National Center for Competency Testing

The "What ifs" of Venipuncture

COURSE DESCRIPTION

Venipuncture procedures can differ slightly from place to place. However, the basic steps remain the same. Healthcare professionals who routinely collect blood specimens by venipuncture are aware that there are many variables that occur with each step. These “what ifs” are discussed in this continuing education course.

This course has been updated for 2020 to include references to the most recent standards.

Valid for P.A.C.E.® credit through 5/31/2022

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COURSE TITLE: The "What Ifs" of Venipuncture

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OBJECTIVES

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

1. Identify the organization that produces documents considered to be the "gold standard" for blood and specimen collection procedures.
2. Name two federal laws that require a request for a laboratory test be accompanied by a test order.
3. List information that is recommended to be included on a test request.
4. List actions that reassure the patient of the phlebotomist's competency and professionalism.
5. List unique patient identifiers that per The Joint Commission can be used to assure reliable patient identification.
6. Discuss 18 "what if" scenarios associated with patient approach and identification.
7. Identify laboratory tests where fasting is required and those where fasting is preferred.
8. Discuss two "what if" scenarios associated with the pre-collection assessment of patients.
9. Describe the CDC Hand Hygiene Guidelines.
10. Discuss two "what if" scenarios associated with phlebotomy supplies.
11. Identify the pros and cons of three blood collection systems.
12. Discuss three "what if" scenarios associated with patient positioning.
13. Discuss 14 "what if" scenarios associated with application of a tourniquet and selection of venipuncture sites.
14. Describe cleansing of the venipuncture site for a routine blood collection.
15. Discuss two "what if" scenarios associated with venipuncture site collection for sterile specimens and blood alcohol levels.
16. Discuss 10 "what if" scenarios associated with venipuncture needle insertion and blood aspiration.
17. Describe common causes of failure to obtain blood and the appropriate troubleshooting action for each.
18. List volume considerations for common evacuated blood collection tubes.
19. Describe the rationale for the CLSI recommended order of draw.
20. List the CLSI recommended order of draw.
21. Discuss two scenarios associated with failure to release the tourniquet following venipuncture.
22. Identify the rationale for use of gauze pads over cotton balls.
23. Discuss four scenarios associated with removal and disposal of venipuncture needles.
24. Identify recommended procedures for bandaging the venipuncture site.
25. Discuss three scenarios associated with bandaging the venipuncture site.
26. Identify information that must be included on an attached label on a blood specimen.
27. Identify two scenarios associated with blood collection tube labeling.
28. List common lab tests that require special handling and the type of handling required.
29. List reasons for blood collection specimen rejection.

VENIPUNCTURE IN GENERAL

The phrase, “A laboratory test result is only as good as the specimen collected” is used by phlebotomy instructors everywhere. Adherence to policies and standard operating procedures ensures pre-analytical errors will be minimized, providing the first big step in having accurate and reliable laboratory test results for the physician for diagnosis and treatment.

Note: The term “phlebotomist” is used throughout the reading material. This term encompasses all individuals who collect blood specimens, not just those who are specifically educated and trained as a phlebotomy technician.

THE “WHAT IFS” OF THE BASIC VENIPUNCTURE PROCEDURE

Venipuncture procedures can differ slightly from place to place. Laboratory management staff should consult the Clinical Laboratory Standards Institute (CLSI) standard GP41 *Collection of Diagnostic Venous Blood Specimens, 7th Ed* (April 2017) and standard GP33 *Accuracy in Patient and Specimen Identification*, 2nd *Ed* (April 2019) to determine whether their own venipuncture procedure meets approved practice. CLSI produces documents that are considered the gold standard for all blood and specimen collection procedures.

The following procedural steps (1-17) in **bold font** are based on the CLSI standard GP41 identified above. Healthcare professionals who routinely collect blood specimens by venipuncture are aware that there are many variables that occur with each step. These “what ifs” are discussed in the information that follows.

1. Receipt of the Test Order Request for Blood Collection

Laboratory test requests should be received and maintained in the laboratory in a systematic manner. Many laboratories use an information system; others use a manual system. Federal agencies, federal law, and some state laws require each request for a laboratory test to be accompanied by a test order.

The two federal requirements that affect almost all laboratories are:

- Centers for Medicare and Medicaid Services (CMS)
- Clinical Laboratory Improvement Act of 1988 (CLIA).

The Centers for Medicare & Medicaid Services (CMS) regulates all laboratory testing (except research) performed on humans in the U.S. through the Clinical Laboratory Improvement Amendments (CLIA).

CMS, a government agency under the control of the United States Department of Health and Human Services (DHHS), stated in February 2018:

“Laboratory tests must be ordered by the physician or non-physician practitioner (NPP) who is treating the beneficiary, that is, the physician who furnishes a consultation or treats a beneficiary for a specific medical problem and who uses the results in the

management of the beneficiary's specific medical problem. Tests not ordered by the physician or NPP who is treating the beneficiary are not reasonable and necessary."

Per CMS, an order may be delivered via the following forms of communication:

- *"A written document signed by the treating physician/practitioner, which is hand-delivered, mailed, or faxed to the testing facility. Although no signature is required on orders for clinical diagnostic tests paid on the basis of the clinical laboratory fee schedule, the physician fee schedule, or for physician pathology services, documentation in the medical record must show intent to order and medical necessity for the testing.*
- *A telephone call by the treating physician/practitioner or his/her office to the testing facility.*
- *An electronic mail by the treating physician/practitioner or his/her office to the testing facility.*

If the order is communicated via telephone, both the treating physician/practitioner or his/her office, and the testing facility must document the telephone call in their respective copies of the beneficiary's medical records. While a physician order is not required to be signed, the physician must clearly document, in the medical record, his or her intent that the test be performed."

Per CLIA, a federal law:

> *The laboratory must have a written or electronic request for patient testing from an authorized person.*

Some states also have their own laws defining the components of a laboratory test order and personnel authorized to order laboratory tests. Other states defer to federal laws. It is the responsibility of the laboratory's administration staff to assure compliance with all applicable federal or state laws.

CLSI recommends the following information be included on a test request. If the healthcare facility and/or laboratory use an electronic/computer system, this information is generally included on the test order request form or specimen collection label.

- Name of the healthcare provider or authorized person requesting the test
- Patient's full name (first/last and middle, if applicable)
- Patient-specific identifier
- Patient's sex
- Patient's age or date of birth (per facility policy)
- Test(s) to be performed
- Site of collection, when appropriate
- Date and, if appropriate, time specimen is to be collected
- Additional information/instructions needed for a specific test

A phlebotomist must complete the following upon receipt of a test request for blood collection:

- Ensure the test request contains complete information
- Ensure the request and preprinted labels match exactly

- Resolve all discrepancies before proceeding with the collection
- Contact the healthcare provider or authorized person for clarifications

What if…	Then…
…you do not have an order?	…the laboratory collecting the specimen without an order may be in violation of federal requirements, federal laws, and/or state laws.
…the order is verbal, i.e., the physician's office called in an "add on" test or just informed you at the patient's bedside to collect blood for another test?	…the laboratory must have a policy and procedure to assure a written order is received within a set time period. CMS states, "The testing facility must document the telephone call in their respective copies of the beneficiary's medical records."

2. Approach and Greet the Patient

Patient approach should be done in a way that reassures the patient of the phlebotomist's competency and professionalism. The following list provides actions that demonstrate competency and professionalism.

- Wearing clean unwrinkled clothing
- Having a hygienic appearance
- Using a calm unrushed manner
- Having a clean organized phlebotomy area (for outpatients) or phlebotomy tray (for inpatients)
- Respecting the patient's privacy, e.g.,
    - Knocking lightly on the door (for inpatients) or otherwise announce your entry.
    - Follow your facility's policy for addressing the patient by name.
    - Saying "good morning," "good afternoon," or "good evening."
    - Peeking through a drawn bed curtain to assure the patient is not with another healthcare provider or using a bedpan, etc.
- Identifying yourself and stating why you are there; e.g., "Good morning. My name is Susan and I am from the laboratory. I'm here to collect a blood specimen."

Phlebotomists should look for any signage that indicates any precautions that need to be taken for the patient. Look for the presence of an ID band and observe the room for the locations of containers, supplies, and equipment, as well as patient-specific conditions such as IV fluids or VADs.

The phlebotomist should employ greeting approaches that suit the patient setting, such as outpatient, long-term care, or at-home collections. Refer to the CSLI GP41 standard for recommended approaches in different situations.

The following table gives several "what if" scenarios that are encountered by phlebotomists in any setting and the respective actions the phlebotomist should take.

What if…	Then…
…the patient is with a physician?	…inform the patient you will return shortly. If the blood collection is a stat, timed, or of urgent priority, ask for permission to proceed with the collection. Always assure you follow facility policy.
…the patient is with a member of the clergy?	
…another healthcare provider is performing a procedure?	
…family members/friends are present?	…ask them to leave the room while you perform the blood collection. If family members insist on staying, assure it is acceptable with the patient.
…the patient is not in the room?	…go to the nursing station to inquire about the patient's absence and when he/she will return. Inform nursing personnel you or another phlebotomist will return later.
…the patient is asleep?	…speak softly to awaken the patient before collecting the specimen.
…the patient is comatose?	…speak to the patient as you would someone who is alert. Unconscious patients are often aware of conservations and activities around them.
…the patient does not speak English?	…enlist the assistance of an official translator or an employee who speaks the patient's language.*
…the patient is hearing impaired?	…speak louder or write your name and the reason you are there. If necessary, obtain the assistance of an individual who can use sign language.**
...the patient is too young or cognitively impaired and cannot understand you?	…follow the appropriate age-related competencies about speaking to a child or an adult with a cognitive impairment. If necessary, obtain the assistance of a family member or nursing staff member.

* Most healthcare facilities have a list of employees who are able to speak languages other than English, and those who have the ability to use sign language.

3. Patient Identification

Patient identification is crucial. It is the phlebotomist's responsibility to ensure the blood specimen is collected from the individual identified on the test request/laboratory requisition.

Proper patient identification begins with the registration process. It's at this step that a patient-specific identifier is generated or verified (if a returning patient) and the identification band is applied. Hospitalized patients (inpatients) should have an identification band. Many facilities also place identification bands on outpatients entering the facility for testing of any kind.

A patient identifier is information directly associated with a particular individual that reliably identifies them as the person for whom the service or treatment is intended. The Joint Commission requires at least <u>two</u> identifiers are used to identify a patient. Acceptable identifiers may include but are not limited to:

- The individual's name
- Assigned identification number (e.g. medical record number, etc)
- Telephone number
- Date of birth or another person-specific identifier
- Electronic identification technology coding, such as bar coding or RFID, that includes two or more person-specific identifiers

a room number is not a patient-specific identifier!

The phlebotomist must take into account the possibility an ID band being placed on the wrong patient. Thus, the phlebotomist must take the steps below to verify correct patient identification. See CLSI GP33 for information beyond what is provided below.

3(a) Identifying patients with an ID band

To positively identify a patient wearing an identification band, the phlebotomist must:

- Ask the patient to state their full name and then spell their first name and last name. Do not ask "yes/no" questions.
- Ask the patient to state their date of birth.
- Confirm these match exactly with the information on the ID band
- Verify the ID band information - including the complete name and patient-specific identifier- matches the test request and pre-printed labels.

This must all match **exactly** before proceeding with the blood collection.

Phlebotomists must not rely on bed tags, ID bands not on the patient, or charts/medical records placed in the patient room.

3(b) Identifying patients without an ID band

To positively identify a patient not wearing an identification band, the phlebotomist must:

- Ask the patient to state their full name and then spell their first name and last name. Do not ask "yes/no" questions.
- Ask the patient to state their date of birth.
- Ask patient to present personal identification (preferably photo ID) that contains the patient-specific identifier determined to be acceptable by the facility (if no ID, the phlebotomist must follow facility policy).
- Verify the information provided- including the complete name and patient-specific identifier- matches the test request and pre-printed labels.

3(c) Identifying patients who are unable to participate

- Ask the patient's healthcare professional, relative, or friend to state the patient's full name, spell the patient's first name and last name, and state the patient's date of birth. Do not ask "yes/no" questions.
- Compare this information to the patient information on the test request and pre-pre-printed labels, then compare against the patient's ID band (if the patient is wearing one)
- Document the identifier's name and title (if healthcare provider) or relationship to the patient.

Any discrepancy between information on the identification band (or as stated by the patient) and on the test order/requisition form must be resolved before a blood specimen is collected. The discrepancy must be reported to the responsible person

as defined in the facility policy. All discrepancies no matter how minor they appear to be must be resolved before blood specimens are collected.

Many healthcare facilities use barcode systems as an additional method of patient identification. These systems include many of the same features. Each patient is given a unique barcode in the hospital electronic health record system. This barcode is included on the identification band. Using a handheld device interfaced with the hospital electronic health record, the phlebotomist scans the barcode on the identification band and confirms the identity with the identification number in the electronic health record. Following confirmation of matching identifiers, specimen labels are printed at the bedside. The labels may include a variety of information such as specimen requirements, location, time of collection, phlebotomist identity, and other items as specified by the institution. The photograph below shows a patient identification band being scanned prior to labels being printed for specimen containers/evacuated tubes.

Scanning barcodes on identification band before specimen collection
Clinical Center News, April 2009
http://clinicalcenter.nih.gov
The Clinical Center located the National Institutes of Health in Bethesda, Md.,
is the nation's largest hospital entirely dedicated to clinical research.

What if…	**Then…**
…the inpatient does not have an identification band?	…do not collect a blood specimen. Speak with the nurse in charge of the patient to have an identification band placed on the patient.
… the identification band is unreadable?	…do not collect a blood specimen. Speak with the nurse in charge of the patient to have a readable identification band placed on the patient.
… the identification band does not match information on the test order?	…do not collect a blood specimen. Speak with the nurse in charge of the patient (or other responsible employee) to begin the process of discrepancy resolution.
…the patient is in a facility that does not use identification bands, e.g., long-term care, behavioral health, home care, etc.?	….refer to the previous section of this course called “Identifying patients without an ID band.”
…the patient is unable to participate in the identification process due to being too young, unconscious, cognitively impaired, etc?	… refer to the previous section of this course called “Identifying patients who are unable to participate.”

What if…	Then…
…the patient speaks a foreign language?	…refer to the facility's policy for accessing interpreter services.
…an identification band is taped to a headboard, bed rail, or somewhere else?	….do not collect a blood specimen. Identification information located anywhere but on the patient is not reliable for specimen collection procedures.
…it is an emergency situation and the patient identity is unknown?	…follow the facility policy to provide a temporary but unique designation of the patient until positive identification can be provided. Many facilities use a specific blood bank identification system in emergency situations.

4. Address the Pre-collection Requirements

The phlebotomist must obtain patient consent to proceed with the blood collection. The procedure for obtaining consent is defined by facility policy.

The phlebotomist must also verify that the patient has complied with pre-collection requirements that impact the validity of the laboratory test. Physiological factors can impact test results, such as diet, medication, posture, time of day, and others. Refer to the facility's policy regarding the procedures for holding meals and notifying staff that the patient's blood has been collected.

Examples of laboratory tests with specific pre-collection requirements include those that require fasting, cortisol testing, and therapeutic monitoring of drugs. Some laboratory tests require the patient to eliminate certain types of foods or to refrain from all food and drink except water, i.e., fast. If the diet restrictions are not followed, the test results will be inaccurate.

Fasting is generally defined as no food or beverages except water for a minimum of 8 hours. Depending on the specific test, a longer time period of fasting may be required.

Refer to the following chart to identify common laboratory tests for which fasting is required and preferred.

Fasting is Required	Fasting is Preferred
• Cryoglobulin • Gastrin • Fasting glucose • Glucose tolerance • Gestational diabetes confirmation • Lactose tolerance • Lipids – cholesterol, triglyceride, high-density lipoprotein, low-density lipoprotein • D-xylose tolerance	• Homocysteine • Insulin • Iron and iron profile • Growth hormone • Parathyroid hormone
What if…	**Then…**
…the patient is not fasting and you need to collect blood for tests that will be affected?	…do not collect the blood specimen. Notify the appropriate nursing and laboratory personnel that the patient is no longer fasting.
…the blood collection is for therapeutic drug monitoring?	…the medication dose, time of last dose, and blood collection time must all be recorded in the laboratory records.

What if…	Then…
…the patient refuses to have their blood collected?	…respect the patient's right to refuse blood collection. Do NOT proceed with specimen collection as you can be held liable for assault and battery. Inform the patient's nurse of the refusal.

5. Hand Hygiene is Performed

Hand hygiene is part of Standard Precautions. It can reduce the transmission of healthcare-associated infections. Hand hygiene should be performed per guidelines and facility policy:

- Whenever hands are visibly dirty or contaminated.
- Before:
  - having contact with patients
  - putting on gloves
  - inserting any invasive device
  - manipulating an invasive device
- After:
  - having contact with a patient's skin
  - having contact with bodily fluids or excretions, non-intact skin, wound dressings, contaminated items
  - having contact with inanimate objects near a patient
  - removing gloves

Hand hygiene can be performed with an alcohol-based hand rub when appropriate. Alcohol-based hand rubs have some advantages over soap and water. However, per the CDC, it is always acceptable to use a handwashing (soap and water) procedure but it is not always acceptable to use an alcohol-based hand rub. Per CLSI GP41, "Soap and water must be used for visibly soiled hands and for patients known to be infected with *Clostridium difficile (C. diff*)." See the CLSI document M29 for more information.

Following are the CDC guidelines for soap and water versus alcohol-based hand rubs.

Soap and Water Required	Alcohol-Based Hand Rub OK
• After removing gloves that are visibly contaminated with blood/body fluids. • When bare hands are visibly contaminated with blood/body fluids. • Before eating. • After using a restroom. • After caring for a person with known or suspected infectious diarrhea • After known or suspected exposure to spores (e.g. *B. anthracis, C difficile* outbreaks)	• Immediately before direct patient contact. • After removing gloves that are not visibly contaminated. • Before performing an aseptic task (e.g., placing an indwelling device) or handling invasive medical devices • Before moving from work on a soiled body site to a clean body site on the same patient • After touching a patient or the patient's immediate environment • After contact with blood, body fluids or contaminated surfaces (hands not visibly soiled) • After contact with a patient's intact skin.

The CDC recommended procedures for each type of hand hygiene follow.

Soap and Water	Alcohol-Based Hand Rub
1. Wet hands with water. 2. Apply the recommended amount of soap to wash hands. 3. Rub hands vigorously for at least 15 seconds, covering all surfaces of the hands and fingers, including between the fingers and the area around and under the fingernails. 4. Rinse hands with water and dry thoroughly with a disposable paper towel. 5. Use another paper towel to turn off the faucet. **This procedure should take 40-60 seconds.**	1. Apply the recommended amount of product to the palm of one hand. 2. Rub hands together, covering all surfaces of the hands and fingers, until the hands are dry. Use enough rub so this step takes at least 15 seconds. **This procedure should take 20-30 seconds.**

What if…	Then…
…your hands are dry, cracked, inflamed from repeated hand hygiene?	…you have hand dermatitis, a very common condition among healthcare professionals. To minimize the development of hand dermatitis, use the following recommendations. • Use warm water and the least harsh soap for routine hand washing. • When acceptable, use emollient alcohol based hand rubs. • Use water-based moisturizers after washing hands. • When not at work, use a heavier, oil-based moisturizer under cotton gloves to help heal the skin. • Seek medical attention if the skin appears to be infected or does not improve.

6. Assess the Patient Prior to Starting the Blood Collection

The phlebotomist must assess each patient for several factors:

- Ask the patient if they have problems with blood draws.
- Ask the patient for about any other conditions that impact blood collection, such as a mastectomy or lymph node removal.
- Ensure the patient does not have objects in their mouth at the time of blood draw (food/liquid, gum, thermometer) other than required medical treatments as needed.
- If any latex supplies are used, ask the patient if they have a latex allergy or sensitivity.

Latex Allergy and Sensitivity

Some people develop latex allergies and sensitivities. There are three types of reactions to latex.

- Irritant contact dermatitis: symptoms include dryness, itching, scaling, and burning lesions generally limited to areas in contact with latex.

- Allergic contact dermatitis: symptoms are similar to those of irritant contact dermatitis but the dermatitis can be more severe and spread to body areas not exposed to latex.
- Latex hypersensitivity: also called immediate allergic reaction. This is the most serious type of latex sensitivity. Symptoms begin with rhinitis (such as in seasonal allergies), then progress to rapid heartbeat, chest pain, difficulty breathing, low blood pressure, anaphylactic shock, and potentially death. These symptoms can occur without latex items even coming into contact with the individual. Symptoms may be triggered by only the presence of latex items in the areas around the individual.

  Patients with latex hypersensitivities should wear a wristband stating this, similar to those used for patients with medication allergies. Because of latex hypersensitivities, many healthcare facilities have replaced items containing latex with those that are latex-free. However, it is difficult to have an environment that is completely free of latex due to the presence of latex in many medical items.

What if…	**Then…**
…the patient has a latex allergy/sensitivity?	…assure all phlebotomy equipment and items used are latex-free, including the tourniquet, bandage/tape, and gloves.
…the patient has had a mastectomy or lymph node removal? Note: lymph nodes may be removed for reasons other than breast cancer such as lymphoma, melanoma, head and neck cancer, and more.	…identify an alternative site from which to collect blood. Do not perform a venipuncture on the arm on the side of the body where the patient has had a mastectomy or lymph nodes removed. If both breasts have been removed or lymph nodes removed on both sides, the patient's physician should be contacted to provide permission to use one of the arms for venipuncture.
…the patient has an IV?	… identify an alternative site from which to collect blood. The fluid from the IV can contaminate the blood specimen resulting in unreliable test results. If there is no other location to collect a blood specimen, blood for most laboratory tests can be collected from a site below (distal) the IV site. Have the nurse in charge of the patient turn off the IV for at least two minutes. Apply the tourniquet between the IV and the venipuncture site. The IV can be turned back when the venipuncture is completed. You must notate on the test order/requisition that the specimen was collected below an IV; include the type of IV fluid in the notation. Drawing above an IV is only recommended if there is no other site from which to obtain blood. The procedure for drawing below an IV site should be followed.
…the patient has a history of passing out (syncope) during blood draws?	….prepare to position the patient in a recumbent position.

What if…	Then…
…the patient has an AV fistula, AV shunt, heparin lock, or vascular access device such as a PICC line?	…avoid using an arm that has any of these devices. Look for an alternative site. If no alternative site exists, contact the patient's nurse to see if he/she can obtain a blood specimen from any of these devices. Do not attempt to use any of these devices yourself. Phlebotomists must complete thorough and documented training before collecting blood from any of these devices.
…performing venipuncture on the arm with a PICC line in unavoidable?	… place the tourniquet below the PICC insertion site and obtain the blood specimen below the tourniquet. venipuncture must never be attempted above a PICC line.
…the patient has a multilumen catheter or implanted port that is tunneled through the chest wall?	…follow facility policy. Blood collection from the arms or hands is generally permissible.

7. Position the Patient for the Blood Collection

Patient safety requires that phlebotomists collect blood only when the patient is securely positioned in a seated or recumbent position. The patient's arm must be supported either horizontally or at a slight downward angle. The arm should form a straight line from shoulder to wrist.

In a seated position, the chair must have features that support the patient and prevent falls. Chairs designed specifically for phlebotomy are recommended. At the very least, the chair should have armrests for support of the arm and to protect the patient in the event of an adverse reaction. The patient's arm should be supported by the armrest, and not significantly bent at the elbow. If needed, a pillow can be placed under the patient's arm.

Blood should not be collected from a patient who is sitting on a surface without these safety features. If no such chair is available, patients should be placed in a recumbent position.

A patient who declares a history of syncope during the pre-collection assessment should be positioned in a recumbent position. This requires positioning the patient on their back comfortably either by reclining the phlebotomy chair or bed, or having the patient lie flat (after verification with the health care provider). See CLSI GP41 for more information.

8. Specimen is Collected

This section consists of several steps, from the gathering of supplies, through each step of the blood collection procedure, to removing and disposing of the needle. See CLSI GP41 for more information about the specimen collection process.

8(a) Gather supplies

A well-organized phlebotomy station and tray should be fully stocked with routine phlebotomy equipment and items. All equipment should meet the current safety regulations to assure the risk of occupational exposure to blood is minimized.

All supplies should be routinely inspected for applicable expiration dates. Expired items should be discarded as appropriate.

The phlebotomy area or tray should be stocked to assure all types of equipment and items are present to expedite the collection procedure. For example, in addition to needles and tube holders, there should be syringes, syringe transfer devices, winged collection sets, alcohol prep pads, blood culture collection cleansing items, etc.

What if…	Then…
…you have expired evacuated tubes?	…do not use them. The vacuum may have dissipated and/or the additives may no longer perform as expected.
…you think a disposable item has been opened before you selected it to use?	…discard it. Any items you suspect are no longer sterile must be discarded.

The blood collection system used (evacuated, non-evacuated, winged collection set) is determined by the characteristics of the patient's vein. There are pros and cons to each system.

Blood Collection Method	Pros	Cons
Evacuated System	• Large quantities of blood can be collected with one venipuncture. • Tubes automatically fill to required amount of blood. • Small volume tubes can be used.	• Even the smallest tubes may contain sufficient vacuum to collapse delicate veins. • Until the tube is completely pushed on, you do not know if the needle is in the vein.
Syringe	• You can control suction pressure so not to collapse delicate veins. • A "flashback" of blood appears in the hub when the vein is entered. • Many think a syringe is easier to maneuver when dealing with difficult veins/situations.	• Amount of blood collected is limited. • Hemolysis can occur if the plunger is not gently and evenly retracted. • A syringe transfer device is required to remove blood from the syringe and into evacuated tubes.
Winged Collection Set	• Excellent for superficial veins as the needle can be entered at the lowest angle possible.	• Use of smaller gauge needles and longer lengths of tubing increase the risk of hemolyzed specimens. • Studies identify a higher risk of needlestick injury when winged collection sets are used.

<u>8(b) Selection of the site</u>

The recommended site for blood collection is the antecubital fossa at the front of the elbow, followed by the back of the hand. A physician's written permission must be obtained prior to performing venipuncture on the side in which a mastectomy has been performed.

8(c) Applying the tourniquet

The tourniquet should be applied just proximal to the venipuncture site being considered. The tourniquet should be released if the vein is not yet accessed after **one minute**, as the stasis of blood flow leads to hemoconcentration and infiltration of blood into the tissue. This may result in falsely elevated laboratory test results for tests such as cell counts, proteins, cholesterol, glucose, and potassium. If the time exceeds one minute and the tourniquet needs released, allow two minutes for the blood flow to normalize before reapplying the tourniquet.

Non-latex tourniquets must be used, and a new tourniquet must be used for each patient. Inpatients may be assigned a personal tourniquet for their venous blood draws, if facility policy allows. Tourniquets should not be so tight that they cause discomfort for the patient. A blood pressure cuff inflated below the patient's diastolic pressure may be used in place of a tourniquet if the healthcare professional possesses the training required to properly apply the cuff.

8(d) Selection of a vein

Once the tourniquet is applied, request the patient to clench their fist and hold it. The act of making a fist, along with the pressure from the tourniquet makes the veins become more prominent and easier to palpate and puncture. The patient should not clench and release his/her fist (pumping) as this can result in unreliable test results for some analytes.

Select a venipuncture site, preferably in the antecubital fossa area. Phlebotomists should prioritize antecubital vein selection as follows:

1. Center veins- median and lateral aspect of the median cubital veins
2. Outer veins- cephalic vein and accessory cephalic vein
3. Inner veins- basilica vein and medial aspect of the median cubital vein (venipuncture in this area poses the greatest risk of arterial and nerve injury).

If there are no acceptable sites in the antecubital fossa of both arms, the next recommended site is the back of the hand. Blood collections outside of these recommended venipuncture sites require a working knowledge of the anatomy involved and facility policy must be referenced and followed prior to making any such attempt.

See CLSI GP41 for more detail regarding venipuncture site selection.

If the vein selection process causes the tourniquet to be applied longer than one minute, the tourniquet should be released and the blood flow allowed to normalize for two minutes before beginning again.

8(e) Select appropriate supplies

Select the appropriate device and needle gauge based on the vein characteristics and blood volume that is needed. Tubes are selected based on the requested lab test(s) and lab instrumentation requirements. Consideration should be given to the physical characteristics of the vein, the volume of blood required, and risk of drawing too much blood from the patient.

8(f) Put on Gloves

Gloves are required at this step, and latex allergies must be considered. Do not remove the fingertip of the glove; gloves must remain intact. Attention must be paid to the need for donning gloves earlier in the process based on isolation precautions; refer to the facility policy.

What if…	**Then…**
…there are bruises/lesions in area where tourniquet should be applied?	…consider an alternate site from which to collect blood. If there are no alternative sites, the tourniquet can be applied over the patient's gown, or gauze can be used to cover up and protect any lesions.
…there is quite a bit of hair?	…apply the tourniquet over the patient's gown, or place a paper towel or tissue over the hair and apply the tourniquet over the towel/tissue.
…the patient complains that the tourniquet is pinching their skin?	…apply the tourniquet over clothing, or place a gauze pad between the tourniquet and skin.
…you don't find a venipuncture site?	…check the other arm; if there are no potential sites on the other arm, look for a site on the top of the hand.
…you are having problems locating a vein and the tourniquet is on for longer than one minute?	…release the tourniquet and reapply it after two minutes.
…the patient's hand begins to shake when asked to make a fist?	…ask the patient to release his/her fist. There are diseases and conditions that result in a patient having tremors when a fist is made. Proceed with the venipuncture procedure without the patient making a fist.
… the patient exhibits tremors and shaking of the arm and hand?	…obtain assistance from another healthcare provider to assure the arm is held still during the procedure.
…the patient is obese?	…be aware that the veins may be located much deeper from the surface and more difficult to feel. Do NOT blindly perform a venipuncture thinking that a vein must be present.
…the patient has rolling veins?	…anchor the vein more securely by applying pressure directly below the needle insertion site.
…the patient has sclerosed veins?	…look for an alternate site. Avoid these veins for venipuncture.
…the patient has small fragile/superficial veins?	…use a winged collection set and small volume evacuated tubes to collect the blood. Alternatively, a syringe can be used and blood transferred into an evacuated tube with a syringe transfer device.
…the patient has thrombosed veins?	…look for an alternate site. Avoid these veins for venipuncture.

What if…	Then…
…the patient states he/she is going to faint?	…place the patient on a bed in a recumbent position if at all possible. If a chair is the only option, place yourself directly in front of the patient during the phlebotomy procedure. If the patient then faints, your body can prevent the patient from falling out of the chair.
…the patient is combative?	…obtain assistance from another healthcare provider to assure the arm is held still for the procedure.
…the patient is unconscious or semiconscious?	…obtain assistance from another healthcare provider to assure the arm is held still for the procedure.

Cleanse the site using a clean gauze pad with 70% isopropyl alcohol solution or commercially-prepared alcohol pad. The latest studies and articles have found that **back and forth friction** should be the motion used to clean the site (as opposed to a concentric circular motion).

The cleansing motion should not be so vigorous to abrade the skin. If the area is especially dirty, use a new alcohol pad and cleanse the site again.

Allow the cleansed area to air dry (about 30-60 seconds). Do NOT wipe off the alcohol, fan the area, or blow on the area to speed the drying. The drying period is needed to allow for the maximum antiseptic effect of the alcohol. Inserting the needed before the alcohol is dry can also cause a burning sensation for the patient.

Do NOT touch the site after cleansing, even if you have cleansed the tip of a gloved finger with an alcohol pad. This disrupts the antiseptic effect of the alcohol. If the venipuncture is difficult and the vein needs repalpated, the site needs disinfected again. Stay aware of the length of time the tourniquet has been applied; release the tourniquet if the time has exceeded one minute, then wait two minutes before reapplying.

What if…	Then…
…you are drawing a blood culture or other sterile specimen?	…follow the facility policy for sterile blood specimen collection. CLSI GP41 recommends a minimum 30 second friction rub; if using a commercial disinfectant the phlebotomist must follow the manufacturer's instructions. The phlebotomist must also disinfect the rubber top of the blood culture bottle with 70% isopropyl alcohol and allow it to dry.
...you are collecting a blood alcohol level?	…do NOT cleanse the site using an alcohol or tincture of iodine wipes. A non-alcohol-based cleanser must be used. Soap and water is acceptable as is an aqueous povidone-iodine or aqueous benzalkonium.

8(g) Insert Needle and Aspirate Blood

After the alcohol or other cleansing substance has dried, anchor the vein, notify the patient the venipuncture is about to occur, and perform the puncture with the equipment you selected as most appropriate for the patient's veins. Hold the needle in line with the vein at an angle of 30° or less. When using a winged collection set, the needle must be held/secured in place for the duration of the collection procedure.

Once the needle is inserted, instruct the patient to release his/her fist. Once blood flow is established, release the tourniquet and continue with collecting the required tubes/quantities of blood.

What if…	**Then…**
…no blood appears in the tubes?	…troubleshoot the venipuncture. See the chart on page 20
…the tubes don't fill to their maximum capacity?	…collect as much blood as possible. Deliver all tubes to the laboratory to see if analysis can be performed on small quantities of blood. NOTE: Some tubes must be filled to capacity to assure reliable test results. Refer to the table on page 22.
…you forget to invert tubes after collection.	…the blood will not mix thoroughly with the additive or anticoagulant. This may result in specimen rejection and the need to perform another venipuncture on the patient.
…the patient complains of severe pain?	…immediately release the tourniquet and remove the needle. Hold pressure on the venipuncture site. Any pain other than the small amount associated with a routine puncture requires immediate discontinuation of the procedure. Pain can be extreme and include numbness of the arm; it can be burning and feel like an electrical shock; or it can radiate up and down the arm. Continuing with the venipuncture when the patient experiences pain can risk injury to nerves, arteries, and other tissues. Injury can significantly affect the patient's life and be permanent. Document the incident following facility protocol.
…releasing the tourniquet during the apiration process may result in vein collapse for the patient?	…keep the tourniquet in place.
…the situation requires the phlebotomist use a syringe?	…assemble the needle and syringe, Per OSHA, a syringe with engineered sharps injury protection must be used. Break the seal of the plunger to expel all air (if required, per manufacturer instructions). Once inserted, pull the syringe plunger back slowly and steadily to aspirate the required volume of blood. Avoid pulling quickly; excessive pulling pressure results in hemolysis of the red blood cells. Per OSHA, do not use the syringe needle to transfer blood into a tube or blood culture bottle.

What if…	Then…
…the patient has nausea and/or vomits?	…release the tourniquet and remove the needle as quickly as possible. Apply pressure to the venipuncture site. Call for help and medical assistance. Apply cold cloths to the patient's forehead and back of the neck. Provide him/her with an emesis basin or similar container. Document the incident following facility protocol.
…the patient feels faint or faints?	…release the tourniquet and remove the needle as quickly as possible. Apply pressure to the venipuncture site while physically supporting the patient (if he/she is seated). Call for help. If the patient is conscious, have him/her lower the head and breathe deeply. When help arrives, have the helper obtain wet cloths and apply one to the patient's forehead and one to the back of the neck. If the patient is unconscious, call for medical assistance. If the patient is seated, two people can lower the patient to the floor and elevate the legs. After the patient recovers, he/she should remain in the area for at least 15 minutes and should not operate a vehicle for at least 30 minutes. Document the incident following facility protocol.
…the patient has a seizure?	…release the tourniquet and remove the needle as quickly as possible. Apply pressure to the venipuncture site. Call for help and medical assistance. Try to protect the patient from injury without restricting movement of the extremities. Do not try to put anything into the patient's mouth. Document the incident following facility protocol.
…the inserted needle needs moved slightly to one side?	…remove the tube from the tube holder (or release syringe plunger). Pull the needle back but keep it under the skin. Re-anchor vein, adjust to the correct needle insertion direction, and advance the needle. If this second attempt is also unsuccessful, release the tourniquet, remove the needle, and apply gauze to the puncture site. Note- do not attempt needle relocation in the inner antecubital fossa. Additional attempts must be made in a different area, preferably the other arm. The entire venipuncture process must be started over. If this attempt also fails, another phlebotomist should make the next attempt. Follow facility policy.

Common Causes of Failure to Obtain Blood		
Problem	**Cause**	**Troubleshooting Action**
Tube Position	The tube may not be seated properly in the tube holder and the tube stopper may not be completely penetrated.	Remove the tube and reseat. Try another tube if you think the vacuum of the tube is compromised.
Tube Vacuum	The tube may be expired or the vacuum lost.	Remove the tube and insert a new tube.
Needle Position	The needle may not be inserted far enough to penetrate the vein.	Slowly and precisely move the needle a little deeper.*
	The needle bevel may not be completely under the skin. You may hear a hissing sound as the vacuum in the tube escapes.	• Slowly and precisely move the needle a little deeper.* • If blood does not enter the tube, try another tube as the vacuum in the first tube may be exhausted.
Problem	**Cause**	**Troubleshooting Action**
Needle Position-continued	The needle bevel may be only partially into the vein.	• Slowly and precisely move the needle a little deeper.* • A hematoma may begin to form as blood leaks out of the vein and enters the tissue. If blood is only slowly entering the tube, discontinue the procedure as the specimen will most likely be hemolyzed and injury to the patient may occur.
	The needle may barely be in the vein and the tube vacuum is causing the bevel to be “stuck” to the vein wall.	• Slowly and precisely move the needle a little deeper.* • Slightly increase the angle of the needle.
	The needle may have completely gone through the vein.	• Slowly and precisely pull the needle back.* • A hematoma may begin to form as blood leaks out of the vein and enters the tissue. If blood is only slowly entering the tube, discontinue the procedure as the specimen will most likely be hemolyzed and injury to the patient may occur.
Vein	The walls of the veins have drawn together shutting off the blood flow. Vacuum in the tubes may cause the veins to collapse, especially in those whose veins are fragile.	Discontinue the venipuncture. Perform another venipuncture using either a syringe or winged infusion set/small vacuum tubes.

8(h) Fill and Mix the Collection Tubes

Tubes with additive must be filled to their stated volumes. This will be when the vacuum is exhausted. Visually inspect each tube to ensure they are filled adequately. Do not remove the tube closures to fill tubes or transfer blood from one tube to another.

Once filled, disconnect the tube and mix by gentle inversion. Considering order of draw, connect the next tube as needed and fill/disconnect/mix.

When disconnecting the last tube, release the tourniquet if it has not yet been released. Ensure the tourniquet is released prior to withdrawing the needle.

Ensure each filled collection tube is properly mixed by gently inverting the tube slowly for the required number of inversions per the manufacturer's instructions.

The table on page 22 describes the volume requirements for collection tubes containing additives.

8(i) Filling tubes after a syringe draw

Per OSHA's Bloodborne Pathogens Standard, never transfer blood into a collection tube using the syringe needle.

A syringe with engineered sharps injury protection must be used. Once needle is withdrawn (and needle's safety feature is activated and needle assembly is discarded), apply a safety transfer device to the syringe. Quickly insert a collection tube into the safety transfer device. Allow tube to fill until the blood flow into the tube ceases; do not apply pressure by pushing on the syringe's plunger. Fill tubes using the correct order of draw.

Blood will clot in a syringe if left in it for too long. Blood must be transferred into collection tubes immediately.

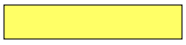
What if…	Then…
…you need to transfer blood from a syringe draw into tubes?	….use a safety transfer device to transfer the blood in the syringe into tubes, or use a tube holder with multi-sample needle during the syringe blood draw if the vein can withstand the vacuum pressure. Per OSHA standards, never transfer blood from a syringe into a tube using a needle.

8(j) Order of Draw

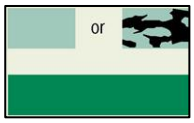
The purpose of the order of draw is to avoid possible test result error due to cross contamination from tube additives. While it might seem impossible for the very small amounts of additives in tubes to cause inaccurate test results, extensive research has been performed that indicates this is possible.

The recommended CLSI order of draw is 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 and tube holder) system. Many laboratory accreditation agencies such as the College of American Pathologists (CAP) and The Joint Commission require CLSI standards to be followed. The table on page 23 describes the correct order of draw.

What if…	Then…
…you forget the order of draw and draw tubes in an incorrect order?	…some of the laboratory test results may be unreliable.

Volume considerations for blood collection tubes with additives			
CLOSURE COLOR	**OVERFILL EFFECTS**	**UNDERFILL EFFECTS**	**MINIMUM ACCEPTABLE DRAW VOLUMES***
Yellow **(SPS)**	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**
Light 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% of capacity**
Red Red/Black Gold 	None	Quantity not sufficient (QNS) to analyze	50% of 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
Lavender Pink Pearl (White)  	Insufficient EDTA to completely inactivate clotting; results in clots within the specimen, rendering it useless for testing	Dilution effect; erroneously low cell counts & hemato-crits; RBC morphology changes; staining changes; insufficient volume for blood bank testing	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 (ACD) 	Insufficient additive to completely inactivate clotting	Insufficient volume for testing	**100% of capacity**

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

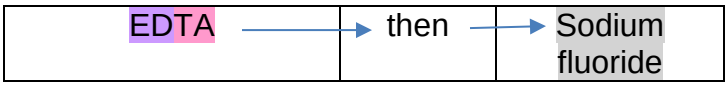
Order of Draw		
Order	**Tube**	**Stopper/Shield Color**
1	Blood culture, i.e., sterile specimens	• Blood culture bottles • Yellow stopper SPS tubes • Any other test that must be sterile 
2	Coagulation tube (tubes with citrate additives)	• Light blue stopper/shield • Clear shield over blue stopper 
3	Serum tube (with or without clot activator, with or without gel)	• Red & black stopper • Gold shield • Red stopper/shield  • Royal blue shield with **clot activator*** 
4	Heparin tube (with or without gel plasma separator)	• Speckled green stopper • Light green shield • Green stopper/green shield 
5	EDTA tube	• Lavender stopper/shield • Pink stopper/shield  • White (pearl) shield  • Royal blue shield with **EDTA***  • Tan tube with EDTA* 
6	Sodium fluoride/potassium oxalate Glycolytic inhibitor tube	• Gray stopper/shield 
7	All other tubes in no particular order unless otherwise directed	

*If a royal blue closure tube or tan closure tube is being collected for trace metal analysis, the tube should be collected first or via a second venipuncture to assure there is no trace metal contamination on the needle from puncturing the other tube stoppers. A separate venipuncture for trace metal analysis must be performed if blood cultures are ordered at the same time.

Below are a few more notes about the purpose of "order of draw:"

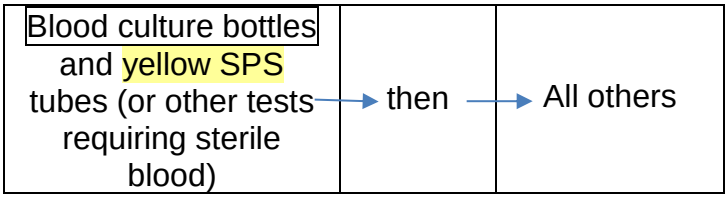
- EDTA is rich in potassium and can falsely elevate potassium test results. Due to this, tubes used to test for potassium must be collected before tubes containing EDTA. Therefore:

- The additives in gray closure tubes distort the microscopic appearance of blood cells on a WBC differential test. Therefore:



- Clot activators can interfere with coagulation tests such as prothrombin (PT) and activated partial thromboplastin time (aPTT), resulting in shortened test results. Therefore:

- Bacteria from non-sterile tube closures can contaminate blood collected into bottles/tubes used for blood cultures, resulting in the growth of bacteria erroneously leading a physician to think the patient has a blood infection. Therefore:



8(k) Remove and Dispose of Needle, Apply Pressure

With the tourniquet released, remove the needle while placing a clean gauze pad lightly over the venipuncture site. Immediately activate the needle's safety mechanism according to the manufacturer's instructions. Note that some needle devices are activated while the needle is still within the vein. Be aware of what type of safe needle devices you are using and how the safety features are activated. Discard the needle/unit into a sharps container.

Patients may apply pressure to the gauze if the phlebotomist constantly monitors to ensure adequate pressure is applied. Patients must not bend their elbow, as adequate pressure cannot be applied and a hematoma may develop. The venipuncture site should not be bandaged until bleeding has stopped. Patients actively taking certain anticoagulants ("blood thinners") or patients on chemotherapy may require pressure to be applied for longer as their clotting time may be prolonged.

Gauze pads are recommended over cotton balls for placement over the venipuncture site. The fibers in cotton balls can adhere to the platelet plug that forms over the venipuncture site. When the cotton ball is removed, the adhered fibers pull out the platelet plug and bleeding begins again. This does not happen with gauze pads.

What if…	Then…
…your facility uses cotton balls?	…be aware that bleeding may begin again when you remove the cotton ball to check the appearance of the venipuncture site.
…you are not using safe needle devices?	…the facility providing venipuncture supplies is in violation of federal laws, including the Bloodborne Pathogen Standard and the Needlestick Prevention Act. Individuals not using safe needle devices are placing themselves at unnecessary risk for needlestick injury and occupational exposure to bloodborne pathogens.
What if…	**Then…**
…there is no container?	…safely transport the used collection equipment to the nearest available sharps container.
…the container is full?	…immediately contact the responsible individuals to remove/empty the full container.
…you stick yourself with the needle?	…finish the procedure, wash your hands thoroughly, and report the exposure to the appropriate personnel.
…you forget to release the tourniquet before removing the needle?	…blood will flow from the puncture site in copious quantities. Immediately release the tourniquet, cover with a gauze square, and place firm pressure over the venipuncture site.
…you leave without releasing the tourniquet, and it remains on the patient?	…significant circulatory, neurological, vascular, and muscular damage can occur to the patient. The longer a tourniquet remains in place, the greater the chance of significant injury. Always check to assure you have removed the tourniquet before leaving the patient's side. The patient, for whatever reason, may not realize or complain about the prolonged pressure on his/her arm due to a tied tourniquet. There have been reports of tourniquets remaining on patients for up to 18 hours.

9. Specimen is Labeled

Tubes must be positively identified after filling, not before, with a firmly attached label containing the patient's

- First and last name
- Patient-specific identifier (medical record/other identification number)
- Collection date and time (using military time or including AM or PM as appropriate)
- Your identification per facility policy

Collection tubes must be labeled in the presence of the patient by the phlebotomist who performed the venipuncture. Labels must be securely applied to collection tubes and all information on the label must be visible and legible. The label must be affixed in such a way that the contents of the collection tube are visible (for assessment of fill volume and specimen quality). If the labels are barcoded, the label must be correctly positioned for bar code readers. See CLSI GP33 for more information.

What if…	Then…
…tubes are not labeled correctly?	…the tubes may be rejected requiring the patient to have another venipuncture.
…the test order is for a blood bank procedure?	…additional patient identification and tube labeling procedure may be required. Follow the facility policy.
…what if the tube must be labeled by another healthcare professional in an emergency environment?	…the person labeling must have witnessed the collection and that the patient was properly identified.

10. Provide Post-Venipuncture Care

Continue to monitor the patient for the possibility of syncope**.** Observe the venipuncture site for at least 5-10 seconds for any indication of prolonged/excessive bleeding or formation of a hematoma under the skin. Continue to apply pressure until bleeding has stopped. Once stopped, apply an adhesive bandage over the gauze to hold it in place. Instruct the patient to leave the bandage on for at least 15 minutes and to avoid exerting that arm for several hours. If needed, help the patient regain their original position and move all equipment back to its original position.

What if…	Then…
…the patient has skin reactions to regular adhesive bandages?	…use paper tape or a self-adherent wrap such as Coban™ over a folded gauze square.
…the patient has developed a hematoma?	…assure the bleeding has stopped then place a pressure bandage over the site by using a self-adherent wrap such as Coban™ over a folded gauze square.
...what if the patient continues to bleed?	…you should firmly apply pressure to the venipuncture site while the patient raises his/her arm above the level of the heart. If the bleeding has not stopped after 5 minutes, apply a pressure bandage, notify nursing personnel, and note the prolonged bleeding on the test order/requisition.

11. Handle and Transport Blood Specimen(s)

Some laboratory tests require special handling between the time of collection, delivery to the laboratory, and until the time of analysis. Common tests and the required special handling follow. Refer to CLSI GP44 for more information about specimen handling and processing.

Tests That Require Chilling	Tests That Require Maintenance at 37ºC	Tests That Require Protection From Light
• Gastrin • Ammonia • Lactic acid • Catecholamines • Pyruvate • Parathyroid hormone	• Cold agglutinin • Cryofibrinogen • Cryoglobulins	• Bilirubin • Vitamin A • Vitamin B_6 • Beta carotene • Porphyrins

Chilling is accomplished by placing filled labeled tubes in a mixture of ice and water. Filled tubes should never be placed directly in containers of ice only. To maintain

filled labeled tubes at body temperature (37ºC), heat blocks are used. Aluminum foil or a paper towel can be wrapped around filled labeled tubes to protect them from light.

After the tubes have been labelled and special handling performed (if needed), you can remove the gloves and perform hand hygiene as previously described. Thank the patient for his/her cooperation and leave the room (if an inpatient) or escort the patient out of the collection area (if an outpatient).

Send or deliver labeled blood tubes to the laboratory as quickly as possible. Unless otherwise indicated, keep tubes at room temperature. Do not place specimens near heat vents or in sunlight.

What if…	Then…
…you do not handle the specimen per recommendations?	… some of the laboratory test results may be unreliable.
…a delay occurs between specimen collection and receipt in the laboratory?	...some specimens may be rejected or some test results may be unreliable.
…the specimens are stored or transported incorrectly?	...some specimens may be rejected or some test results may be unreliable.

Common reasons for specimen rejection include but are not limited to the following.

- Inadequate, inaccurate, or missing specimen identification
- Insufficient blood to analyze; can be quantity not sufficient (QNS) or the volume of blood is inadequate for the additive (e.g., a partially filled light blue coagulation tube)
- Hemolysis
- Incorrect tube (i.e., CBC collected in a green closure tube)
- Improper handling
- Delay in transport
- Incorrect collection time (e.g., therapeutic drug monitoring test collected at improper time or before drug is administered)

CONCLUSION

Phlebotomy is an important component of health care, as it impacts the validity of laboratory test results. Additionally, the act of venipuncture can lead to accidental patient injury. To minimize patient injury risks and the introduction of preanalytic variables to the laboratory testing process, phlebotomists must adhere to the standards set forth within the CLSI documents and should be fully familiar with governing laws and facility policies. This course covered several CLSI standards for venipuncture and provided many “what if” scenarios commonly encountered by any healthcare professional who performs blood collection.

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TEST QUESTIONS

The "What Ifs" of Phlebotomy #1221020

Directions:

- Answer sheets: Read the instructions to assure you correctly complete the answer sheets.
- Online: Log in to your User Account on the NCCT website www.ncctinc.com.
  - **NOTE:** If the online test questions differ from the course test that follows the reading material, the CE course you are using is outdated or the question has been revised since you downloaded it. The online question is the most current and it should be answered accordingly.
- Select the response that best completes each sentence or answers each question from *the information presented in the course*.
- If you are having difficulty answering a question, go to www.ncctinc.com and select *Forms/Documents*. Then select *CE Updates and Revisions* to see if course content and/or a test questions have been revised. If you do not have access to the internet, call Customer Service at 800-875-4404.

1. Which organization is considered to be the gold standard for blood and specimen collection procedures?

    a. Centers for Medicare and Medicaid Services
    b. Clinical Laboratory Standards Institute
    c. College of American Pathologists
    d. The Joint Commission

2. Per the Centers for Medicare and Medicaid Services (CMS), who is authorized to place an order for a laboratory test?

    a. Anyone on the patient's nursing staff under the direction of a physician
    b. The lab technologist who suspects the wrong test was ordered
    c. The patient's physician or non-physician practitioner
    d. All of the above

3. What should you do if you need to draw blood and a member of the clergy is with the patient?

    a. Go ahead and collect the blood specimen.
    b. Have the nurse in charge of the patient ask the clergy member to leave.
    c. If the specimen collection is not urgent or timed, inform the patient you will return shortly.
    d. Tell the clergy member to leave while you collect the blood specimen.

4. When identifying a patient prior to collecting blood, you notice the patient's middle initial on the test order form differs from the middle initial on the patient's identification band. What do you do next?

    a. Assume it is a typographical error and proceed with specimen collection.
    b. Change the middle initial on the test order form to match the information on the identification band.
    c. Collect the blood specimen and tell the appropriate individual about the discrepancy so it can be resolved.
    d. Do not collect the specimen and report the discrepancy to the appropriate individual for resolution.

5. Considering the possibility of the ID band having been placed on the wrong patient, what should the phlebotomist do prior to collecting blood?

    a. Have the patient state and spell their name and date of birth and then check them against the ID band.
    b. Check the ID band against the test request only.
    c. State the expected first and last name to the patient and ask them to confirm the identity is correct by answering yes or no.
    d. Show the test request to the patient and ask them if it indicates their correct identity.

6. In an outpatient facility where ID bands are not required, what does the phlebotomist need to ask the patient to provide to properly establish identification?

    a. To state and spell their first and last names.
    b. To state their date of birth.
    c. To provide proof of ID.
    d. All of the above.

7. A patient refuses to let you collect a blood specimen. What do you do next?

    a. Call the doctor to report the patient's refusal.
    b. Call the lab to have someone else talk to the patient.
    c. Inform the patient's nurse of the refusal.
    d. Inform the patient you must draw the specimen and start the procedure.

8. For which of the following lab tests is fasting NOT listed as being required?

    a. Cholesterol
    b. Complete blood count (CBC)
    c. Cryoglobulin
    d. Gastrin

9. You enter a patient's room to collect a fasting blood glucose and notice the patient is just finishing his breakfast. What is your next step?

    a. Collect the blood specimen immediately before the food is broken down in the stomach.
    b. Collect the blood specimen and write on the test order that the patient has eaten.
    c. Do not collect the specimen and notify the appropriate personnel that the patient is no longer fasting.
    d. Refuse to collect the specimen even if the physician requests it be collected.

10. While collecting the blood specimen, you get some of the patient's blood on your gloves. Which of the following is the appropriate hand hygiene procedure?

    a. Cleanse your hands with a two-step blood culture collection prep.
    b. Use an alcohol-based hand rub.
    c. Use an alcohol-based hand rub followed by washing with soap and water.
    d. Wash your hands with soap and water.

11. Your hands are dry, cracked and inflamed from repeated hand hygiene procedures. What should you do?

    a. At home, use a heavier, oil-based moisturizer
    b. Use a water-based moisturizer after performing hand hygiene.
    c. Use warm water and less harsh soap for handwashing.
    d. All are acceptable actions.

12. Which of the following is the most serious type of latex allergy/sensitivity?

    a. Allergic contact dermatitis
    b. Irritant contact dermatitis
    c. Latex hypersensitivity
    d. All are equally serious

13. Five years ago a patient had a mastectomy on her right side. Which arm should you use for a venipuncture?

    a. Either side is OK as the mastectomy was five years ago
    b. Left arm
    c. Right arm as long as it is OK with the patient
    d. Right arm as long as you do not use a tourniquet

14. Which of the following identifies a situation where it is acceptable to collect a blood specimen and obtain reliable lab test results?

    a. AV fistula in left forearm; satisfactory antecubital veins in right arm
    b. IV in hand with satisfactory antecubital veins; IV cannot be turned off
    c. Sclerosed antecubital veins
    d. Thrombosed antecubital veins

15. If a phlebotomist struggles to find a suitable vein or has difficulty accessing the selected vein, after what length of time should the tourniquet be released?

    a. 1 minute
    b. 2 minutes
    c. 3 minutes
    d. 4 minutes

16. Which of the following motions is the latest recommended motion to use for disinfection of the venipuncture site?

    a. Concentric circles moving in an outward direction
    b. Concentric circles moving in an inward direction
    c. One swipe from left to right
    d. Back and forth friction

17. You have lab test orders to collect a blood alcohol. Which of the following is acceptable for cleansing the venipuncture site?

    a. 70% isopropyl alcohol wipe
    b. Aqueous benzalkonium
    c. 60% isopropyl alcohol wipe
    d. Tincture of iodine

18. Which of the following disrupts the antiseptic effect of alcohol cleansing of the venipuncture site?

    a. Cleansing the tip of a gloved finger and re-palpating the venipuncture site
    b. Fanning the area to speed up the drying
    c. Removing the wetness of the alcohol with a gauze square
    d. All of the above disrupt the antiseptic effect of the alcohol

19. What should a phlebotomist do to safely repalpate the vein after disinfection?

    a. Tear the index finger tip off the glove to better feel the vein.
    b. Cleanse the tip of a gloved finger with an alcohol pad.
    c. Disinfect the site again after repalpatation.
    d. Put on clean gloves before repalpating the disinfected site.

20. While collecting a blood specimen, the patient complains of a burning pain in her arm. What should you do?

    a. Continue with the collection as you only have one more tube to collect.
    b. Continue with the venipuncture as you suspect the patient being “a baby.”
    c. Release the tourniquet, remove the needle, and hold pressure on the site.
    d. Release the tourniquet as it is tied too tight and that is causing the pain.

21. You are very sure the needle is in the patient’s vein but the tube is not filling with blood. You do not hear a hissing sound and you do not see the formation of a hematoma. Which of the following is likely?

    a. The needle bevel is not completely under the skin
    b. The needle has gone completely through the vein
    c. The needle is damaged
    d. The vacuum may be lost in the tube

22. Drawing a lavender closure tube before a light green closure tube can falsely elevate which of the following test results?

    a. Creatinine
    b. Potassium
    c. White blood count
    d. WBC differential

23. What can occur if a serum tube (red) is drawn just prior to a coagulation tube (light blue)?

    a. Bacterial contamination can affect the results of the coagulation testing.
    b. The potassium additive in the serum tube can carry over and falsely shorten coagulation test results.
    c. The potassium additive in the serum tube can carry over and falsely extend coagulation test results.
    d. The clot activator in the serum tube can carry over and falsely shorten coagulation test results.

24. Additives in which of the following tubes can distort the microscopic appearance of blood cells?

    a. Light blue closure
    b. Lavender closure
    c. Gray closure
    d. Green closure

25. You leave a patient's room without releasing the tourniquet from his arm. You realize this in 15 minutes. What should you do next?

    a. Call the patient's nurse to have him/her check on the patient.
    b. Go to the patient's room to release the tourniquet and report the incident.
    c. Nothing. The patient will realize the tourniquet is still on and will release it.
    d. Nothing. The patient's nurse will find it later.

26. Five minutes after a venipuncture, the patient continues to bleed. What should you do next?

    a. Apply a pressure bandage and return to the lab.
    b. Apply a regular bandage and have the patient continue to apply pressure.
    c. Apply a regular bandage and continue to hold the venipuncture site yourself for an additional 10 minutes.
    d. Apply a pressure bandage and notify the appropriate nursing personnel of the continued bleeding.

27. Which of the following blood specimens should be chilled in a mixture of ice and water?

    a. Lactic Acid
    b. Cold agglutinin
    c. Calcium
    d. Cryoglobulins

28. Which of the following blood specimens should be protected from light?

    a. Bilirubin
    b. Vitamin A
    c. Vitamin B_6
    d. All should be protected from light

29. Which of the following would be a cause for specimen rejection?

    a. A blood glucose collected in a red closure tube
    b. A lavender closure tube filled to 50% of capacity
    c. A tube with missing specimen identification
    d. A tube for an ammonia level transported in ice/water

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