National Center for Competency Testing

Frequently Asked Questions About Phlebotomy

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COURSE DESCRIPTION

Many healthcare professionals view the collection of blood as a simple procedure. However, phlebotomy is a detailed procedure that, if not performed correctly, can affect the accuracy of laboratory test results and can even cause permanent disability in the patient. Phlebotomy is also an evolving profession. What was the standard of practice five years ago is perhaps now no longer the standard of practice. This CE module answers questions asked by practicing professionals about a wide range of topics including safe needle devices, wearing gloves, order of draw, difficult patients, volume requirements, and more.

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COURSE TITLE: Frequently Asked Questions about Phlebotomy

Author: Lucia Johnson, MA Ed, CLS(NCA), MT(ASCP)SBB
Director of Continuing Education
National Center for Competency Testing

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Upon completion of this continuing education module, the professional should be able to:

1. List the approved order of draw.
2. State the reference used to define the order of draw.
3. Identify test results that are affected by prolonged tourniquet application.
4. Identify the potential consequences resulting from a healthcare worker's failure to wear gloves during a blood collection procedure.
5. List common causes of "poor" veins and tips used to obtain blood from patients with these issues.
6. Identify potential causes of anger exhibited by patients and family members.
7. Describe tips that can be used to respond to an angry patient or family member.
8. State the reason that needles should not be placed in tube holders until at the patient's bedside.
9. Describe possible repercussions of failure to positively identify patients.
10. State the reason a venipuncture must be stopped immediately in the event of a nerve puncture or nick.
11. Describe phlebotomy actions that could result in a lawsuit.
12. Identify methods used by a phlebotomist to minimize the potential of legal action.
13. Identify recommendations to prevent the formation of a hematoma.
14. State reasons skin antiseptics must be allowed to dry prior to venipuncture.
15. Identify venipuncture sites that are acceptable for use when the arm has an IV.
16. Describe the procedure used when collecting blood specimens from an arm with an IV.
17. State reasons that wrist veins cannot be used for venipuncture.
18. Identify the importance of obtaining the recommended volume of blood for blood cultures.
19. Describe ways a phlebotomist could become infected with MRSA.
20. Identify factors involved in determining the specimen type used for lab testing.
21. Describe reasons that discard tubes are no longer required when performing a venipuncture for a protime (PT) or activated thromboplastin time (aPTT).
22. Identify the exception to the rule regarding objective #21.
23. Define the use of the recently marketed pink closure evacuated tube.
24. Identify the advantages of using a lavender closure tube versus a red closure tube for blood bank testing.
25. List lab tests where the specimens must be chilled or kept warm immediately after collection.

26. List causes of prolonged patient bleeding following a venipuncture and the steps a phlebotomist should take when this occurs.
27. Identify the need for blood transfer devices.
28. Describe the rationale for following the manufacturer's instructions for operation of safe needle devices.
29. Describe reasons for the change in the Bloodborne Pathogen Rule that required tube holders to be single-use only.
30. State the minimum acceptable volumes for evacuated blood collection tubes.
31. Describe the significance of artificial nails, nail length, and chipped nail polish in the healthcare environment.

FREQUENTLY ASKED QUESTIONS ABOUT PHLEBOTOMY

QUESTION: ***I have worked at three different places and the order of draw was different at each place. How do I know what is the right order of draw?***

Answer: There is only one **recommended** order of draw. The recommended order of draw is found in the most current edition of the Clinical and Laboratory Standards Institute *Procedures for the Collection of Diagnostic Blood Specimens by Venipuncture*, H3-A6. This document originated in 1977 and updates are prepared as needed. The latest edition is H3-A6, published in October 2007.

The Clinical and Laboratory Standards Institute (CLSI), formerly known as the National Commission on Clinical Laboratory Standards (NCCLS), is an international, nonprofit organization that develops standards and guidelines for patient testing and related healthcare issues. Healthcare professionals voluntarily participate in CLSI projects. Individuals involved in the phlebotomy standards include experts in the profession of phlebotomy and experts employed by the makers of venipuncture equipment.

The purpose of the order of draw is to avoid possible test result error due to cross contamination from tube additives. While it might seem impossible for the very small amounts of additives in tubes to cause inaccurate test results, extensive research has been performed that indicates this is quite possible. For example, if a:

- lavender closure tube is collected before a red or green closure tube: the potassium becomes falsely increased and the calcium becomes falsely decreased.
- gray closure tube is collected before a lavender closure tube: the microscopic morphology of blood cells becomes distorted leading to inaccurate red and white blood cell evaluations.

The recommended order of draw follows. It should be used for both glass and plastic venous blood collection tubes. The same order of draw is also used for collections using a syringe or an evacuated (collection tube & tube holder) system.

Order	Tube	Closure Color
1	Blood culture, i.e., sterile specimens	Blood culture bottles, yellow closure with sodium polyanethol sulfonate (SPS)
2	Coagulation tube (sodium citrate)	Blue closure
3	Serum tube with or without clot activator, with or without gel	Red/gold/speckled red and black closure
4	Heparin tube (lithium or sodium) with or without gel plasma separator	Green closure
5	EDTA	Lavender closure (also called purple); pink closure
6	Glycolytic inhibitor	Gray closure
7	ACD solution	Yellow closure (not the same tube as SPS)
8	All other tubes in no particular order unless otherwise directed	

The order of draw is changed when new research indicates a probable interference or inaccuracy in test results.

QUESTION: ***What will happen if a tourniquet is not removed in the recommended time?***

Answer: Inaccurate laboratory test results may occur if a tourniquet is not removed within one minute. When a tourniquet is applied, the local blood flow is stopped. This leads to concentration of the blood and blood entering the surrounding tissue. This may result in falsely high values for all protein-based analytes, increased packed cell volume, and changes in other cellular elements.

The most current edition of the CLSI *Procedures for the Collection of Diagnostic Blood Specimens by Venipuncture*, H3-A6, states that the tourniquet application for preliminary vein selection should not exceed one minute.

For most patients, it is easy to release the tourniquet within the one-minute period. Most veins are easily located and the venipuncture procedure can be completed quickly. Following is an alternative procedure that can minimize the amount of time the tourniquet is on a patient. This process is also useful if you are not sure what type of venipuncture equipment you will actually be using to collect the specimen.

1. Confirm the identity of the patient.
2. Cleanse hands.
3. Place the tourniquet on the arm.
4. Locate the vein to be punctured.
5. Identify the actual site to perform the puncture by noting a “landmark” such as a freckle, hair, scar, etc.
6. Release the tourniquet.
7. Put on gloves.
8. Cleanse the arm with 70% isopropyl alcohol or other appropriate antiseptic.
9. Assemble the venipuncture equipment.
10. Assure the antiseptic has dried on the arm.
11. Retie the tourniquet. Do NOT repalpate the site.
12. Locate the “landmark” and perform the venipuncture.
13. Release the tourniquet as soon as possible* after blood has been obtained.
14. Complete all other specimen collection steps.

If you are having difficulty locating a venipuncture site, release the tourniquet and wait at least two minutes to allow the blood to return to “normal” before retying it.

*When should the tourniquet be released? While it is important to minimize the length of time a tourniquet is tied in place during the actual collection, it is also important to maximize your chances of obtaining all of the blood needed for patient testing. If collecting only one tube, it is recommended to release the tourniquet as soon as blood begins to flow into the tube. If several tubes are needed, the tourniquet may need to stay in place until blood begins to flow into the last tube being filled. Always use your best judgment to assure sufficient specimens are collected while minimizing the amount of time the tourniquet is in place.

QUESTION: ***I don't like to wear gloves when drawing blood. What will happen if I don't wear them?***

Answer: Failure to wear gloves during blood collection procedures increases the healthcare worker's risk of exposure to bloodborne pathogens including, but not limited to, the Human Immunodeficiency Virus, Hepatitis B virus, and the Hepatitis C virus. Obviously, examination gloves will not stop a needle from puncturing the skin. However, if an accidental needlestick occurs when wearing gloves, the gloves will greatly reduce the amount of blood entering the skin of the healthcare worker.

Twenty-five years ago, the Occupational Safety and Health Administration (OSHA) released the Occupational Exposure to Bloodborne Pathogens, Final Rule, 29 CFR 1910.1030. This is a United States federal law that states, "Gloves shall be worn... when performing vascular access procedures...." The standard goes on to state gloves must be worn "when it can be reasonably anticipated that the employee may have hand contact with blood, other potentially infectious materials, mucous membranes, and non-intact skin...." Venipuncture and skin puncture are vascular access procedures.

NOTE: Volunteer blood donation centers are the only instance where some flexibility is permitted regarding the use of gloves and phlebotomy, and even then certain requirements must be fulfilled. If an employer in a volunteer blood donation center judges that routine gloving for all phlebotomies is not necessary then the employer must (1) periodically reevaluate this policy; (2) make gloves available to all employees who wish to use them for phlebotomy; (3) not discourage the use of gloves for phlebotomy; and (4) require that gloves be used for phlebotomy when the employee has cuts, scratches, or other breaks in the skin; when the employee judges that hand contamination with blood may occur (e.g., performing phlebotomy on an uncooperative source individual); or when the employee is receiving training in phlebotomy.

The Bloodborne Pathogen Rule requires employers to provide gloves in appropriate sizes and accessible locations at no cost to employees. Employers must provide alternatives for those who have allergies to the gloves normally provided. Employers who fail to comply with or enforce the Bloodborne Pathogen Rule are subject to severe monetary fines.

The Bloodborne Pathogen Rule does not state exactly when during the phlebotomy procedure gloves need to be donned. However, the CLSI *Procedures for the Collection of Diagnostic Blood Specimens by Venipuncture*, H3-A6 states that gloves should be put on after site selection and just before site preparation. This allows vein palpation to occur without gloves. (NOTE: Gloves must be worn for the entire phlebotomy procedure when drawing blood from a patient in an isolation room.)

QUESTION: ***How do I deal with a patient who has poor veins?***

Answer: A patient with poor veins must be approached with thoughtfulness when it comes to blood specimen collection. Venipuncture techniques may need to be altered, an alternative site chosen, or the performance of a skin puncture may be required to obtain specimens.

There are both physical and clinical reasons that may make a patient difficult to draw. Some practices can improve the chance of obtaining blood via venipuncture.

- Physical Difficulties
  - The vein rolls: Rolling veins are often found in older men and women. The movement of the vein is due to the lack of supportive, subcutaneous fatty tissue. To improve the chances of obtaining a specimen:
    - Use the thumb to anchor the vein below the venipuncture site, slightly stretching out the vein so that it cannot roll.
    - Position the arm so that the area to be drawn is extended as flat as possible.
    - Insert the needle quickly.
  - The vein collapses: Veins may collapse when blood is removed too rapidly or forcibly. Although this can happen with any vein, this is most common with small veins and/or the veins of the elderly.
    - To avoid this occurrence, use the smaller sizes of vacuum tubes when collecting blood from fragile and/or veins of the elderly.
    - If the vein collapses, leave the needle in and apply pressure above the puncture site on the vein with the flat end of the free index finger, then release pressure. This will allow the vein to fill up and blood to flow.
  - The vein is completely missed:
    - Draw the needle straight back until only the bevel is beneath the skin. Reposition the needle, anchor the vein, and quickly pierce the vein.
    - If the needle has gone completely through the vein, a hematoma may rapidly develop. If this occurs, release the tourniquet, remove the needle, and apply pressure.
    - Always palpate beyond the needle's position in the skin or to the side.
    - When a small quantity of blood leaks into the venipuncture site, the needle may only be partially inserted into the vein. Slightly push the needle in a little farther.
  - The veins are small, fragile, or superficial:
    - Be prepared to collect small volumes of blood. Know what tests can be grouped together and the minimum volume of blood needed.
    - Use a winged infusion set with a syringe. Small fragile veins my collapse when evacuated tubes are used to collect blood.
    - Allow syringe to fill slowly so as not to collapse the vein or hemolyze the sample.
  - There are no good veins available:
    - Check all possible sites again. Consider ankle veins if the patient's condition allows use of this site. NOTE: Most facilities require permission of the physician to perform venipuncture on ankle veins.
    - Warm the site by applying a warm washcloth/paper towel or chemical warmer.
    - Move the arm or hand to a downward position.
    - Consider collecting the specimens using a skin puncture.
  - No blood is obtained when you are sure the vein entered:
    - A slight position adjustment may be needed to get blood flowing into the tube.
    - The needle may have gone through the vein. Slightly back the needle out to correct.

        - The bevel of the needle may be up against the wall of the vein. Rotate the needle minutely to free up the bevel.
        - Sometimes pressing and pulling down a little bit on the skin or slightly changing the angle of the needle will allow blood to flow.
        - It is possible for a vacuum tube to be defective and not draw blood into it. A new tube should be placed in the holder if there is no explanation as to why blood is not flowing into the tube.
- Clinical conditions
    - Burns: Burn sites are unacceptable for phlebotomy. Areas free of burns must be inspected for possible venipuncture sites. If only small quantities of blood are required, skin puncture may be necessary.
    - Breast cancer surgery patients: Blood samples should not be collected from the arm on the side a patient has had breast cancer surgery (a mastectomy or a lumpectomy with lymph node removal). The presence of lymph fluid dilutes the blood in this area, giving erroneous patient test results. The lymph fluid may also make the patient's arm swollen thus making tourniquet application painful. Additionally, skin puncture should not be performed on the side of breast cancer surgery. In addition to altering test results, the performance of venipuncture, skin puncture, injections, etc. on breast cancer surgery patients may lead to the development of a bacterial infection.
    - Obese patients: The obese patient presents problems for venipuncture because the veins are much further from the surface and may be more difficult to feel.
        - Conventional tourniquets may be too short to fit around the arm without rolling and twisting. Extra long tourniquets can be purchased. A long length of Penrose drain tubing or a long Velcro closure strap often works better than a conventional tourniquet. A blood pressure cuff can also be used.
        - Palpate the area thoroughly, pressing to feel deep veins. Rotate the arm to better feel a vein. The cephalic vein may be more easily palpated by doing this.
        - If the patient has a double crease in the antecubital area, the median cubital vein may be palpable in between the two creases.
        - Never attempt to draw blood when a vein cannot be palpated.
    - IV fluids: Blood samples must never be drawn from above an IV site. The IV fluid entering the vein will dilute the blood sample, giving erroneous patient results. If no other site is available to draw blood, a skin puncture should be considered. If this is not a possibility, the next best solution is to draw from a vein distal to the IV (first choice) or proximal to the IV (second choice). The IV must be discontinued for a minimum of two (2) minutes before the blood specimens can be collected. Always indicate on the specimen tube label that the specimen was collected from an arm with an IV. Indicate the type of IV fluid on the label. Some facilities have policies that recommend the first 5 mL of blood collected be discarded as this blood may still be contaminated with IV fluid.
    - Hematoma: A venipuncture should not be made in the area of a hematoma. Stasis of blood flow in this area may lead to inaccurate patient test results. If no other site is available, it is acceptable to perform the venipuncture distal to the hematoma.

- Edema: Edema impairs circulation and may disrupt the exchange of oxygen and nutrients between the blood and tissue. Consequently, drawing blood specimens from edematous areas may result in inaccurate patient test results. Edematous tissue may also be fragile and damaged by tourniquet application and antiseptic application.
- Scar tissue/thrombosed veins: It is difficult to obtain blood from thrombosed veins or veins with scar tissue. In these situations, other sites should be selected or skin puncture should be considered.
- Indwelling lines (vascular access device, heparin lock, central venous catheter, cannula, fistula): Only trained personnel can obtain blood samples using these sites. Because lines are routinely flushed with heparin, a minimum of five (5) mL of blood must be collected and discarded before obtaining blood for laboratory tests.

QUESTION: ***How do I deal with an angry patient?***

Answer: Angry patients and families are a big challenge for healthcare workers. Anger is a normal emotion and, at one time or another, everyone has expressed anger. Patients and family members may have reasons for becoming upset and venting their anger. For example:

- They may be scared about the diagnosis and/or treatment of the patient's disease or disorder.
- They do not feel that they can vent their anger with their doctor or nurse for fear of some sort of retaliation with their care.
- If hospitalized, the patient may feel that he/she has lost all control over his/her life.
- If the patient is an outpatient, he/she may express anger for what he/she considers an extra-long wait for the phlebotomy procedure.
- Having blood drawn may be the last straw in a long series of tests he/she has undergone OR the patient's physician is ordering more and more blood tests to determine a diagnosis. The patient may be "fed up" with all of the testing.
- The patient may have had a bad phlebotomy experience in the past.
- The phlebotomist may just be in the wrong place at the wrong time.
- The patient may be concerned about the financial aspects of his/her situation.

There are tips on how to handle anger effectively. Although "fixing" the problems of the patient and/or their family members may not be the responsibility of the phlebotomist, the phlebotomist can play a role in diffusing the anger. Failure to try to diffuse the anger of the patient or his/her family members may have a negative impact on the patient's recovery and/or treatment.

Tips for handling angry patients and/or family members include:

- Stay calm. Do not take the anger personally. It is human instinct to respond with anger or even to want to leave the situation ("fight or flight" phenomenon). Stop all activity and focus on the situation at hand. Breathe slowly and deeply while concentrating on the situation.
- Let the patient/family member vent. Sometimes that is all that is needed. Do not interrupt. Patiently listen to the whole story. When the venting is clearly finished, the phlebotomist can begin to respond.

- When responding:
  - Speak slowly, gently, and clearly.
  - Use open body language. Keep your hands out of your pockets. Keep your arms uncrossed. Nod your head.
  - Use the patient's name. This personalizes the situation and gives the patient evidence that he/she is more than just the patient assigned to that room, i.e., the man in Room 345 or the woman with stomach cancer.
  - Be empathetic. Use statements such as "I understand that you are angry." "I understand how you feel." "I would have felt the same way."
- Offer a possible solution. For a phlebotomist to be able to do this, he/she should know to whom to refer an angry patient such as an office manager, nursing supervisor, patient representative, doctor, etc.

IMPORTANT NOTE: Only rarely do angry patients and/or family members become violent. However, if a phlebotomist feels threatened or frightened by a patient or a family member, he/she should seek immediate assistance.

QUESTION: Why is it wrong to organize my tray by putting needles into tube holders before going on a phlebotomy run?

Answer: Opening the sterile seal on the needle and inserting the needle into a tube holder any time before the actual venipuncture increases the chance that the needle will become contaminated with microorganisms. Venipuncture is an invasive procedure that must be performed in an environment that is as sterile as possible. Failure to maintain asepsis may lead to infections in patients. Needles should be opened and placed into holders at the patient's bedside.

QUESTION: What can happen if I do not identify the patient correctly?

Answer: If a patient is not positively identified and blood is collected and labeled with the wrong patient identification, the laboratory test results will not represent the status of the intended patient. Serious consequences may arise if the patient is treated based on the lab results. For example, under doses and/or overdoses of medications such as insulin and Coumadin® could be given to a patient. The worst-case scenario is a patient dying because of an incompatible blood transfusion.

Each patient should be identified with two unique identifiers. These identifiers include patient first/last name, medical record number, birth date, Social Security number, address, or unique number generated by a computer system. The patient should only have blood drawn if the two unique identifiers match exactly.

Failure of a phlebotomist to follow the facility's procedure for patient identification may result in termination and a lawsuit if the patient experiences permanent and/or serious consequences.

QUESTION: What happens if I accidentally hit a nerve while drawing blood?

Answer: Permanent disability due to nerve damage may result if a nerve is punctured or nicked during a venipuncture procedure. Several nerves lay among the muscles, veins, and arteries of the arm. The nerves include the axillary, radial, median, ulnar, and basilic. The median nerve is the nerve most likely to be punctured or nicked during

a venipuncture in the antecubital space. When this occurs, the patient will exhibit severe shooting “electric” pains in the arm. The venipuncture should immediately be discontinued and direct pressure applied to the site until any bleeding has stopped. A supervisor should be notified about the incident so the proper documentation and patient evaluation by a physician can occur.

If the venipuncture continues when the patient experiences severe pain associated with nerve puncture/nick, permanent nerve damage may occur. Life-long disability may occur. Only a physician can evaluate if nerve damage has occurred. Nerve damage resulting from venipuncture has led to lawsuits against the phlebotomist.

QUESTION: ***Can I be sued by a patient?***

Answer: Yes, healthcare workers who collect blood specimens can be sued for issues relating to blood specimen collection. Examples of lawsuits resulting from blood specimen collection include but are not limited to the following:

- misidentification of a patient or patient specimen that ultimately results in a patient’s death or prolonged recovery time,
- failure to perform the skin puncture or venipuncture following the approved facility procedure resulting in harm to the patient such as nerve damage resulting from trauma to the median nerve, bone infection resulting from a heelstick or fingerstick,
- failure to raise a bed rail that has been lowered during the phlebotomy procedure, resulting in the patient falling out of bed,
- collection of a blood specimen from a patient who has refused the procedure, and
- discussion or release of patient test results to unauthorized personnel.

It is important that healthcare workers responsible for the collection of blood specimens be aware of the risks involved in phlebotomy and methods to use to minimize them. Steps in risk management involve the identification of the risk, treatment of the risk using policies and procedures already in place, education for patients and employees, and evaluation of what should be done in the future. Phlebotomy policies and procedures should take into account inherent risks. It is imperative that individuals performing venipuncture procedures be correctly trained to follow the policies and procedures.

Lawsuits can be either civil or criminal. Criminal law is concerned with breaking state laws. A person convicted with a criminal offense can be imprisoned, fined, or both. Civil law is concerned with actions between two people (or groups of people such as a business or company) and is based on tort, a legal term referring to any act that results in an injury or damage willfully made by a private party against another party. A malpractice claim is a tort that may result in a person receiving money for damages caused by the other person, business, or company.

A patient is legally entitled to compensation for injuries caused by improper or careless treatment by a healthcare provider. Malpractice is a claim of improper treatment or negligence brought against a healthcare worker by means of a civil lawsuit. To support a claim of malpractice, it must be proven that there was negligence by the healthcare worker that caused harm to someone or something. It can involve doing something carelessly or failing to do something that should have been done. There are three levels of negligence: slight (not much), ordinary (failing to act as a reasonable, careful

person), and gross (willful and reckless). For negligence to be claimed there must be: 1) a legal duty or obligation owed by one person to another, 2) a breaking or breach of duty, and 3) harm done as a direct result of the action.

Informed consent means that the patient must be given adequate information as to the method, risks, and consequences concerning a procedure before consenting to it. A patient has a constitutional right to refuse medical treatment. A healthcare worker who attempts a venipuncture procedure without the patient's consent is violating this right and can be charged with assault and battery. Assault is defined as the threat to touch a person. Actually touching a patient without their consent is called battery.

In healthcare, confidentiality is maintaining the privacy of medical information about patients and employees. Information regarding an individual's test results, treatment, or condition is discussed only with those responsible for the medical care of that individual. Unauthorized release of information concerning an individual can lead to a claim of breach of confidentiality or invasion of privacy.

An individual responsible for collection of blood specimens can avoid legal action by doing the following.

- ◈ Always follow approved policies and procedures for patient identification.
- ◈ Always follow approved policies and procedures for labeling of patient specimens.
- ◈ Be cognizant of age related issues involving all aspects of collection of blood specimens, including patient safety issues, volume considerations, site of venipuncture or skin puncture, and phlebotomy techniques.
- ◈ Always follow approved policies and procedures for venipuncture and specimen collection.
- ◈ Always leave a patient room in the same manner as you found it, i.e., raise the bed rail if you lowered it to perform the venipuncture, etc.
- ◈ Never draw a blood specimen from a patient who has refused the procedure.
- ◈ Never release laboratory test information to unauthorized personnel.

<u>QUESTION:</u> What should I do if the patient starts to develop a hematoma?

<u>Answer:</u> If a hematoma begins forming at a fast rate, the venipuncture should be discontinued and pressure held on the puncture site with the patient's arm raised above his/her heart. If the hematoma is small, the venipuncture can be continued with caution.

A hematoma is a localized leakage of blood into the tissues. In phlebotomy, hematomas may form when the vein is punctured. The blood then clots and the hematoma appears as a dark blue-purple-red discoloration (a bruise) on the skin. Depending on the amount of blood that has leaked from the vein, the area containing the hematoma may be swollen and painful.

Blood may leak from a vein when the vein is punctured slowly allowing blood to flow out of the bevel of the needle or when the needle completely goes through the vein. While a hematoma can form on any patient type, elderly patients and patients taking anticoagulant drugs are more prone to form them.

A pressure bandage made out of Coban™ or folded gauze and tape should be placed on the venipuncture site with instructions for the patient to keep the bandage on for at least four hours. If the patient is taking anticoagulants, the healthcare worker should hold pressure on the venipuncture site until the site stops bleeding. A pressure bandage should then be applied.

A venipuncture should not be made in the area of a hematoma. Stasis of blood flow in this area may lead to inaccurate patient test results. If no other site is available, it is acceptable to perform the venipuncture distal to the hematoma.

Following are recommendations to prevent the formation of a hematoma.

- Make sure the needle fully penetrates the top wall of the vein as partial penetration may allow blood to leak from the partially inserted needle bevel.
- Release the tourniquet before removing the needle.
- Use only the major superficial veins for venipuncture.
- Hold the venipuncture equipment as still as possible when collecting blood.
- Before placing a bandage on the patient, assure the puncture site has stopped bleeding.
- Apply a pressure bandage by folding a small gauze pad on top of the site and covering with a bandage or Coban™.

QUESTION: ***I was taught to clean the venipuncture site with alcohol and then wipe the alcohol off with a cotton ball so it doesn't sting when the needle goes in. Why is this now considered wrong?***

Answer: All antiseptics must be allowed to dry in order to provide proper antisepsis. Antiseptics are substances or solutions used to prevent sepsis, a disease state resulting from the presence of microorganisms or their toxic products in the bloodstream. If the skin is not properly cleansed, bacteria from the skin may enter the blood system at the time of venipuncture. Wet antiseptics should never be wiped dry for the purposes of speeding up the venipuncture procedure.

70% isopropyl alcohol in the form of individually wrapped prep pads is the most common antiseptic used for routine blood collection. Other antiseptics include povidone iodine in several forms (prep pads for blood gas collection and sponge pads for blood culture collection). Chlorhexidine gluconate can be used for those allergic to iodine. Specialized procedures are necessary to cleanse the skin prior to the collection of blood cultures.

QUESTION: ***Why shouldn't I draw blood from an arm with an IV?***

Answer: Blood collected from an arm with an IV (including blood and blood product transfusion) may be contaminated with the intravenous fluids that could cause inaccurate test results. The other arm should be evaluated for blood specimen collection. If both arms are unsuitable for venous blood collection, skin puncture should be considered. If skin puncture is not an option, it is possible to draw blood from a distal site (first choice) or a proximal site (second choice) of an IV. The procedure follows.

- Ask the responsible caregiver to turn off the IV for at least two (2) minutes. Always assure that the flow has stopped before performing the venipuncture.

- Apply the tourniquet. When drawing distal to the IV, place the tourniquet between the IV and the venipuncture site.
- Complete the venipuncture procedure. NOTE: Some facilities recommend discarding the first 5 mL of blood collected as this could be potentially contaminated with IV fluids.
- Document that the venipuncture was performed proximal or distal to an IV. Include the contents of the IV and the arm used.

QUESTION: ***Why shouldn't I use the veins on the inside of the wrist?***

Answer: Small bones, nerves, arteries, and veins are closely placed in the wrist area. Puncturing or nicking a nerve could cause temporary or permanent nerve damage that could lead to a disability.

The latest version of CLSI *Procedures for the Collection of Diagnostic Blood Specimens by Venipuncture*, H3-A6 states that the veins on the palm-side of the wrist should not be used for venipuncture.

QUESTION: ***I have been told that when I am having problems getting enough blood for a set of blood cultures, it is OK to draw only the aerobic bottle. Why shouldn't we do this all of the time?***

Answer: To assure the best chance of culturing microorganisms from the blood, the specific blood volume requirements of the blood culture bottle manufacturer must be followed. This is to make sure there are actually enough bacteria in the blood to grow in the culture medium. The volume requirements vary considerably among manufacturers. Only on rare occasions should just one bottle be collected.

QUESTION: ***What is MRSA and how does it affect me as a phlebotomist?***

Answer: MRSA stands for Methicillin-Resistant *Staphylococcus aureus*. *Staphylococcus aureus*, abbreviated *S. aureus* or "staph", is a common bacteria carried on the skin and in the nose of many healthy people. Staph is a common cause of minor skin infections (pimples and boils) in the United States. Generally, these minor infections resolve themselves without the use of antibiotics. However, staph can also cause serious infections such as surgical wound infections, sepsis (blood stream infections), and pneumonia. Staph infections are generally treated with a group of drugs known as beta-lactam antibiotics. Beta-lactam antibiotics include methicillin, oxacillin, penicillin, and amoxicillin.

Some strains of *S. aureus* have become resistant to the beta-lactam drugs, making the infection very difficult to treat. All patients with MRSA require treatment with vancomycin or teicoplanin. These drugs are expensive, have toxic side effects, and administered by IV. Therefore hospitalization of the patient is required.

Individuals most at risk for infection with MRSA are patients that are hospitalized, live in nursing homes, have a compromised immune system, and/or are debilitated. MRSA is rarely a threat to the general public.

Healthy people can carry MRSA and can transmit the bacteria to others. Carriers are individuals that do not have symptoms of an infection but bacterial culture and

sensitivity tests identify MRSA on their hands or in their nose. Carriers are a problem in the healthcare setting. If a healthcare worker is identified as being a MRSA carrier, the person is treated by using a disinfectant such as chlorhexidine for washing hands, bathing, and washing hair, and is given an ointment antibiotic (mupirocin) to apply inside of the nose. A carrier may be removed from direct patient care in high risk settings.

The main method of MRSA is transmission via hands that may become contaminated by coming in contact with 1) colonized or infected patients, 2) colonized or infected body sites of the personnel themselves, or 3) devices, items, or environmental surfaces contaminated with body fluids containing MRSA.

Patients with MRSA are placed in Contact Precautions Isolation in a private room. To collect blood on a patient in Contact Precautions, the following must be done to prevent the healthcare worker from exposure to MRSA:

- Wear gloves when entering the room. Gloves must be worn at all times to assure the phlebotomist is protected from contaminated patient skin or environmental surfaces.
- Don a clean, nonsterile gown before entering the room to protect the skin and prevent soiling of clothing.
- Remove the gown and gloves before exiting the patient room and thoroughly wash hands with soap and water.

QUESTION: ***At my full time job, I am told to draw electrolytes in a green closure tube. At my part time job, they tell me to draw electrolytes in a red closure tube. Who is right?***

Answer: Both of your employers are right! It is the responsibility of the laboratory to determine the type of specimen to collect for testing. The determination is based on analytical method, type of analyzer used for the testing, and the manufacturer's recommendations for specimen type. In the case of electrolytes, different methods call for use of plasma, use of serum, or even the use of whole blood.

Sometimes the situation dictates the specimen type. For example, some laboratories may request a green closure tube for STAT testing as the testing can be done on plasma. The tube can be centrifuged immediately upon receipt and there is no wait time required for specimen clotting.

QUESTION: ***Where I used to work, it was required to collect a little bit of blood in a discard tube before drawing a PT. At my new job, I am told that this is not necessary. Who is right?***

Answer: Your new employer is correct. In the past, there was concern that the first blood collected into a tube or syringe was contaminated with tissue thromboplastin resulting from the entry of the needle into the skin. The presence of tissue thromboplastin in a blue closure tube could alter the results of the routine coagulation tests, protime (PT) and activated partial thromboplastin (aPTT). Therefore, it was necessary to collect a small quantity of blood in another tube to assure that no tissue thromboplastin would contaminate the blue closure tube.

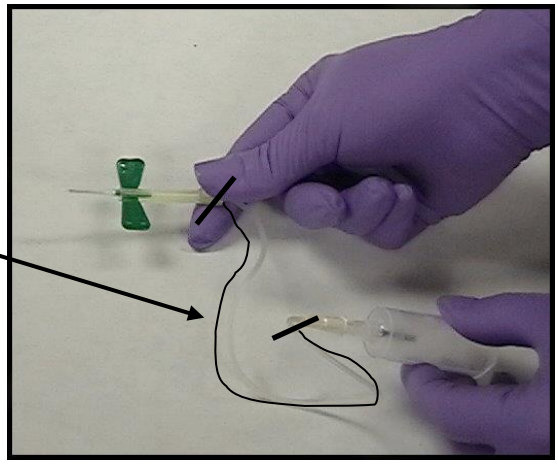
Research now indicates that trauma to the skin during a venipuncture is minimized with today's single use and finely sharpened needles. The amount of tissue thromboplastin generated from a venipuncture today is minimal and will not affect the results of PT and aPTT testing. However, studies have **not** been performed for other coagulation tests so a discard tube should be filled with a small volume of blood prior to collecting blood into a blue closure tube.

NOTE: The "no discard tube needed" policy applies only when using a routine venipuncture with needle/tube holder or needle/syringe. If using a winged infusion set, refer to the next question.

QUESTION: ***Why do I have to use a discard tube when drawing a blue closure using a winged infusion set?***

Answer: When using a winged infusion set to collect blood for coagulation testing (PT, aPTT, and other coagulation tests), a small volume of blood must first be collected into a discard tube. If this is not done, the volume of blood collected into the blue closure tube will be incomplete due to the displacement volume in the winged infusion set tubing.

Displacement volume in winged infusion set tubing



Photograph courtesy of Ann Gray, Inpatient Phlebotomy Supervisor, Physicians Reference Lab, Kansas City, Missouri

NOTE: All pictures are best viewed from the NCCT website or the Continuing Education CD-ROM.

QUESTION: ***Blood bank specimens used to be collected in red closure tubes. Now they are collected in lavender closure tubes. Why did it change?***

Answer: For many years, serum was required for blood bank antibody screening and antibody identification. Research studies within the last 10 years have shown the plasma from EDTA tubes is satisfactory for these blood bank tests. Blood bank personnel find it easier to work with the EDTA anticoagulant specimens as the specimens can be centrifuged immediately upon receipt as clot formation is not required. In addition, fibrin formation, a problem with clotted specimens, is not an issue with anticoagulated specimens.

QUESTION: ***I see that there is a new tube with a pink closure. What is it used for?***

Answer: Tube manufacturers have developed a new evacuated tube with a pink closure. The tube contains spray-dried potassium EDTA and it is designed for whole blood hematology testing and blood bank testing. The tube has a special label for

patient information that is required to meet the American Association of Blood Banks (AABB) requirements. Except for the special label, the pink closure tube is the same as the lavender closure tube.

The pink tube should be inverted eight (8) times to prevent clotting.

***QUESTION*: What tests require that blood specimens be cooled immediately following venipuncture?**

Answer: Chilling of blood specimens (2 to 8 ºC) immediately following venipuncture is needed for gastrin, ammonia, lactic acid, catecholamines, pH/blood gas, and parathyroid hormone (PTH) lab tests. Chilling the specimen slows down metabolic processes which can alter these test results. NOTE: Other lab tests may require chilling. Follow your laboratory's policies.

Blood specimens are chilled by placing the tubes immediately in either crushed ice or a mixture of ice and water. The ice or ice/water mixture must cover all of the blood in the tube. Large cubes of ice are not acceptable because the temperature is inconsistent and areas of the blood may not be sufficiently chilled.

QUESTION: What tests should be kept warm immediately following venipuncture?

Answer: Specimens that must be kept at body temperature (37 ºC) from the time of collection to testing include cold agglutinins and cryofibrinogen. A heat block for transportation is required. NOTE: Other lab tests may require maintenance at body temperature. Follow your laboratory's policies.

QUESTION: I had a patient continue to bleed for about 10 minutes. Did I do something wrong?

Answer: Excessive bleeding following a venipuncture is almost always the result of medication being taken by the patient (anticoagulant drugs) or the patient having a coagulation disorder such as hemophilia.

The phlebotomist should observe for excessive bleeding. If bleeding continues for more than five minutes, the patient's nurse or doctor should be notified. Pressure, applied with a gauze pad, must continue at the site as long as necessary to stop the bleeding. Once bleeding has stopped, a pressure bandage made with a folded gauze square and tape, adhesive bandage, or Coban™ wrap should be tightly wound around the arm and left in place for at least 15 more minutes.

QUESTION: What is a blood transfer device?

Answer: OSHA requires that safety needle devices be used to collect blood specimens. Safety needles must be activated while still in the patient's arm or immediately after removal from the vein. Therefore, it is impossible to insert the needle that is attached to a syringe through the closure to get blood into vacuum tubes.

This requirement has led to the development of blood transfer devices. Most transfer devices resemble a tube holder with a preattached multiple sample female luer adapter.

The syringe is attached to the luer adapter on the outside portion of the transfer device. The evacuated tube is pushed on to the multiple sample needle inside of the transfer device. Tubes are allowed to fill completely until all blood has been transferred to the appropriate tube. Thus, blood can be transferred from the syringe to tubes without risk of needlestick.

Transfer device placed on a syringe

Evacuated tube placed on needle inside transfer device

Photographs courtesy of Ann Gray, Inpatient Phlebotomy Supervisor, Physicians Reference Lab, Kansas City, Missouri

QUESTION: ***At my new job, the safe needle device is activated while still in the patient's vein. I am afraid that this hurts the patient. Why can't I activate it right after I remove the needle from the vein?***

Answer: Laboratory policies and procedures must be based on the manufacturer's instructions. Manufacturer's instructions for this type of safe needle device require that the device be activated while still in the patient's vein. The manufacturers of safe needle devices have done extensive research and testing on their products. The products would not be released for use if they caused unnecessary pain to the patient. In addition, if the phlebotomist receive a needlestick while not following the recommended procedure and then contracts a bloodborne pathogen infection from the needlestick, a workmen's compensation package could be invalidated.

QUESTION: ***I think it is very wasteful to throw away a tube holder after using it only once. Why can't I reuse them?***

Answer: Tube holders are **single-use only** disposable devices. Effective June 12, 2002, OSHA policy amended the Bloodborne Pathogen Rule to require that the tube holder and needle must be discarded as a unit into a sharps container immediately after the activation of the safe needle device.

Reasons for this policy include the potential for a needlestick injury when removing the needle and the potential presence of blood in the tube holder. While some individuals believe that using alcohol to wipe out the inside of the tube holder between phlebotomies is sufficient, OSHA states that this practice is not acceptable.

QUESTION: ***How do I know if I have enough blood in the tube?***

Answer: Some patients are very hard to draw. No matter what amount of blood you obtain, always take it to (or call) the laboratory to see if the testing can be performed. The chart on the following page identifies the recommended acceptable draw volumes as well as effects of overfilling and underfilling tubes.

CLOSURE COLOR	OVERFILL EFFECTS	UNDERFILL EFFECTS	MINIMUM ACCEPTABLE DRAW VOLUMES*
Red/Gold/ Speckled	None	QNS (Quantity Not Sufficient) to analyze	50% of capacity
Lavender/pink	Insufficient EDTA to completely inactivate clotting; results in clots within the specimen, rendering it useless for testing	dilution effect; erroneously low cell counts & hematocrits; RBC morphology changes; staining changes; QNS	50% of capacity
Blue	insufficient sodium citrate to completely inactivate clotting; results in coagulation of the specimen, rendering it useless for testing	prolongation of both PT and aPTT test results	**100% capacity**
Green	insufficient heparin to completely inactivate clotting; results in clotting of the specimen, rendering it useless for testing	dilution effect; excess heparin may cause erroneously low test results	50% of capacity
Gray	insufficient additive to completely inactivate clotting; results in clotting of the specimen, rendering it useless for testing	dilution effect; excess additive may cause erroneously low test results	50% of capacity
Yellow for blood culture	insufficient additive to completely inactivate clotting; results in bacteria trapped in clot and decreased chance of growth of microorganism *in vitro*	decreased blood volume collection decreases the incidence of pathogen recovery	**100% of capacity**

*Maximum volume of draw for each size of tube is generally indicated by a line (the same color as the rubber closure) found at the top of the label when holding the tube upright.

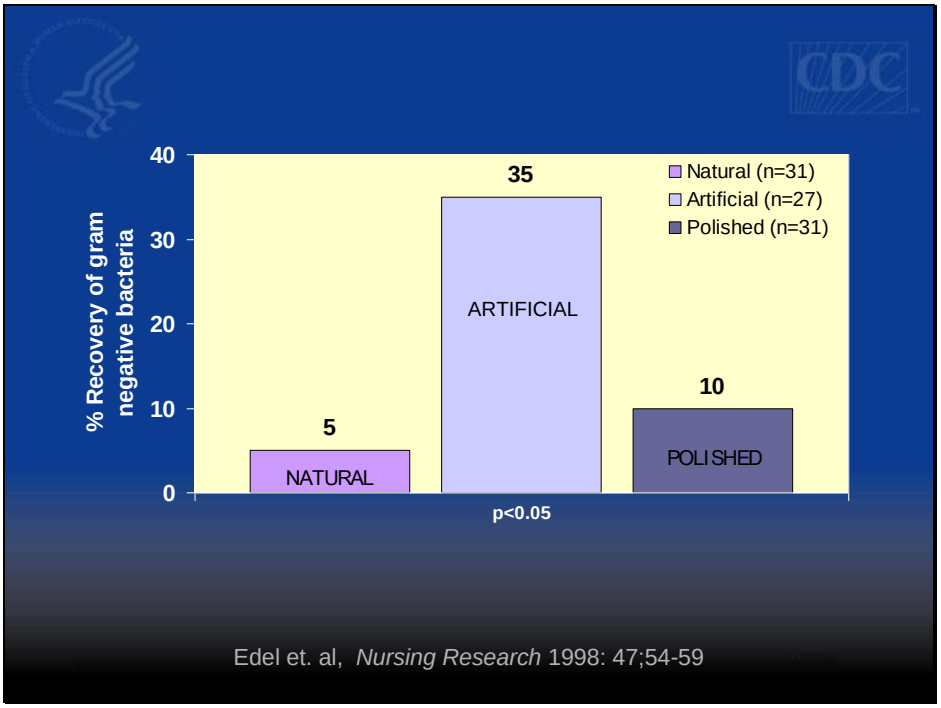
QUESTION: ***My supervisor informed all of our phlebotomy staff that we could no longer wear sculptured or other forms of artificial nails. I am very upset and want to know why we are being told this.***

Answer: In October of 2002, the Centers for Disease Control and Prevention (CDC) released the publication *Guideline for Hand Hygiene in Health-Care Settings, Recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force*. The Task Force evaluated numerous studies about the types and quantities of bacteria isolated from natural nails, artificial nails, and nails painted with polish. Results of these studies include:

- The subungual areas (the area beneath the nail) have high concentrations of bacteria including staphylococci, *Pseudomonas* spp., Corynebacteria, and yeasts. These are all microorganisms that can cause human infections.

- Freshly applied nail polish does not increase the amount of bacteria around and under the nail, but chipped nail polish increases the amount of bacteria isolated.
- Even after healthcare workers have performed careful handwashing with soap and water or with a surgical scrub, substantial numbers of bacteria are isolated in the subungual area.
- Healthcare workers (HCWs) who wear artificial nails are more likely to have Gram negative bacteria on their fingertips than those who have natural nails, both before and after careful handwashing. Gram negative bacteria can cause serious infections.
- HCWs who wear artificial nails are more likely to harbor Gram negative pathogens on their fingertips than are those who have natural nails, both before and after handwashing.
- The majority of bacteria are found along the area 1 mm from the free edge of the nail.
- In a neonatal intensive care unit, an outbreak of *Pseudomonas* spp., a pathogenic bacteria, occurred because of two nurses transmitting the bacteria from their nails to the neonate infants. One nurse had long natural nails and one had long artificial nails.
- Personnel wearing artificial nails have also been implicated in several outbreaks where Gram negative bacteria and yeast were transmitted from the healthcare workers to the patients.

The following graph from the CDC Hand Hygiene educational materials shows the percent recovery (how many individuals "grew" Gram negative bacteria from swabs of their subungual areas) for healthcare workers with natural nails, artificial nails, and polished nails.



The Hand Hygiene Task Force recommended more studies be performed on both natural and artificial nails to further identify the potential for transmission of microorganisms from healthcare workers to patients. However, the Task Force determined that the existing studies provided sufficient evidence that long natural nails,

artificial nails, and nails with polish pose an infection hazard. Their recommendations are:

- Natural nail tips should be kept to ¼ inch in length.
- Artificial nails should not be worn when having direct contact with high risk patients (e.g., ICU, OR).

It is up to each healthcare facility to determine how to implement and monitor the CDC recommendations. Many facilities have implemented policies that require all healthcare workers with direct patient contact, including phlebotomists, must have only natural unpolished nails that are no more than ¼ inch long. While this may upset some healthcare workers, it is vitally important that healthcare facilities do everything possible to protect patients from microorganisms transmitted from healthcare workers.

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TEST QUESTIONS
Frequently Asked Questions about Phlebotomy
Course 1220107

Directions:

- Before taking this test, read the instructions on how to complete the answer sheets correctly. If taking the test online, log in to your User Account on the NCCT website www.ncctinc.com.
- Select the response that best completes each sentence or answers each question from *the information presented in the module*.
- If you are having difficulty answering a question, go to www.ncctinc.com and select Recertification/CE, then select Updates/Revisions to see if course content and/or a test question have been revised. If you do not have access to the internet, call Customer Service at 800-875-4404.

1. You have test orders that require collection in gray, green, lavender, and red closure tubes. Which one of the following represents the recommended order of draw?

   a. Gray, red, green, lavender
   b. Green, lavender, gray, red
   c. Lavender, gray, red, green
   d. Red, green, lavender, gray

2. A phlebotomist has to collect blood for blood cultures, a complete blood cell count, and a protime. In what order should the tubes be drawn?

   a. Blue, lavender, blood cultures
   b. Lavender, blood cultures, blue
   c. Blood cultures, blue, lavender
   d. Blood cultures, lavender, blue

3. The current edition of the CLSI *Procedures for the Collection of Diagnostic Blood Specimens* states that the tourniquet should not be left on the arm for more than _____ while selecting a vein.

   a. 30 seconds
   b. one minute
   c. two minutes
   d. three minutes

4. Based upon OSHA's Bloodborne Pathogen Rule, which group of individuals below, in certain circumstances, could be exempt from wearing gloves when performing a venipuncture?

   a. Doctors
   b. Phlebotomy instructors
   c. Blood donor phlebotomists
   d. Registered nurses

5. Which one of the following organizations is responsible for the Bloodborne Pathogen Rule that requires gloves be worn when drawing blood?

   a. American Association of Blood Banks
   b. Clinical and Laboratory Standards Institute
   c. Occupational Safety and Health Administration
   d. Your employer

6. Gloves must be worn when palpating veins to locate a venipuncture site.

   a. True
   b. False

7. A phlebotomist has to collect blood on an elderly patient with fragile superficial veins. The recommended venipuncture technique is to _____.

   a. perform a routine venipuncture collecting blood into full size tubes
   b. release the tourniquet as soon as blood enters the first tube
   c. use a winged infusion set with a syringe
   d. warm the site before performing the puncture

8. A possible cause of blood not entering a tube when the phlebotomist is certain he/she is in the vein include all of the following EXCEPT the _____.

   a. bevel of the needle is up against the wall of the vein
   b. tube is defective tube
   c. needle may have gone through the vein
   d. venipuncture area is full of edema

9. If a vein has been completely missed when inserting the needle, the needle should be withdrawn and a new venipuncture performed.

   a. True
   b. False

10. Which one of the following could make a patient become angry?

    a. Concern about hospital bills
    b. Fear about his/her diagnosis
    c. Loss of control over his/her life
    d. All of the above

11. Which one of the following may help when dealing with an angry patient?

    a. Ask “Why are you mad at me? I am just here to draw your blood.”
    b. Express empathy.
    c. Interrupt the patient and tell them to speak to his/her doctor.
    d. Stand by the patient with your arms crossed.

12. It is an acceptable practice to thread needles into the tube holders at the beginning of your work shift.

    a. True
    b. False

13. When performing patient identification procedures, you confirm the patient's first and last names are the same on the requisition as on the wristband. The birth date (the second identifier used at your facility) has the same month, same day but the year is 1947 instead of 1945. It is acceptable to collect blood on this patient as there has obviously been a typographical error made.

    a. True
    b. False

14. A patient experiences severe shooting pains in his arm when you are drawing blood from the basilic vein. What most likely has happened?

    a. The patient's median nerve has been punctured or nicked.
    b. The patient is developing a hematoma.
    c. The patient is having a heart attack.
    d. The patient's vein has collapsed.

15. The nerve most likely to be punctured or nicked while collecting blood specimens in the antecubital area is the _____ nerve.

    a. axillary
    b. median
    c. basilic
    d. ulnar

16. Healthcare workers who collect blood specimens can have both criminal and civil lawsuits filed against them.

    a. True
    b. False

17. Nothing can occur during a venipuncture procedure that could lead to permanent disability of the patient.

    a. True
    b. False

18. Which one of the following should be done if a patient suddenly develops a large hematoma during the venipuncture procedure?

    a. Stop the venipuncture procedure.
    b. Apply pressure to the site and raise the arm above the level of the patient's heart.
    c. Apply a pressure bandage.
    d. All answers are correct.

19. All antiseptics used to clean a patient's skin, including alcohol, must be allowed to dry before performing a venipuncture.

    a. True
    b. False

20. All of the following are steps performed when drawing blood from an arm with an IV EXCEPT which one?

    a. Select the distal site over the proximal site if possible.
    b. Tie the tourniquet between the IV and the venipuncture site.
    c. Turn off the IV for a minimum of 20 minutes.
    d. All are correct.

21. Superficial veins located on the palm side of the wrist can be used for venipuncture as long as a winged infusion set is used.

    a. True
    b. False

22. To assure the optimal chance of isolating microorganisms from a blood culture, add the volume of blood recommended by the manufacturer on the blood culture bottles you are using.

    a. True
    b. False

23. A healthcare worker could become infected with MRSA by all of the following EXCEPT which one?

    a. Touching contaminated bedding or other environmental surfaces
    b. Touching contaminated patient skin
    c. Wearing the recommended personal protective equipment for entering a Contact Isolation room
    d. All of the above

24. MRSA is a concern in healthcare because _____.

a. people can spread the infection without having symptoms
b. treatment requires hospitalization
c. treatment can have toxic side effects
d. All of the above

25. The type of specimen collected for a laboratory test is based on _____.

a. analytical method
b. type of analyzer used
c. manufacturer's recommendations
d. All of the above

26. Current research indicates that it is not necessary to collect a discard tube when drawing a protime (PT) using a winged infusion set.

a. True
b. False

27. Blood Bank testing can be performed on which one of the following tube types?

a. Blue
b. Green
c. Lavender
d. All of the above

28. What is unique about the newly released pink closure tube?

a. It contains EDTA.
b. It has a label that meets the AABB requirements for specimen labeling.
c. It needs to be inverted to assure the anticoagulant mixes well with the blood.
d. All of the above

29. Which one of the following tests should be chilled immediately after collection?

a. Ammonia
b. Cold agglutinins
c. Cryofibrinogen
d. All of the above

30. Prolonged bleeding following a venipuncture is almost always a result of _____.

a. anticoagulant drugs being taken by the patient
b. collapsed veins
c. too large a needle used for the venipuncture
d. too much blood collected

31. The accepted method to transfer blood from a syringe to an evacuated tube is to pierce the tube with the needle on the syringe, allowing blood to flow into the tube.

a. True
b. False

32. When using safe needle devices, the laboratory's policies and procedures must follow the manufacturer's instructions.

a. True
b. False

33. Tube holders should be cleaned out with alcohol between patients.

a. True
b. False

34. Which one of the following tubes must be filled to 100% of capacity?

a. Blue
b. Lavender
c. Gray
d. Green

35. All of the following statements are TRUE about fingernails as discussed in the CDC Hand Hygiene report EXCEPT which one?

a. Artificial nails should be kept to ¼ " in length.
b. High concentrations of microorganisms are present in the subungual area.
c. Patients have become ill from microorganisms transmitted to them from the fingernails of healthcare workers.
d. Artificial nails are not recommended for those working in high risk areas.

End of Test

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____Yes ____No 6. Did you learn anything new?

____Yes ____No ____Maybe 7. Did you learn anything you might use at work?

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