Phlebotomy

Phlebotomy

Objectives

Upon successful completion of this course, the student will:

- Be familiar with the proper order to fill tubes during blood draw.
- Know the importance of using standard precautions during venipuncture.
- Be able to perform the evacuated tube venipuncture procedure.
- Be able to perform the syringe venipuncture method.
- Be aware of contraindications to the completion of venipuncture.
- Be aware of possible complications resulting from venipuncture.
- Be able to properly document the procedure.

Phlebotomy

Definitions

Edema - Swelling caused by excess fluid in the body's tissues

Gauge - The gauge size of a needle determines the diameter of the opening of the needle. The smaller the number the larger the diameter.

Lumen - The opening of a needle

Petechiae - Small discolored spots on the skin caused by bleeding.

Vein - A blood vessel that transports blood from the body to the heart.

Venipuncture - A procedure that involves puncturing a vein.

Phlebotomy Equipment

Collection Tubes and Additives

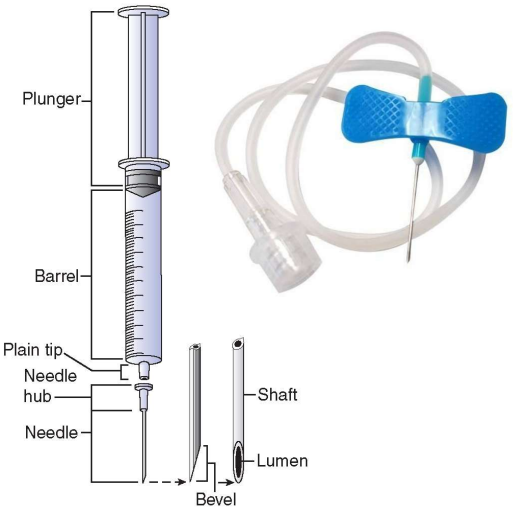
Blood collection tubes come in many varieties and have different uses based on the additives inside of them. A tube's color determines which additive is inside. These additives are generally used to control the speed at which the collected blood clots, either increasing or decreasing the speed. Provided are the most used tubes and additives. For more comprehensive information on their uses, refer to your facility policy and procedure. The tubes must be filled in the correct order, as displayed in the table.

Tube Color	Order	Additive	Uses
Color Varies	1	Blood Cultures	
Light Blue	2	Sodium Citrate	Coagulation studies
Red	3	Clot Activator	Clot activation
Gold	4	SST	Chemistry tests Serum samples
Light Green	5	Lithium Heparin	Plasma or whole blood
Dark Green	6	Sodium Heparin	Plasma or whole blood
Lavender	7	EDTA	Hematological tests
Gray	8	Sodium Fluoride	Testing glucose
Yellow	9	ACD Solution	Bacteria in blood

Phlebotomy Equipment

Syringes

Syringes are used in place of collection tubes when the veins being collected from are fragile. A winged-infusion set is often used in conjunction with syringes. Winged-needle sets are often superior when drawing blood from the hand due to the smaller gauge. Syringes come in different sizes to match the amount of blood being collected. The parts of the syringe are the plunger, the barrel, the plain tip, the needle hub, the needle, the shaft of the needle, the bevel of the needle, and the lumen of the needle.



Phlebotomy Equipment

Needle Safety Devices

Needle safety devices are designed to protect the needle after is has been removed from the patient's arm. Most needles are designed with safety devices and should be activated immediately after removal from the patient's arm.

Phlebotomy Procedures

Standard Precautions

Due to the invasive nature of phlebotomy in blood retrieval, maintaining standard precautions during blood draws is critical in preventing infection and other complications. Appropriate personal protective equipment for blood collection could include the following:

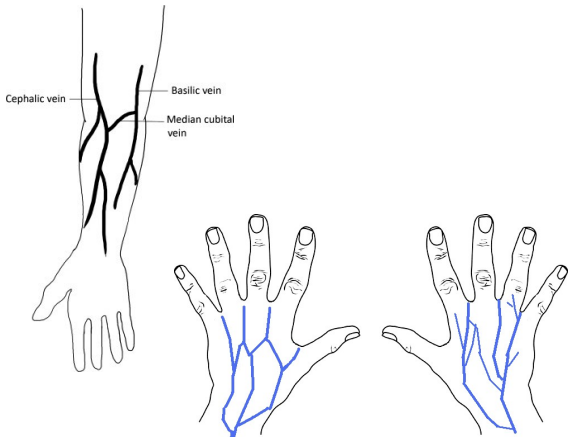
- Gloves
- Face mask
- Face shield
- Lab coat, apron, or gown
- Goggles

Refer to your facility policy and procedure for appropriate PPE to use during blood collection.

Phlebotomy Procedure

Vein Selection

When selecting a vein for venipuncture in blood collection, those most used are the cephalic, basilic, and median cubital veins in the antecubital fossa. The vein you select should ideally be bouncy to the touch, have no pulse, and refill when depressed. Alternatively, blood may be drawn from a vein on the back of the patient's hand with a small gauge needle.

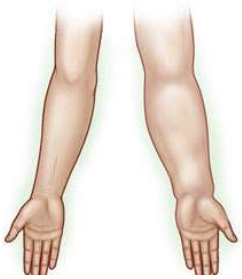


Phlebotomy Procedure

Contraindications to Using an Arm

Some reasons not to use a specific arm include, but are not limited to:

- Presence of intravenous lines
- Burns of scars at blood draw locations
- Thrombosed or Sclerosed veins
- Edema on either arm
- Mastectomy



Phlebotomy Procedure

Vacutainer Method Procedure

1. Verify physician/LIP order.
2. Identify patient using appropriate identifiers.
3. Explain procedure to patient/significant other.
4. Position patient for comfort and access to blood collection site.
5. Perform hand hygiene.
6. Assemble equipment and supplies on clean work surface.
7. Don gloves and other appropriate PPE.
8. Apply Tourniquet 3 to 4 inches above blood collection site.
    a) Do not leave tourniquet for longer than 1 minute.
9. Cleanse the skin.
10. Allow skin to dry for 30 to 60 seconds
11. Remove needle cap and inspect needle

Phlebotomy Procedure

Vacutainer Method Procedure (cont'd)

12. Stabilize vein and insert needle.
13. Push vacuum tube onto sheathed needle.
14. Adjust as necessary to promote blood flow.
15. Allow each tube to fill completely.
    - Remember to fill each tube in correct draw order.
16. Remove tourniquet upon filling last tube.
17. Place gauze on site, apply pressure after needle is removed.
18. Activate safety device on needle.
19. Dispose of sharps and supplies in appropriate containers.
20. Label specimens with patient's full name, date/time of collection, nurse's initials, and patient's room or bed number.
21. Check patient for continued bleeding and apply bandage if none is present.

Phlebotomy Procedure

Syringe Method Procedure

1. Verify physician/LIP order.
2. Identify patient using appropriate identifiers.
3. Explain procedure to patient/significant other.
4. Position patient for comfort and access to blood collection site.
5. Perform hand hygiene.
6. Assemble equipment and supplies on clean work surface.
7. Don gloves and other appropriate PPE.
8. Apply Tourniquet 3 to 4 inches above blood collection site.
    a) Do not leave tourniquet for longer than 1 minute.
9. Cleanse the skin.
10. Allow skin to dry for 30 to 60 seconds
11. Remove needle cap and inspect needle

Phlebotomy Procedure

Syringe Method Procedure (cont'd)

12. Move plunger back and forth slightly to check for free movement.
13. Stabilize vein and insert needle.
14. Check for flash of blood upon insertion of needle.
15. Pull back on plunger gently until desired amount of blood is acquired.
16. Remove tourniquet upon filling syringe.
17. Place gauze on site, apply pressure after needle is removed.
18. Activate safety device on needle.
19. Immediately fill required tubes using transfer device.
20. Dispose of sharps and supplies in appropriate containers.
21. Label specimens with patient's full name, date/time of collection, nurse's initials, and patient's room or bed number.
22. Check patient for continued bleeding and apply bandage if none is present.

Phlebotomy Procedure

Geriatric Patient Considerations

Here are some additional considerations when drawing blood from the elderly patient:

- Use a smaller gauge needle when presented with more difficult arm veins.
- Winged blood collection set can give the phlebotomist more control when accessing hand veins.
- Use additional care in the application of the tourniquet, as geriatric patients are often prone to bruising.
- The same applies for applying pressure to the insertion site after venipuncture is complete. Use care while applying pressure.
- Avoid adhesive bandages when bandaging insertion site.

Phlebotomy Procedure

Contraindications

These contraindications may prevent the completion of the venipuncture procedure:

- Cellulitis or abscess
- Venous fibrosis
- Presence of Hematoma
- Vascular shunt or graft
- Obesity
- Damaged veins
- Edema
- Thrombosis or sclerosis of veins.

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Phlebotomy Complications

- **Hematoma -** Blood can leak out of a vein and under the skin. This causes a solid swelling of clotted blood within the tissues.
- **Petechiae -** a small red or purple spot caused by bleeding into the skin. May be caused by issues with coagulation.
- **Collapsed veins -** A vein that has been swollen due to damage. Blood flow will continue once swelling subsides, but severe damage can be permanent.

Collapsed Vein

Petechiae

Hematoma

Phlebotomy

Phlebotomy Complications

- **Nerve damage -** Nerve damage can be caused by hematoma or by mechanical damage to the nerve during venipuncture. Immediately discontinue venipuncture if the patient reports sharp electric tingling.
- **Hemoconcentration -** Can result from prolonged tourniquet application. Patient may complain of tightness, burning, and discomfort around the site of venipuncture.
- **Arterial puncture -** During venipuncture, an artery may be punctured instead of a vein. Remove the needle immediately and apply pressure to the site until the bleeding stops.
- **Infection -** Inadequate cleansing or poor technique can lead to infection of the venipuncture site.
- **Fainting -** Patients may become dizzy and faint at the thought or sight of blood during the venipuncture procedure, caused by rapid decline in blood pressure from fear.
- **Excessive bleeding -** Can occur in patients on anticoagulants. Do not leave the patient alone until the bleeding has stopped.
- **Thrombus Formation -** A thrombus may form in the vein in response to damage to that vein.

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Pre-analytical Complications

The following variables can unpredictably affect lab results if not controlled:

- Patient assessment
- Test requests
- Specimen collection
- Specimen transport
- Specimen delivery to lab

In order to ensure accurate test results, it is imperative that you follow your facility policy and procedure when it comes to these possible variables, as well as accurately document all aspects of the venipuncture procedure.

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Documentation and reporting

Documentation of the procedure in the patient's medical record includes but is not limited to:

- Procedure performed
- Date and time of procedure
- Patient response to the procedure
- Complications occurring during or resulting from the procedure
- Communication with prescriber/LIP
- Interventions
- Education provided to patient or patient representative

References

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- Dhingra, N., Diepart, M., Dziekan, G., Khamassi, S., Otaiza, F., & Wilburn, S. (2010). WHO guidelines on drawing blood: best practices in phlebotomy. https://doi.org/https://www.euro.who.int/__data/assets/pdf_file/0005/268790/WHO-guidelines-on-drawing-blood-best-practices-in-phlebotomy-Eng.pdf
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