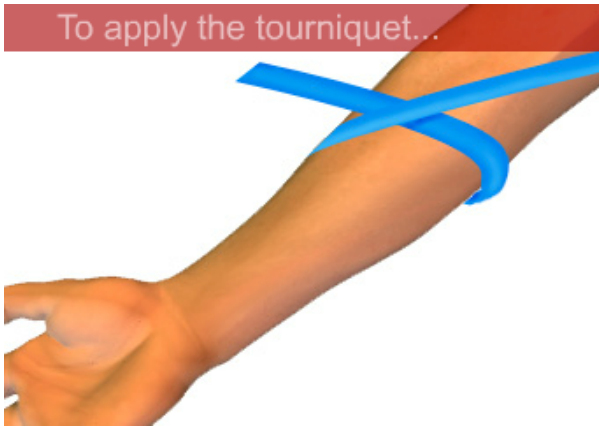


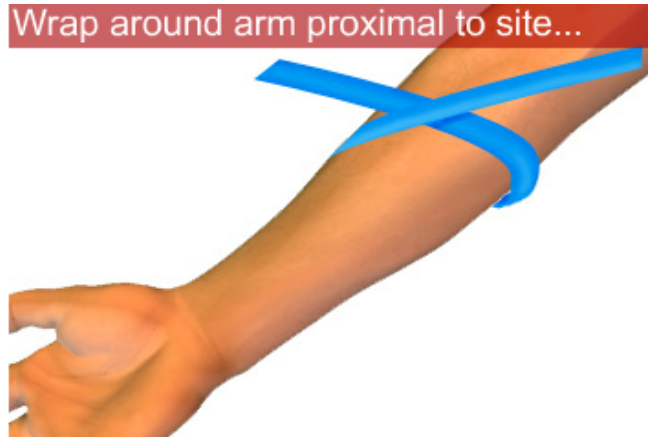
Figure 7-6. Components of the evacuated tube system, p. 157. Copyright © 1998 Lippincott-Raven Publishers, McCall and Tankersley's *Phlebotomy Essentials*, second edition.

## Tying the Tourniquet

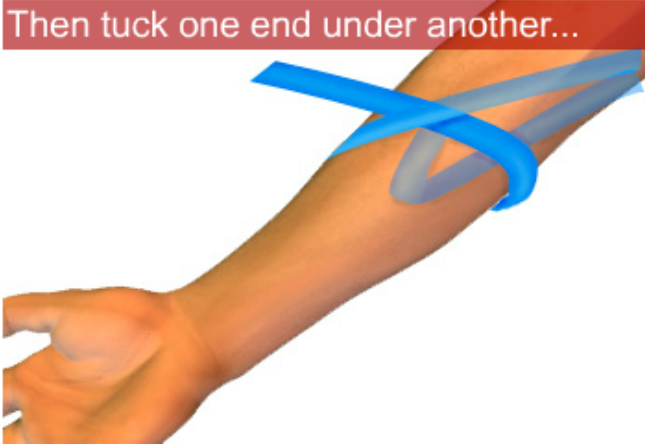
To apply the tourniquet...



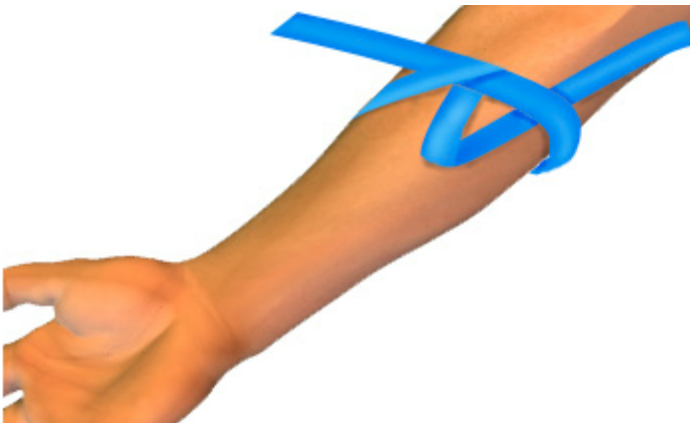
Wrap around arm proximal to site...



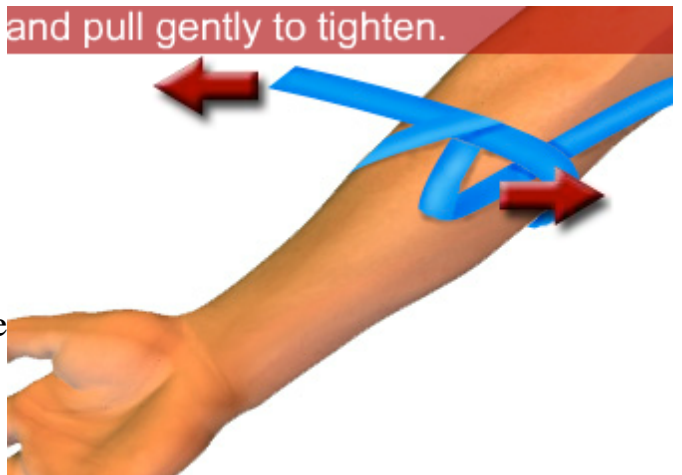
Then tuck one end under another...



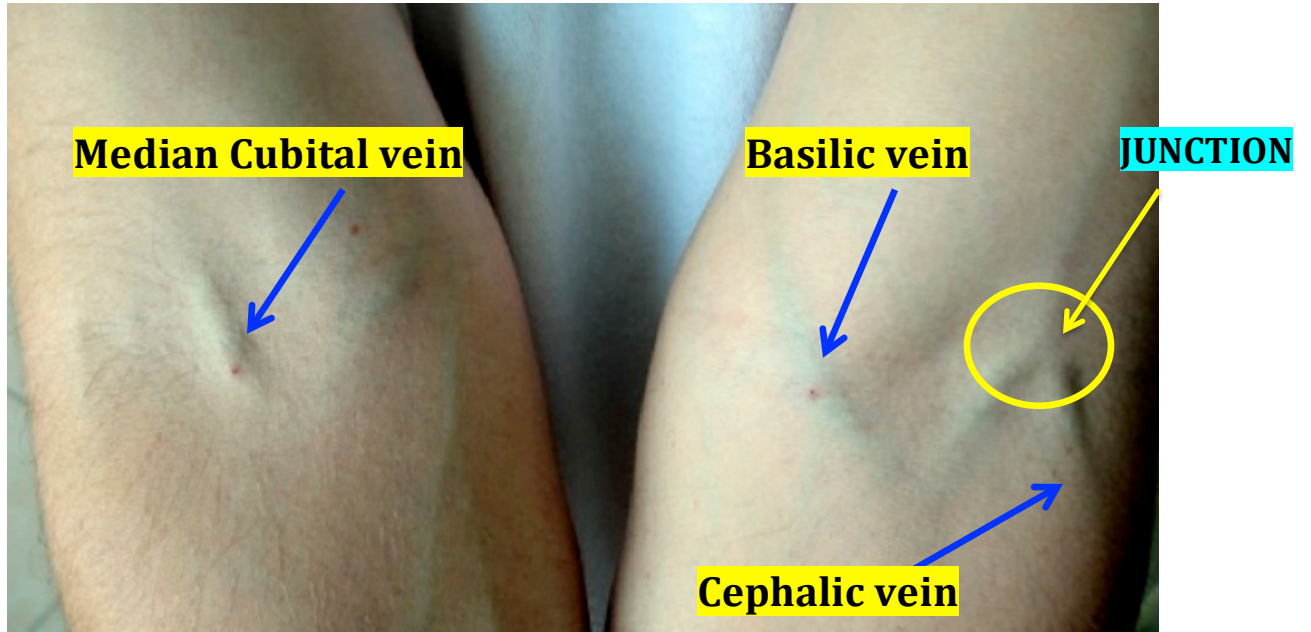
and pull gently to tighten.



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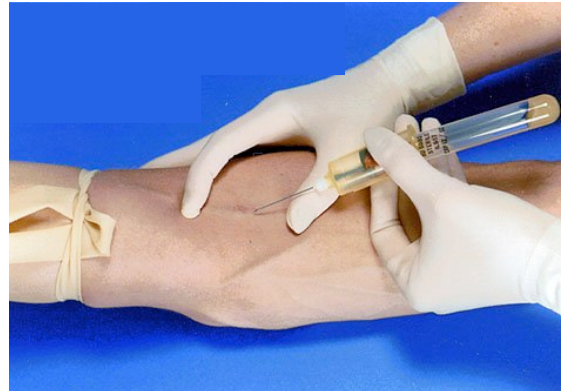
### Palpating the Vein



## Cleansing the Site



## Performing the Venipuncture

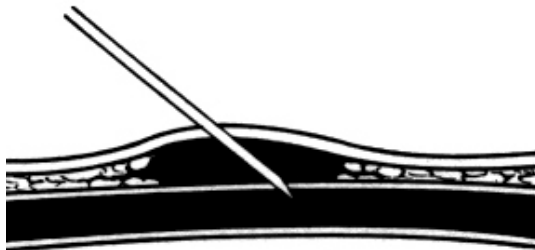




A. Correct insertion technique; blood flows freely into needle.



B. Bevel on vein lower wall does not allow blood to flow.



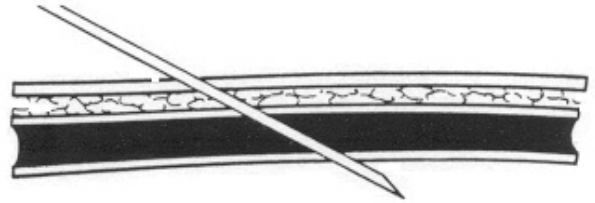
C. Needle partially inserted and causes blood leakage into tissue.

**Figure 10-6** Proper and improper needle positioning.

A. Proper needle position. B. Needle bevel against the upper wall of a vein. C. Needle bevel against or embedded in opposite wall of vein. D. Needle inserted all the way through a vein. E. Needle partially inserted into vein. F. Needle in collapsed vein.



B. Bevel on vein upper wall does not allow blood to flow.



D. Needle inserted too far.



F. Collapsed.

Completing the Venipuncture- Always remove the tube from the back of the vacuum needle FIRST.

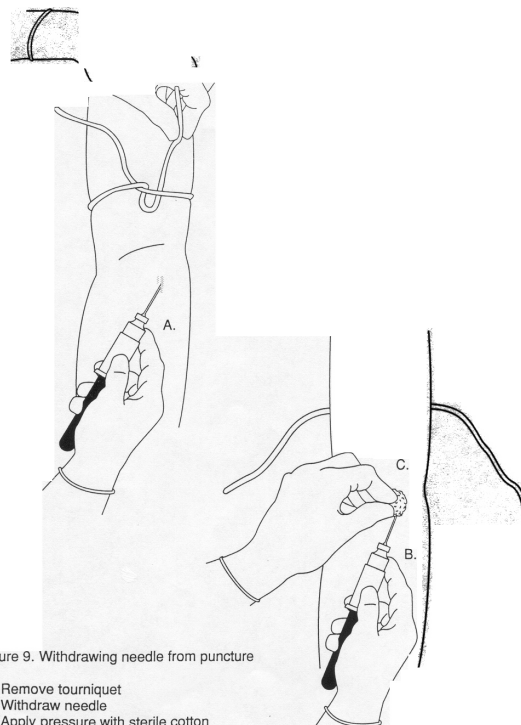


Figure 9. Withdrawing needle from puncture

- A.) Remove tourniquet
- B.) Withdraw needle
- C.) Apply pressure with sterile cotton

## Introduction:

Quality test results depend heavily on proper patient identification and preparation. The student phlebotomist should "interview" the artificial arm to determine both the patient's identity and the patient's adherence to preparation guidelines. Not all laboratory tests have special patient preparation guidelines. In fact, most do not. However, the phlebotomist must remember to screen the patient regarding these guidelines whenever appropriate. You will practice on the artificial arms and must perform 3 successful multi-draws (two to three tubes of blood drawn).

## Materials:

1. Artificial arm
2. Vacuum tube holder
3. 21 or 22 gauge vacuum multi-sample needles
4. Tourniquet
5. Alcohol pads
6. Vacuum tubes

## Instructions:

Each venipuncture must be witnessed and evaluated by your lab partner or instructor, using the checklists. Your partner must fill out the checklist for your third successful stick. Remember the purpose of this exercise is to allow you to learn and develop good venipuncture technique. Don't be shy about tactfully calling your lab partner's attention to mistakes he/she made.

## **Procedure:**

**NOTE:** This is an overview of the steps of the procedure. You will be using the evaluation sheets in this lab to evaluate each other on the draws.

1. Watch instructor demonstration of venipuncture on the artificial arm.
2. Wash hands.
3. Role play: Approach the patient, identify yourself, the department you represent, and the procedure you are about to perform., identify the patient and explain the procedure to the patient.

4. Assemble equipment and supplies.
5. Prepare the vacuum system by attaching the needle to the hub and positioning a tube in the holder.
6. Apply the tourniquet and examine the arm for palpable veins.
7. Palpate the veins.
8. Release the tourniquet, cleanse the chosen site with a 70% alcohol swab. Begin at the puncture site selected and move the alcohol pad outward, in concentric circles (experienced phlebotomists are so quick that they may not release the tourniquet during site preparation).
9. Allow the site to air dry.
10. Reapply the tourniquet, making sure that the ends do not touch the prepared site.
11. Ask patient to clench fist tightly.
12. Position the holder in the palm of your hand between your thumb and index finger. Your palm should be pointing to the left if you are right-handed, and to the right if you are left-handed.
13. Uncap the needle. Inspect the needle for manufacturer's defects.
14. Anchor the vein selected, using the thumb and index finger.
15. Position the needle in the same direction as the vein selected. Insert the needle, bevel up, at a 15- degree angle. The needle should be inserted in one smooth motion. Only the index finger and thumb should move forward to guide the needle into the vein.
16. Release the vein and push the evacuated tube onto the back of the needle. Be sure to keep the holder stationary. Once the tube has been pushed onto the needle, take your hand off of the tube. If the stopper of the tube has been punctured by the back of the needle, and blood is

- not entering the tube, pushing on the tube will not cause blood to enter it.
17. Allow the tube to fill, when the vacuum has been exhausted, blood will no longer enter the tube.
  18. Keeping the holder absolutely still, pull the evacuated tube of the back of the needle and replace it with the second tube (if the first tube contained an additive, gently invert it while waiting for the second tube to fill).
  19. Once blood begins to enter the second tube, release the tourniquet within one minute of application.
  20. Pull the evacuated tube off of the needle. Allow it to rest in the holder.
  21. Place a piece of gauze or a cotton ball over the puncture site, do not push down on the gauze.
  22. Remove the needle from the patient's arm and immediately apply pressure with the gauze.
  23. Withdraw needle and immediately activate the needle safety device and place the needle assembly in disposal container.
  24. If the last evacuated tube collected contains an additive, invert gently several times to mix the blood with the additive.
  25. Inspect puncture site, apply bandage if needed.
  26. Label the tubes collected IMMEDIATELY as follows (this can be done as a role play, pretend to write and state to your partner what you are writing on the tube): Artificial Arm, Attempt \_\_\_\_ (the number of the attempt), date, time, and your initials
  27. Discard materials in appropriate waste receptacle and disinfect work area.
  28. Remove gloves, wash hands and leave patient courteously.

## Procedure 2: The Unsuccessful Attempt

### **Introduction:**

Venipuncture of the artificial arms is a learned skill. Therefore, it is unrealistic to complete the 3 successful draws in 3 attempts. Students must know how to react if a procedure is not successful in securing a specimen.

If the phlebotomist does not achieve blood flow into the evacuated tube the following steps should be performed.

### **Procedure:**

16. Release the tourniquet.
17. Remove the evacuated tube from the back of the needle.
18. Place gauze over the puncture site and carefully withdraw the needle.
19. Immediately place the needle into a needle disposal container.
20. Beginning at step #6 of procedure 1, repeat the procedure.

The evaluator should be very critical of the phlebotomist's technique. Remember, the person practicing on the artificial arm today may be your phlebotomist in the future. React as though the artificial arm were your own.

Exercise 2: Venipuncture Vacuum Tube Collection

Phlebotomist \_\_\_\_\_

Patient \_\_\_\_\_

**Circle One: LIVE STICK    DUMMY ARM**

For each of the following select the letter that best describes the level of skill.

**(A) Performed    (B) Not Performed    (C) Needs Improvement**

1. \_\_\_\_ Washed hands properly.
2. \_\_\_\_ Put on gloves.
3. \_\_\_\_ Role play: Approach the patient.
4. \_\_\_\_ Role play: Identified the patient.
5. \_\_\_\_ Role play: Explained the procedure.
6. \_\_\_\_ Applies tourniquet.
7. \_\_\_\_ Proper palpation technique
8. \_\_\_\_ Releases tourniquet.
9. \_\_\_\_ Properly cleanses site.
10. \_\_\_\_ Selects and prepares appropriate equipment..
11. \_\_\_\_ Allows site to air dry.
12. \_\_\_\_ Reapplies tourniquet properly.
13. \_\_\_\_ Asks patient to clench fist.
14. \_\_\_\_ Positions evacuated tube in holder; uncaps needle.
15. \_\_\_\_ Inspects needle for manufacturer's defects.
16. \_\_\_\_ Anchors vein with thumb and index finger.
17. \_\_\_\_ Inserts needle, bevel up, at correct angle.
18. \_\_\_\_ Inserts needle in same direction as the vein.
19. \_\_\_\_ Pushes evacuated tube onto needle, without moving the holder.
20. \_\_\_\_ Draws evacuated tubes in the appropriate order, mixing blood with additive as necessary.
21. \_\_\_\_ Changes tubes without moving needle in or out.
22. \_\_\_\_ Releases tourniquet.
23. \_\_\_\_ Removes last tube from needle.
24. \_\_\_\_ Places gauze over puncture site.
25. \_\_\_\_ Withdraws needle, immediately activates needle safety device and places the needle assembly in disposal container.
26. \_\_\_\_ Inspects puncture site, applies bandage if necessary.
27. \_\_\_\_ Labels tubes correctly.
28. \_\_\_\_ Labels tubes immediately after drawing.
29. \_\_\_\_ Discards used materials in the appropriate receptacle (biohazard or regular trash).
30. \_\_\_\_ Disinfects work area.
31. \_\_\_\_ Removes gloves and immediately washes hands.
32. \_\_\_\_ Leaves patient courteously.

(You will need 3 copies of this page)



Name \_\_\_\_\_

### PATIENT RECORD SHEET

This form is to be used through out the semester to document blood collections in student laboratory. Keep it at the front of your laboratory notebook. Each successful live arm blood collection or capillary collection counts towards successful completion of the course. (YOU will make multiple copies of this sheet.)

	<b>DATE</b>	<b>PATIENT NAME</b>	<b>PROCEDURE PERFORMED</b>	<b>SUCCESS YES      NO RECOVERED</b>	<b>STOPPER COLOR(S)</b>	<b>INSTRUCTOR INITIALS</b>
<b>1</b>						
<b>2</b>						
<b>3</b>						
<b>4</b>						
<b>5</b>						
<b>6</b>						
<b>7</b>						
<b>8</b>						
<b>9</b>						
<b>10</b>						
<b>11</b>						
<b>12</b>						
<b>13</b>						

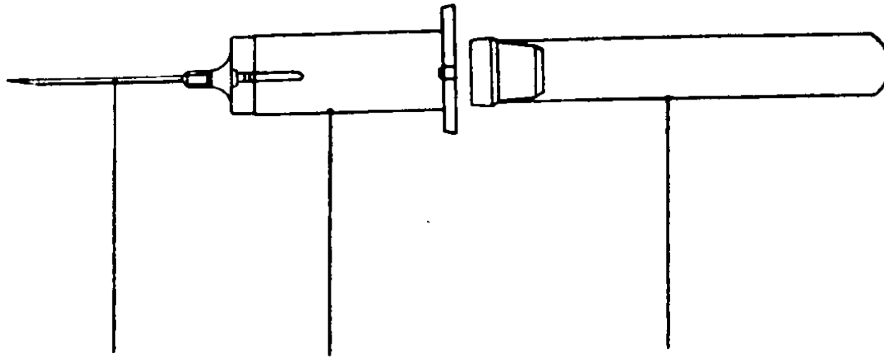
## EXERCISE 2: VENIPUNCTURE - STUDY QUESTIONS

Name \_\_\_\_\_

Date \_\_\_\_\_

Points: 42

1. Label the following diagram (1.5 points).



2. Define the following terms (0.5 point each)

- a) "needle gauge"
- b) "bevel"
- c) "vacuum holder"
- d) "vacuum tube"
- e) "anticoagulant"

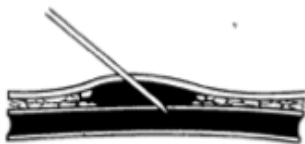
3. For each of the stopper colors listed below state the additive in the tube AND what the sample is used for (0.5 each part).

Stopper Color	Additive Present	Sample Use
a. Red		
b. Red and black mottled top		
c. Light blue		
d. Green		
e. Lavender		
f. Gray		
g. Black		
h. Royal blue		
i. Brown/Tan		
j. Yellow		

4. Describe how a phlebotomist can help prevent anxiety in the patient who has never had his/her blood drawn before. (0.5 point).

5. Explain why blood collection tubes should never be pre-labeled (0.5 point).

6. Describe the action which should be taken whenever the information on the patient's hospital armband does not match the information on the laboratory requisition slip (0.5 point).
7. Describe how an outpatient is properly identified prior to drawing a blood sample (0.5 point).
8. List the steps to be performed (in the correct order) when a patient appears about to faint (2 points).
9. Define "tourniquet" and describe a) how the phlebotomist knows when it is inappropriately applied, b) if it is too tight and c) if it is too loose.(2 points).
10. List the veins of choice for performing venipuncture (1.5 points).
11. List three sources of error which may be the cause of an unsuccessful real arm (not dummy arm) venipuncture attempt (1.5 points).
12. Describe the following needle positions AND indicate whether it is correct or incorrect positioning (3 points).



13. Define "hematoma" and how these are caused during venipuncture (1 point).
14. What is the maximum number of venipuncture attempts which should be attempted (0.5 point)?
15. State the reason why a phlebotomist must never place a tourniquet on an arm above an IV site (1 point).
16. Describe how a blood sample collected at a site above an IV will be affected and how this will impact results of laboratory testing performed on the sample (1 point).
17. List the 4 steps which must be performed when a sample must be drawn above an IV site (2 points).
18. List 3 alternate venipuncture sites in cases when it is impossible to locate a vein in the patient's arm (1.5 points).
19. Briefly describe the 5 steps to follow immediately after an accidental needle stick injury (2.5 points).
20. Describe the proper action to take when a patient initially refuses to have his/her blood drawn (0.5 point).
21. List the sequence of collection of evacuated tubes in a multi-draw (2 points).
22. List 4 reasons that a blood sample may be rejected by the laboratory (2 point).
23. Briefly summarize the steps for performing a routine venipuncture (2 points).

