

**Component I:**            **CORE**

**Module 6:**                **Blood Specimen Collection Equipment**

**Purpose:**                **To prepare the learner with the basic knowledge and skills necessary to use blood collection equipment.**

**Suggested Time Frame:**        **2 hours**

**Objectives:**        **Upon the completion of this module, the learner will be able to:**

1. Demonstrate knowledge of the evacuated tubes for blood collection.
2. Describe the common types of tube additives and their purposes.
3. Describe the blood collection equipment.

**Resources:**

**References:**

Garza, Diane & Becan-McBride, Kathleen, (2002). Phlebotomy Handbook: Blood Collection Essentials. Upper Saddle, New Jersey: Prentice Hall.

Hoeltke, Lynn, (2000). The Complete Textbook of Phlebotomy, 2<sup>nd</sup> Edition. Albany, NY: Delmar, a division of Thompson Learning, Inc.

McCall, Ruth E. & Tankerslay, Cathee M. (1998). Phlebotomy Essentials. Philadelphia, Pennsylvania: Lippincott, Williams & Wilkins.

**Component I:**            **CORE**

**Module 6:**                **Blood Specimen Collection Equipment**

**Topic 1:**                **Evacuated Tubes for Blood Collection**

**Purpose:**                **To prepare the learner with the basic knowledge of the type of evacuated tubes for blood collection.**

**Suggested Time Frame:**        **15 minutes**

**Objectives:**        **Upon completion of this topic, the learner will be able to:**

1. Define key terminology.
2. Correlate color code of the anticoagulants in evacuated tubes.
3. Discuss multisample containers.

**Vocabulary:**

Additive	Evacuated tubes	Multisample needles
Anticoagulant	Blood banking	Hematology
Clot activator	Needle holder	Centrifuged
Serum	Potassium oxalate	Sodium fluoride
Coagulation	Polymer gel	Immunodeficiency
Heparin	EDTA	Potassium
Lithium heparin	Sodium heparin	Lithium
iodoacetic		

**References:**

- Garza, Diane & Becan-McBride, Kathleen, (2002). Phlebotomy Handbook: Blood Collection Essentials. Upper Saddle, New Jersey: Prentice Hall.
- Hoeltke, Lynn, (2000). The Complete Textbook of Phlebotomy, 2<sup>nd</sup> Edition. Albany, NY: Delmar, a division of Thompson Learning, Inc.
- McCall, Ruth E. & Tankerslay, Cathee M. (1998). Phlebotomy Essentials. Philadelphia, Pennsylvania: Lippincott, Williams & Wilkins.

**Module 6: Blood Specimen Collection  
Equipment**

**Topic 1: Evacuated Tubes for Blood  
Collection**

Objective and Content	Recommended Teaching Strategies/Evaluation Methods
1. Define key terms <ul style="list-style-type: none"> <li>A. Review the listed vocabulary terms.</li> <li>B. Spell the listed terms accurately</li> <li>C. Pronounce the terms correctly</li> <li>D. Use the terms in their proper context</li> </ul>	Lecture
2. Correlate the color code with the anticoagulant used in the evaluated (color-coded) evacuated tubes: <ul style="list-style-type: none"> <li>A. Red stopper = no anticoagulant</li> <li>B. Green stopper = heparin (lithium, sodium)</li> <li>C. Lavender stopper = ethylenediaminetetraacetic acid (EDTA)</li> <li>D. Gray stopper = potassium oxalate or sodium fluoride</li> <li>E. Light blue = sodium citrate</li> <li>F. Yellow = acid citrate dextrose (ACD)</li> </ul>	Lecture Demonstration
3. Discuss multi-sample containers <ul style="list-style-type: none"> <li>A. Parts of an evacuated collection tube               <ul style="list-style-type: none"> <li>1. Glass or plastic</li> <li>2. Vacuum determines volume                   <ul style="list-style-type: none"> <li>a. Full draw</li> <li>b. Under filled draw</li> </ul> </li> <li>3. Stoppers are color-coded</li> <li>4. Additives/no additives</li> </ul> </li> <li>B. Tubes come in regular (adult) sizes and pediatric sizes</li> <li>C. Most efficient method to obtain blood               <ul style="list-style-type: none"> <li>1. Blood is directly collected into tubes</li> <li>2. Decreases the probability of needle sticks</li> </ul> </li> <li>D. Red-topped tubes               <ul style="list-style-type: none"> <li>1. Additives: none</li> <li>2. Purpose: for collection of serum                   <ul style="list-style-type: none"> <li>a. Routine chemistries</li> <li>b. Serology</li> <li>c. Blood banking</li> </ul> </li> <li>3. Minimum volume of blood for accurate results: not affected</li> </ul> </li> <li>E. Green-topped tubes               <ul style="list-style-type: none"> <li>1. Additives: sodium heparin, lithium heparin</li> <li>2. Purpose: for collection of plasma and whole blood</li> <li>3. Minimum volume of blood for accurate results: full draw preferred, but no less than <math>\frac{3}{4}</math> full</li> </ul> </li> <li>F. Lavender-topped tubes               <ul style="list-style-type: none"> <li>1. Additives: liquid K<sub>3</sub>EDTA and powdered Na<sub>2</sub>EDTA</li> <li>2. Purpose: for collection of plasma and whole</li> </ul> </li> </ul>	Lecture Demonstration Small and Standard Diameter Tubes - Appendix 6.1 Evacuated Tube - Appendix 6.2 Evacuated Blood Collection System - Appendix 6.3

Objective and Content	Recommended Teaching Strategies/Evaluation Methods
<p>blood.</p> <p>3. Minimum volume of blood for accurate results: full draw preferred but no less than <math>\frac{3}{4}</math> full.</p> <p>G. Gray-topped tubes</p> <p>1. Additives:</p> <ol style="list-style-type: none"> <li>Sodium fluoride</li> <li>Lithium iodoacetate</li> <li>Combinations of sodium fluoride and anticoagulant potassium oxalate</li> <li>Combinations of lithium iodoacetic and anticoagulant lithium heparin</li> </ol> <p>2. Purpose: for collection of plasma</p> <p>3. Minimum volume of blood for accurate results: not affected</p> <p>H. Light blue-topped tubes</p> <p>1. Additives: sodium citrate</p> <p>2. Purpose: for collection of plasma or whole blood primarily for coagulation.</p> <p>3. Minimum volume of blood for accurate results: full draw required</p> <p>I. Yellow-topped tubes</p> <p>1. Additives: acid citrate dextrose (ACD) solution</p> <p>2. Purpose: for collection of special determinations.</p> <p>3. Minimum volume of blood for accurate results: not affected</p> <p>J. Speckled, marbled, or tiger-topped tubes</p> <p>1. Red-gray tubes</p> <ol style="list-style-type: none"> <li>Additives: clot activator and polymer gel</li> <li>Purpose: for collection of serum <ol style="list-style-type: none"> <li>Separates serum from cells when properly centrifuged.</li> <li>Not recommended for blood banking or therapeutic drug levels</li> </ol> </li> <li>Minimum volume of blood for accurate results: not affected</li> </ol> <p>2. Green-gray tubes</p> <ol style="list-style-type: none"> <li>Additives: lithium heparin and polymer gel</li> <li>Purpose: <ol style="list-style-type: none"> <li>For collection of plasma for chemistry determinations.</li> <li>Polymer gel separates plasma from cells when properly centrifuged.</li> </ol> </li> <li>Minimum volume of blood for accurate results: full draw preferred but no less than <math>\frac{3}{4}</math> full</li> </ol>	

**Component I:**            **CORE**

**Module 6:**                **Blood Specimen Collection Equipment**

**Topic 2:**                **Common types of additives**

**Purpose:**                **To prepare the learner with the basic knowledge of common types of additives.**

**Suggested Time Frame:**        **30 minutes**

**Objectives:**        **Upon completion of this topic, the learner will be able to:**

1. Define key terminology.
2. Describe the common types of additives used in blood collection.

**Vocabulary:**

EDTA	Heparin	Sodium citrate
Oxalates	ACD	SPS
Cell morphology	Platelet aggregation	Plasma
Prothrombin	Thrombin	Thromboplastin
Calcium	Glucose	Immunohematology tests
Paternity test	Transplant	Complement
Phagocytosis	Silica particles	Inert
Density	Polymer (Thixotropic) gel separators	

**References:**

- Garza, Diane & Becan-McBride, Kathleen, (2002). Phlebotomy Handbook: Blood Collection Essentials. Upper Saddle, New Jersey: Prentice Hall.
- Hoeltke, Lynn, (2000). The Complete Textbook of Phlebotomy, 2<sup>nd</sup> Edition. Albany, NY: Delmar, a division of Thompson Learning, Inc.
- McCall, Ruth E. & Tankerslay, Cathee M. (1998). Phlebotomy Essentials. Philadelphia, Pennsylvania: Lippincott, Williams & Wilkins.

Objective and Content	Recommended Teaching Strategies/Evaluation Methods
1. Define key terms <ul style="list-style-type: none"> <li>A. Review the listed vocabulary terms.</li> <li>B. Spell the listed terms accurately</li> <li>C. Pronounce the terms correctly</li> <li>D. Use the terms in their proper context</li> </ul>	Lecture
2. Describe the common types of additives used in blood collection. <ul style="list-style-type: none"> <li>A. Anticoagulants               <ul style="list-style-type: none"> <li>1. EDTA (Ethylenediaminetetracetic acid)                   <ul style="list-style-type: none"> <li>a. Anticoagulant of choice for whole blood hematology studies.</li> <li>b. Mechanism of action                       <ul style="list-style-type: none"> <li>i. Prevents coagulation by binding calcium.</li> <li>ii. Preserves cell morphology and inhibits platelet aggregation.</li> </ul> </li> <li>c. Contained in lavender stopper tubes and royal blue stopper tubes with lavender labels.</li> </ul> </li> <li>2. Heparin                   <ul style="list-style-type: none"> <li>a. Anticoagulant of choice for plasma chemistry determinations.</li> <li>b. Mechanism of action: prevents coagulation by inhibiting the conversion of prothrombin to thrombin.</li> <li>c. Contained in green stopper tubes and royal blue stopper tubes with green labels.</li> </ul> </li> <li>3. Sodium citrate                   <ul style="list-style-type: none"> <li>a. Anticoagulant of choice for coagulation studies.</li> <li>b. Mechanism of action: prevents coagulation by binding calcium.</li> <li>c. Best anticoagulant for preserving the coagulation factors.</li> <li>d. Contained in light blue stopper tubes.</li> </ul> </li> <li>4. Oxalates                   <ul style="list-style-type: none"> <li>a. Often used along with an antiglycolytic agent (sodium fluoride and lithium iodoacetate) to collect plasma for glucose analysis.</li> <li>b. Mechanism of action: inhibits coagulation by binding calcium.</li> <li>c. Contained in gray stopper tubes.</li> </ul> </li> <li>5. Acid citrate dextrose (ACD)                   <ul style="list-style-type: none"> <li>a. Commonly used for certain immunodeficiency tests,</li> </ul> </li> </ul> </li> </ul>	Lecture Demonstration

Objective and Content	Recommended Teaching Strategies/Evaluation Methods
<p>immunoematology tests such as paternity, transplant compatibility testing and bone marrow.</p> <ul style="list-style-type: none"> <li>b. Mechanism of action: prevents coagulation by binding calcium.</li> <li>c. Contained in yellow stopper tubes.</li> </ul> <p>6. Sodium polyanethol sulfonate (SPS)</p> <ul style="list-style-type: none"> <li>a. Commonly used in blood culture collection.</li> <li>b. Mechanism of action: prevents coagulation by binding calcium and inhibits complement and phagocytosis.</li> <li>c. Contained in yellow and black stopper tubes or blood culture bottles.</li> </ul> <p>7. No anticoagulant</p> <ul style="list-style-type: none"> <li>a. Contained in red stopper tubes.</li> <li>b. Referred to as “plain” vacuum tubes</li> <li>c. Blood clots by normal coagulation process.</li> <li>d. Used for chemistry, serology, blood bank and immunology.</li> </ul> <p>B. Clot Activators - substances that facilitate blood clotting.</p> <ul style="list-style-type: none"> <li>1. Glass or silica particles.</li> <li>2. Thromboplastin and thrombin.</li> </ul> <p>C. Polymer (Thixotropic) gel separators</p> <ul style="list-style-type: none"> <li>1. An inert synthetic substance that undergoes a temporary change in viscosity during centrifugation.</li> <li>2. Provides a barrier between the plasma/serum and the cell/clot.</li> </ul>	

**Component I:**            **CORE**

**Module 6:**                **Blood Specimen Collection Equipment**

**Topic 3:**                **Blood Collection Equipment**

**Purpose:**                **To prepare the learner with the basic knowledge of blood collection equipment.**

**Suggested Time Frame:**        **1 hour & 15 minutes**

**Objectives:**        **Upon completion of this topic, the learner will be able to:**

1. Define key terminology.
2. Describe uses for gloves.
3. Describe the uses of tourniquets.
4. Describe a syringe and its usage.
5. Describe the uses of adapters/needle holders.
6. Describe the use of needles: multi-sample and single use.
7. Describe the equipment needed for the micro-collection of blood by skin puncture.
8. Describe the contents of specimen collection trays.

**Vocabulary:**

Plunger	Lumen	Iodine pads
Gauge	Hub	Swab sticks
Lancets	Syringe	Needle guard
Multiple draw	Milliliters	Heel sticks
Bevel	Tourniquets	Point
Butterfly needle (winged infusion set)	Finger sticks	Shaft
Needle holder	Penetration depth	Incision
Barrel	Adapter	Isopropyl alcohol
Latex, non-latex	Graduations of syringe	Retract
Polypropylene	Capillary	Light sensitive analytes
Calibrated	Pressure	Contaminated needle
Blunting cannula	Venipuncture	Disposable
Diameter	Gauge number	Sterilize
Pediatrics	Geriatrics	

**References:**

- Garza, Diane & Becan-McBride, Kathleen, (2002). Phlebotomy Handbook: Blood Collection Essentials. Upper Saddle, New Jersey: Prentice Hall.
- Hoeltke, Lynn, (2000). The Complete Textbook of Phlebotomy, 2<sup>nd</sup> Edition. Albany, NY: Delmar, a division of Thompson Learning, Inc.
- McCall, Ruth E. & Tankerslay, Cathee M. (1998). Phlebotomy Essentials. Philadelphia, Pennsylvania: Lippincott, Williams & Wilkins.



**Module 6: Blood Specimen Collection Equipment**

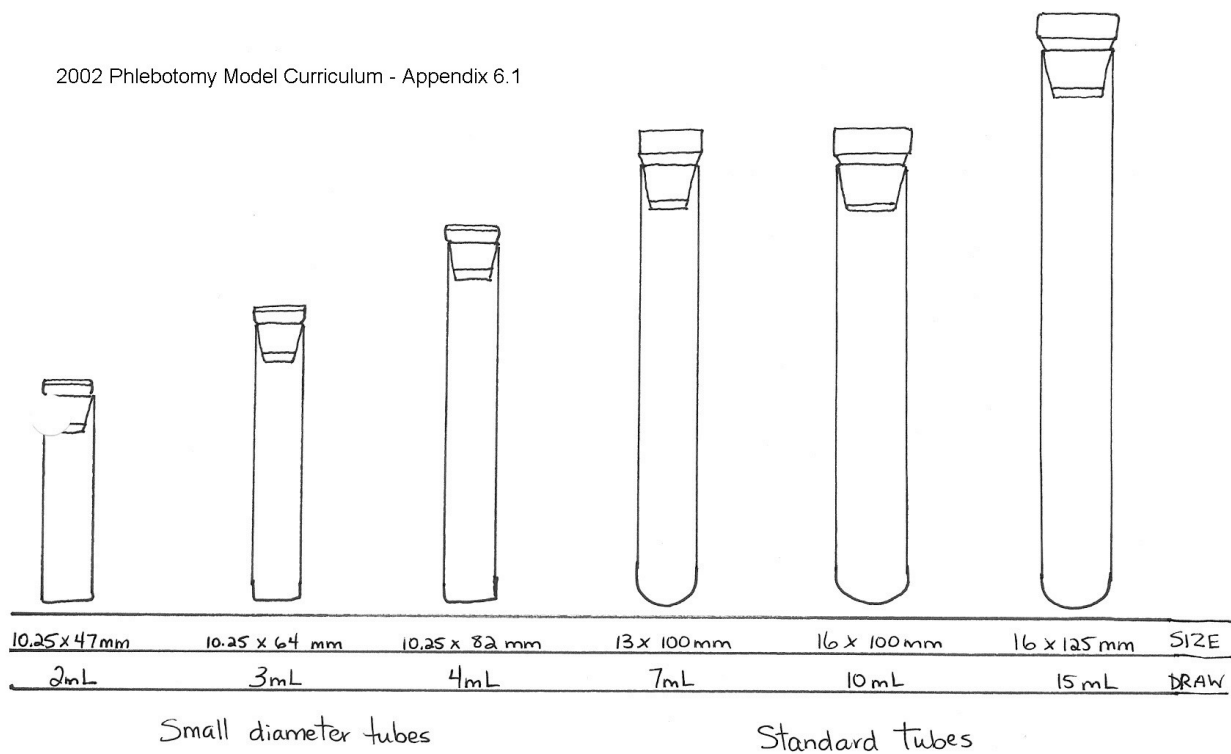
**Topic 3: Blood Collection Equipment**

Objective and Content	Recommended Teaching Strategies/Evaluation Methods
1. Define key terms <ul style="list-style-type: none"> <li>A. Review the listed vocabulary terms.</li> <li>B. Spell the listed terms accurately</li> <li>C. Pronounce the terms correctly</li> <li>D. Use the terms in their proper context</li> </ul>	Lecture
2. Describe uses for gloves. <ul style="list-style-type: none"> <li>A. Worn to protect the phlebotomist and the patients.</li> <li>B. Many commercially manufactured gloves are available and are made of different materials.               <ul style="list-style-type: none"> <li>1. Latex gloves with or without talc.</li> <li>2. Non-latex gloves (for users that have an allergic reaction to latex).</li> <li>3. Hypoallergenic latex gloves</li> </ul> </li> <li>C. Single-use for each patient, with handwashing and/or waterless hand sanitizer in-between patients.</li> </ul>	Lecture Demonstration
3. Describe the uses of tourniquets. <ul style="list-style-type: none"> <li>A. Used during venipuncture to make it easier to locate a patient's vein by impeding venous but not arterial blood flow in the area just below the tourniquet.</li> <li>B. Most frequently used tourniquets are flat latex strips that are inexpensive.</li> <li>C. Blood pressure cuff can be used successfully when veins are difficult to find.</li> <li>D. Non-latex disposable tourniquets are available for patients who are allergic to latex.</li> </ul>	Lecture Demonstration
4. Describe a syringe and its usage. <ul style="list-style-type: none"> <li>A. Parts               <ul style="list-style-type: none"> <li>1. Barrel</li> <li>2. Graduations of fractions of a milliliter</li> <li>3. Plunger</li> </ul> </li> <li>B. Functions               <ul style="list-style-type: none"> <li>1. Blood culture collection.</li> <li>2. Collecting blood from patients whose veins are too fragile to withstand the suction of vacuum tube. The phlebotomist is able to control the suction pressure on the vein by slowly withdrawing the syringe plunger.</li> </ul> </li> <li>C. Must be of the correct size for the amount of blood to be collected.</li> <li>D. Special precautions used to avoid splashing blood when transferring to vacuum tube.</li> </ul>	Lecture Demonstration Syringe: Barrel & Plunger - Appendix 6.4

Objective and Content	Recommended Teaching Strategies/Evaluation Methods
<p>5. Describe the uses of adapters/needle holders</p> <ul style="list-style-type: none"> <li>A. An adapter is a clear, plastic cylinder with a small opening at one end to receive the threaded needle and a large opening at the other end to receive the evacuated blood-drawing tube.               <ul style="list-style-type: none"> <li>1. For single use only</li> <li>2. There are flanges (extensions) on the sides of the tube end of the holder to aid in the tube placement and removal.</li> </ul> </li> <li>B. Sizes of available holders               <ul style="list-style-type: none"> <li>1. Standard-diameter</li> <li>2. Small diameter, used for pediatric patients, geriatric patients or difficult draws.</li> </ul> </li> <li>C. Protective holders or Safety-evacuated tube system holders utilize various engineered safety devices to prevent needlestick injuries. Examples:               <ul style="list-style-type: none"> <li>1. Bio-Plexus Puncture Guard needle holder has a blunting cannula that covers the needlepoint when the phlebotomist applies pressure to the blood collection tube. This device will blunt the needle before it is removed from the patient.</li> <li>2. SIMS Venipuncture Needle-Pro (SIMS Portex Inc., Keene, NH) allows the phlebotomist to activate the needle guard by holding the tube holder and pressing the needle guard against a hard surface to cover the needle after removing the needle from the patient's vein.</li> <li>3. BD VACUTAINER ( Becton &amp; Dickensen) Systems is a single-use blood collection needle that allows the phlebotomist to close the shield over the needle and locks the needle after use.</li> <li>4. Vanishpoint (Retractable Technologies, TX) is a multi-use blood collection tube holder. The needle automatically retracts into the holder after blood collection. It contains no natural rubber latex, which avoids the possibility of a latex allergic reaction.</li> <li>5. Proguard II (Care Medical Products, Ontario, CA) is a single use vacuum tube/needle holder. The used needle is manually retracted into the holder.</li> <li>6. S-Monovette Blood Collection System (Sarstedt, Inc.) is a safety device for vacuum collection or a syringe collection. It combines sample collection, transportation, and centrifugation tube as a unit.</li> </ul> </li> </ul>	<p>Lecture Demonstration</p>
<p>6. Describe the use of needles: multi-sample and single use.</p> <ul style="list-style-type: none"> <li>A. Single use with syringe</li> </ul>	<p>Lecture Demonstration</p>

Objective and Content	Recommended Teaching Strategies/Evaluation Methods
<ul style="list-style-type: none"> <li>1. Parts               <ul style="list-style-type: none"> <li>a. Hub</li> <li>b. Shaft</li> <li>c. Lumen</li> <li>d. Bevel</li> </ul> </li> <li>2. Gauge: 20-23 G is the most commonly used range.</li> <li>3. Length: 1-1½ inches</li> <li>4. Function: refer to syringe function</li> <li>B. Multi-sample with evacuated tubes               <ul style="list-style-type: none"> <li>1. Parts                   <ul style="list-style-type: none"> <li>a. Shaft</li> <li>b. Lumen</li> <li>c. Bevel</li> <li>d. Back-end - rubber sheath</li> </ul> </li> <li>2. Gauge: 21-22 G is the most commonly used range</li> <li>3. Length: 1 - 1½ inches</li> <li>4. Functions:                   <ul style="list-style-type: none"> <li>b. Used with evacuated tube system</li> <li>c. Used with healthy veins</li> </ul> </li> </ul> </li> <li>C. Winged infusion (butterfly)               <ul style="list-style-type: none"> <li>1. Parts                   <ul style="list-style-type: none"> <li>a. Shaft</li> <li>b. Lumen</li> <li>c. Bevel</li> </ul> </li> <li>2. Gauge: 21-25 G is the most commonly used range</li> <li>3. Length: ½ - ¾ inch</li> <li>4. Functions                   <ul style="list-style-type: none"> <li>a. If attached to a syringe, refer to syringe functions.</li> <li>b. If attached to multisample, refer to multisample functions.</li> </ul> </li> <li>5. Flexible plastic tubing that can be attached to a syringe, or specially designed hub/multisample adapter, allowing use with a syringe or evacuated tube system.</li> </ul> </li> <li>D. Needles are pre-sterilized.               <ul style="list-style-type: none"> <li>1. Needles are packaged in individual, color-coded containers according to the gauge and length, and have a protective sheath covering the needle.</li> <li>2. Multi-sample needles come enclosed in sealed, twist-apart shields to maintain sterility.</li> </ul> </li> <li>E. Remove the protective sheath with sterile technique.</li> <li>F. The tip of each needle should be checked for damage. A blunt or bent tip can be harmful to the patient's vein and may result in failure to collect blood.</li> </ul>	<p>Butterfly Collection Device - Appendix 6.5</p>

Objective and Content	Recommended Teaching Strategies/Evaluation Methods
<p>7. Describe the equipment needed for the micro-collection of blood by skin puncture.</p> <p>A. Skin puncture devices. Features include:</p> <ol style="list-style-type: none"> <li>1. Automated</li> <li>2. Safety engineered</li> <li>3. Single-use</li> <li>4. For heel and finger sticks</li> <li>5. Depth ranges: 0/85 mm - 2.4 mm (NCCLS recommendation)</li> </ol> <p>B. Micro-collection Containers - Disposable plastic calibrated micro-collection tubes. Features include:</p> <ol style="list-style-type: none"> <li>1. Color-coded</li> <li>2. Lines to allow for measurement of volume</li> <li>3. Used for capillary blood collection.</li> <li>4. Used for short sample blood collection</li> </ol>	<p>Lecture  Demonstration  List of skin puncture devices and micro-collection containers - Appendix 6.6  Micro-collection Devices - Appendix 6.7</p>
<p>8. Describe the contents of specimen collection trays.</p> <p>A. Usually made of plastic</p> <p>B. Used to hold the phlebotomy supplies for blood collection.</p> <ol style="list-style-type: none"> <li>1. Marking pens or pencils</li> <li>2. Evacuated tubes</li> <li>3. Needle</li> <li>4. Holders/adapters</li> <li>5. Syringes</li> <li>6. Tourniquet</li> <li>7. Blood collection sets (Butterfly needle assembly)</li> <li>8. 70 % Isopropyl alcohol, Iodine pads, or swab sticks</li> <li>9. Sterile gauze pads</li> <li>10. Bandages/tape</li> <li>11. Sharps containers for used needles and lancets</li> <li>12. Lancet for skin puncture</li> <li>13. Micro-collection tubes</li> <li>14. Disposable gloves</li> <li>15. Microscope slides</li> </ol>	<p>Lecture  Demonstration</p>

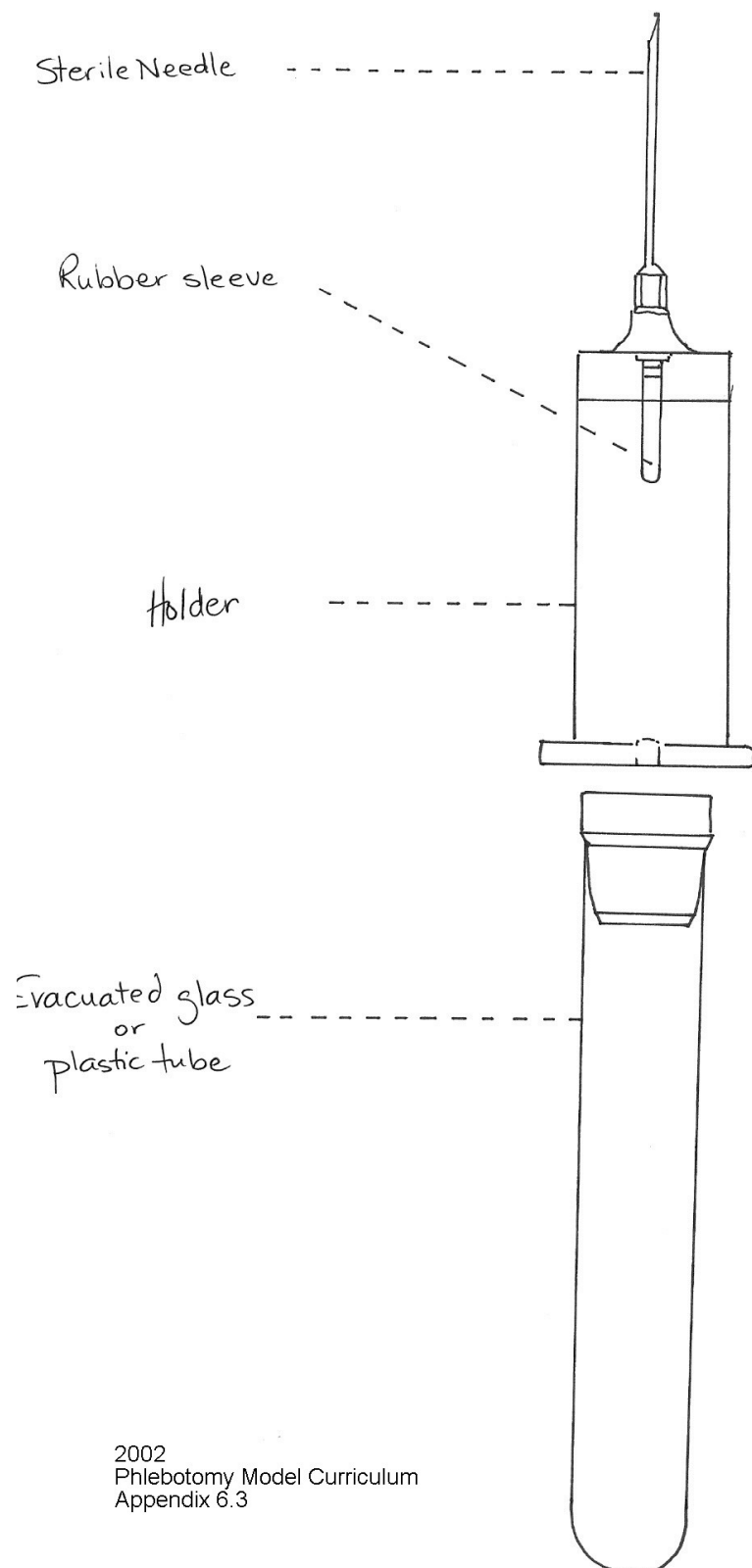




## Evacuated Tube

2002 Phlebotomy Model Curriculum  
Appendix 6.2

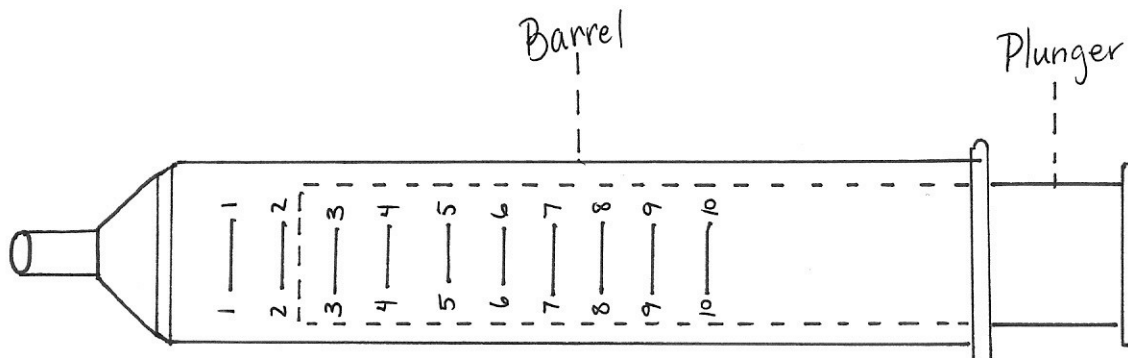
# Evacuated Blood Collection System



2002  
Phlebotomy Model Curriculum  
Appendix 6.3

# Syringe: Barrel & Plunger

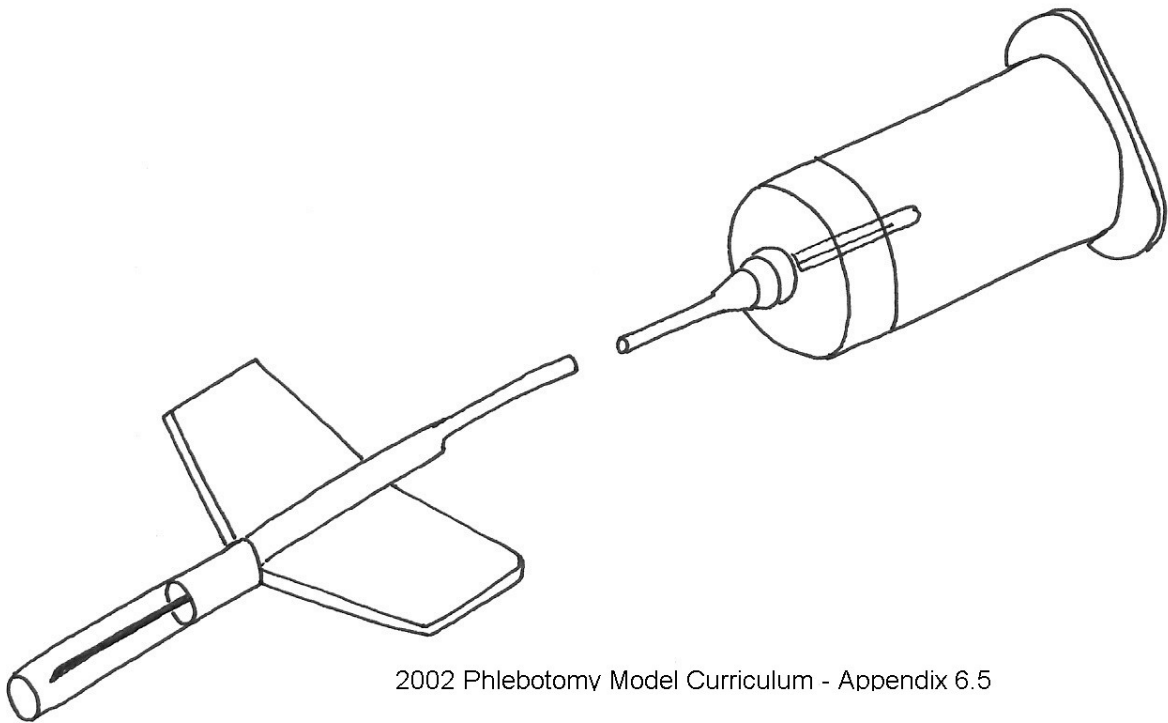
2002 Phlebotomy Model Curriculum - Appendix 6.4





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# Butterfly Collection Device



2002 Phlebotomy Model Curriculum - Appendix 6.5

### Examples of Skin Puncture Devices

1. **Microtainer Brand lancet:** a device that allows the phlebotomist to depress the button to make a cut. They are available in different types for various purposes.
  - a. Point of care testing (1.9 mm and 1.4 mm)
  - b. Heel Stick
  - c. Glucose testing
2. **BD Genie lancet:** a safety-engineered device for skin puncture and it is available in an assortment of puncture depth and width.
3. **BD Quikheel lancet** (BD VACUTAINER Systems, Preanalytical Solutions, Franklin Lakes, NJ): has two different incision depths dependent upon the needs of the infant.
  - a. The teal-colored **Quikheel Infant lancet** has a preset incision depth of 1.0 mm and a width of 2.5 mm.
  - b. The purple-colored **Quikheel Preemie lancet** has a preset incision depth of 0.85 mm and a width of 1.75 mm. This lancet blade retracts permanently after activation to assure safety.
4. **Unistik 2 Neonatal** (LifeScan, Inc. Milpitas, CA): a single-use, disposable lancing device that has a penetration depth of only 1.8 mm.
5. Fully automated, single-use, automatically retracting, disposable devices are produced by International Technidyne Corporation (Edison, NJ).
  - a. **Tenderlett toddler** is for infants and toddlers (0.85 mm depth)
  - b. **Tenderlett Jr.** is for children (1.25 mm depth)
  - c. **Tenderlett** is for adults (1.75 mm depth)
6. **Unistik 2 Micro-collection lancet:** has two penetration depths (2.4 mm and 3.0 mm) and automatically retracts after incision. It is color-coded for easy identification of penetration depth.
7. **Monoject Monoletter Safety Lancets** (The Kendall Co., LP, Mansfield, MA): a micro-collection device for finger stick collection.
8. **Autolett II Clinisafe:** a spring activated puncture device that allows easy ejection of the lancet and platform for the safety of the patient and the phlebotomist.

### Examples of Micro-Collection Containers

1. **Samplette Micro Blood Collector** (Kendall Co., LP, Mansfield, MA) has a full range of anticoagulants, serum, and plasma separation gels. One of their collectors is an amber capillary blood separator that provides protection for light-sensitive analytes (e.g. bilirubin)
2. **BD Microtainer tube** (BD VACUTAINER System, Preanalytical Solutions, Franklin Lakes, NJ) produces capillary blood collection tubes with self-contained serum separator and Microgard closure (a safety engineered feature to reduce the risk of tube leakage or specimen splatter). Each tube is imprinted with two markings, a minimum 250-microliter line and a maximum 500-microliter line to assist in collecting appropriate volumes.
3. **Microvette capillary blood collection system** (Sarstedt, Inc., Newton, NC) has a full range of anticoagulants and serum separation gels. This system can be used to collect, store, and separate samples in the same unbreakable, disposable container.
4. **SAFE-T-FILL** (RAM Scientific Inc., Needham, MA) is an unbreakable plastic capillary receptacle system. The device consists of a plastic capillary inserted into a microtube receptacle, which allows blood to flow directly to the bottom of the tube. The tubes have color-coded caps to identify the micro collection tubes.
5. **Griener MiniCollect Capillary tube** is a micro-collection container made from unbreakable polypropylene with a cap system that eliminates the risk of contamination.

2002 Phlebotomy Model Curriculum - Appendix 6.6

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# Microcollection Devices

2002 Phlebotomy Model Curriculum - Appendix 6.7

