

PHLEBOTOMY MANUAL



Veterans Affairs Medical Center
Lebanon, PA

Approved by Medical Staff Executive Board
(MSEB)

March 18, 2016

ACOS, Clinical Support

Veterans Affairs Medical Center: Pathology and Laboratory Medicine
1700 S. Lincoln Ave. Lebanon, PA 17042
Pathology and Laboratory Medicine

SOP NO: PHL-1	REVISION: March 2016
TITLE: Phlebotomy Manual	FILE: Phlebotomy manual
TOTAL PAGES: 28	EFFECTIVE DATE: Jan 90
RELATED PROCEDURE:	

SOP HISTORICAL RECORD

Jan Abramczuk MD, PhD Chief P&LM Services

DATE	WRITTEN or REVISED BY	Reason for Revision	SUPERVISOR REVIEW	MD REVIEW
Compiled 10 Nov 02	Diane Gracely	Combining all Phlebotomy manuals		
Revised 10 Aug 03	RM Wood	New Format		
Revised 1 Dec 05	RM Wood	minor revisions		
Revised 10 Sep 06	RM Wood	New Medical Director		
Revised 1/01/09	Michele Beaman	New Director/Revision		
Revised August 2011	Michele Beaman	Additions/Corrections		
Revised Jan 2013	Michele Zimmerman	Additions		
Revised Nov 2014	Michele Zimmerman	Remove GTT/Bleeding Times		

DATE	WRITTEN or REVISED BY	Reason for Revision	SUPERVISOR REVIEW	MD REVIEW
Revised March 2016	Michele Zimmerman	Updates		

INDEX

PRINCIPLE	5
SAFETY	5
Specifics of the OSHA standard	5
PHLEBOTOMY PROCEDURE – GENERAL NOTES	6
OUTPATIENT COLLECTION PROCEDURES.....	7
Site Selection	8
Choosing the Blood Drawing System.....	9
Venipuncture Procedure When Evacuated Tube System Is Used.....	10
Venipuncture Procedure Using a Winged Infusion Set (Butterfly)	11
Multiple Specimen Collection	11
The recommended “order of draw” for additive-containing tubes	11
Additives Used in Collecting Blood Specimens	11
Blood Sample That Cannot Be Obtained	12
PERFORMING PHLEBOTOMIES ON PATIENT WARDS	13
Check-in.....	13
Semi-Conscious or Comatose Patients.....	14
Isolation Patients.....	14
ADDITIONAL CONSIDERATIONS	15
SPECIAL SITUATIONS	16
Timed Intervals.....	16
Special Patients	17
SPECIFIC COLLECTION TECHNIQUES	17
Chilled Specimens	17
Cold Agglutinins	17
Specimens Sensitive to Light	17
Heavy Metals	17
Collecting Blood for Blood Alcohol Level.....	17
Collecting Blood Cultures	18
Drawing Blood Bank Specimens	18
INDWELLING LINES OR CATHETERS.....	19
HEPARIN LOCKS	20
FISTULA	20
INTRAVENOUS FLUIDS	20
PATIENT PROBLEMS (Syncope, Nausea, Vomiting, Convulsions)	20
PATIENT INQUIRY	21
FACTORS THAT AFFECT LABORATORY VALUES.....	21
SPECIAL CONSIDERATIONS.....	22
PROPER LABELING OF BLOOD COLLECTION TUBES.....	22
DISPOSAL OF WASTES	23
LABORATORY REQUISITIONS	23
SPECIMEN TRANSPORT TO LEBANON VAMC	24
THERAPEUTIC PHLEBOTOMY	24
ENTERING THERAPEUTIC PHLEBOTOMY RESULTS INTO CPRS	27
SAFETY	28
STANDARD PRECAUTIONS.....	28
BIOHAZARDOUS WASTE MANAGEMENT	28
SHARPS DISPOSAL	28
REFERENCES	28

Phlebotomy Manual

1. **PRINCIPLE:** This manual addresses the multiple factors associated with collecting, handling, and processing of blood specimens. It is understood that no laboratory test can give a valid result without the appropriate blood draw. Methods and techniques for drawing appropriate blood specimens will be addressed in this manual. Individual test requirements can be found in the Laboratory Ward Manual, Veterans Information Systems and Technology Architecture (VISTA) Test Directory, or Computerized Patient Record System (CPRS) Tools-Lab Test Description.

2. **SAFETY:**

a. Refer to institution and laboratory safety policies and procedure.

b. Personal protective equipment (PPE)

(1) PPE encountered by phlebotomists includes gowns, masks, gloves, and face shields. Fluid-resistant lab coats and gloves are worn with all patients.

(2) New gloves will be used for each patient.

(3) A mask or other face protection may be necessary when working with isolation patients or processing specimens in the laboratory.

(4) Laboratory staff will not compromise the barrier integrity of their individual PPE (e.g. tearing the fingertips off gloves to palpate for veins).

c. Standard precautions:

(1) The primary biological hazard associated with phlebotomy is exposure to blood-borne pathogens transmitted by blood-to-blood contact. Transmission may occur by accidentally puncturing oneself with a contaminated needle or lancet, or by passive contact through open skin lesions or mucous membranes of the eyes, nose, or mouth.

(2) To protect workers, standard precautions were enacted into law in 1992. The law states that all bodily fluids used for analysis in the laboratory shall be handled as if infectious.

(3) Veterans Affairs Medical Center (VAMC) has implemented the law and requires wearing gloves when collecting and handling blood specimens, wearing face shields or using splashguards when there is a danger of blood splashing on mucous membranes, and disposing of all needles and sharp objects in puncture-resistant containers without recapping. VAMC uses a needle protection device that eliminates the need for recapping needles.

(4) Under the Occupational Exposure to Blood-Borne Pathogens Standard, all employers must have a written blood-borne pathogen exposure control plan available in the workplace and must provide necessary protection free of charge to employees. The laboratory plan is included in the Safety Manual maintained in each laboratory section.

(5) Specifics of the OSHA standard include:

- (a) Requiring all employees to practice universal precautions.
 - (b) After performing a phlebotomy procedure, personnel shall wash their hands or use an alcohol-based hand sanitizer immediately after removing their gloves. (VAMC plan requires washing of hands and fresh gloves with each patient.)
 - (c) The hospital is required to supply lab coats, gowns, face shields, splashguards, and gloves to all employees when needed.
 - (d) The hospital shall provide phlebotomist with needle protection devices when drawing specimens to prevent the need for recapping of needles. All needle holders are for single use only.
 - (e) Prohibiting eating, drinking, smoking, and applying cosmetics in the work area.
 - (f) Labeling all biohazard material and containers.
 - (g) Providing immunization for the hepatitis B virus.
 - (h) Establish a daily work surface disinfecting protocol. The disinfectant of choice for blood-borne pathogens is sodium hypochlorite (household bleach freshly diluted 1:10). Germicidal disposable cloths that contain anti-bacterial, Tuberculocidal and virucidals are also acceptable disinfectants.
 - (i) Providing medical follow up to employees who have been accidentally exposed.
 - (j) Documenting regular training of employees in safety standards.
- (6) All phlebotomists must be familiar with the facility's Infection Control and Blood-Borne Pathogen Exposure Control Plans.
- (7) Exposure - The phlebotomists must immediately report an accidental needlestick or contamination of a break in the skin by blood or body fluid from an infected patient to immediate supervisor, and follow checklist in Lab Exposure Control Plan.

3. **PHLEBOTOMY PROCEDURE – GENERAL NOTES:**

- a. Morning collections start with the Intensive Care Unit (ICU) at 0500. The night shift phlebotomist or technologist collects these.
- b. Morning collections for most inpatients begin at 0600.
- c. After morning collections, a STAT pager (3121) is carried by a phlebotomist or a technologist to respond to immediate collects and Emergency Department patients.
- d. Outpatients are drawn in Building 17, Monday through Friday 0630-1600.
- e. Specimens drawn in Building 17 (Blood Lab) will be delivered to the main lab as soon as possible by clinic personnel, the medical center runner/volunteer, or by technologists from the main lab.

f. All specimens will have a computer-generated label with the time of the draw and the phlebotomist's initials.

g. All Blood Bank specimens will be labeled using the computer-generated patient label with collector's initials and date and time. The Unique Blood Bank Armband will also be used at this time.

4. **OUTPATIENT COLLECTION PROCEDURES:** Patients are collected in Building 17-2 and CBOCs. Prior to performing the blood collection procedure, properly disinfect the phlebotomy chair arm using a CaviWipe or other disinfecting cloth. Thoroughly clean hands by using cleansing gel or foam between patients. At the conclusion of the phlebotomy, disinfect the entire phlebotomy chair using a CaviWipe or other disinfecting cloth.

a. Patient test request review: Collect the next available patient's computer-generated label. Review the information taking special note of any STAT or as soon as possible (ASAP) request.

b. Call the patient into the phlebotomy room using the next number of Q-Matic system, and ask him/her to be seated.

c. Patient Identification:

(1) Ask the patient his full name and full social security number (SSN). If he does not know this information, ask for his Veterans Affairs (VA) picture identification (ID).

(2) Compare this information with the information on the labels. Report and take any actions necessary to correct discrepancies before drawing the specimen.

d. Verify patient diet and medication restrictions: Confirm that the patient has been following applicable diet and medication restrictions. Some tests may require the patient to fast and/or eliminate certain foods from the diet prior to the blood drawing. Time and diet restrictions vary according to the test. Such restrictions are necessary to ensure accurate test results. If any questions regarding appropriate diet or medications arise, contact the requesting provider.

e. Additional paperwork: Complete any additional paperwork at this time.

f. Reassure the patient: The phlebotomist must gain the patient's confidence and assure the patient that, although the venipuncture will be slightly painful, it will be of short duration.

g. Arm position: Have the patient position his/her arm on the armrest and extend the arm to form a straight line from the shoulder to the wrist. The arm should be supported firmly by the armrest and should not be bent at the elbow.

h. Apply tourniquet.

(1) Place a tourniquet around the patient's arm to increase venous filling. This makes the veins more prominent and easier to access.

(2) Suggested procedure for applying the tourniquet:

(a) Wrap the tourniquet around the arm three to four inches (7.5 to 10.0 cm) above the venipuncture site.

(b) Tuck the end under the last round.

(3) Precautions when using a tourniquet: The tourniquet must be released after one minute. Localized stasis can occur with hemoconcentration and the possible formation of a hematoma. This may result in erroneously high values for all protein-based analytes, packed cell volume, and other cellular elements. If a tourniquet must be applied for the preliminary vein selection, it should be released and reapplied after two minutes. If the patient has a skin problem, the tourniquet should be applied over the patient's gown, or a piece of gauze or paper tissue should be used so that the skin is not pinched.

i. Have the patient make a fist: The veins become more prominent and easier to enter when the patient forms a fist. There must not be vigorous hand exercise ("pumping").

j. Site selection:

(1) To locate veins, it is necessary to palpate and trace the path of veins several times with the index finger. Arteries, unlike veins, pulsate, are more elastic, and have a thick wall. Thrombosed veins lack resilience, feel cord-like, and roll easily.

(2) Factors in site selection

(a) Preferred veins - Although the larger and fuller median cubital and cephalic veins are used most frequently, wrist and hand veins are also acceptable for venipuncture.

(b) Extensive scarring - Healed burn areas are to be avoided.

(c) Mastectomy - Because of potential harm to the patient due to lymphostasis, a physician should be consulted prior to drawing blood from the side on which a mastectomy was performed.

(d) Hematoma - Specimens collected from a hematoma area may cause erroneous test results.

(e) Intravenous (IV) therapy - Optimally, specimens should be collected from the opposite arm. If this is impossible, the provider or nursing staff should be consulted. Blood should never be collected from above the IV site.

(f) Alternative Sites:

1 Sometimes veins in the opposite arm will prove more suitable for venipuncture.

2 If no palpable veins are found in the antecubital area, the forearm, wrist, and hand should be examined for possible sites.

3 Remove the tourniquet from the upper arm and retie the tourniquet on the forearm.

4 Because the veins in the hand and wrist are smaller, it may be necessary to change equipment and use a smaller needle with a syringe or winged infusion set (butterfly) or smaller vacuum tubes.

5 Veins in the legs and feet are sometimes used as venipuncture sites; **however, these sites may only be accessed with provider approval.** Leg veins are more susceptible to infection and the formation of thrombi (clots), particularly with diabetes, cardiac problems, and coagulation disorders.

k. Remove the tourniquet.

l. Choosing the blood drawing system:

(1) Evacuated systems - The evacuated system is the routine method of specimen collection. It is generally preferable to the needle and syringe because it allows the blood to pass directly from the vein into the evacuated tube. The system is composed of three basic elements:

(a) A sterile blood collection needle

(b) A holder that is used to secure both the needle and the evacuated tube. The holder is used only once and has a safety device for capping. No recapping is needed.

(c) An evacuated tube containing a pre-measured vacuum and pre-measured additive.

(2) Blood Collection Set - The blood collection or winged infusion sets (butterfly) are commonly used on patients with small or rolling veins. Blood collection sets can be used with evacuated systems.

m. Blood Collection Tube Selection: Blood collection tubes are selected according to specific testing requirements. The proper tube to use will be identified on the accession label. Tube requirements can be found in VISTA and CPRS. Special test requirements can be found in reference lab catalogs.

n. Cleansing the venipuncture site

(1) The puncture site shall be cleansed to prevent microbiological contamination of either the patient or the specimen.

(2) Remove a commercially prepared alcohol pad from its sterile package.

NOTE: Do not use alcohol for cleaning the venipuncture site when preparing to collect a specimen for blood alcohol testing. Use povidone iodine for these collections.

(3) Cleanse the site with a circular motion from the center to the periphery.

(4) Allow the area to dry to prevent hemolysis of the specimen and to prevent the patient from experiencing a burning sensation when the venipuncture is performed.

(5) If the venipuncture proves difficult and the vein must be touched again to draw blood, the site must be cleansed again.

o. Reapply the tourniquet.

p. Inspect needle and equipment: Needles - The tip of the needle shall be inspected visually to determine that it is free of hooks or burrs at the end of the point and that its opening is clear of any small particles that could obstruct the flow of blood.

q. Perform venipuncture.

(1) Venipuncture procedure when evacuated tube system is used:

(a) Thread the appropriate needle into the holder until it is secured, using the needle sheath as a wrench.

(b) Before using, tap all tubes that contain additives to ensure that the additive is dislodged from the stopper and the wall of the tube.

(c) Insert the blood collection tube into the holder and onto the needle up to the recessed guideline on the needle holder. Avoid pushing the tube beyond the guideline to prevent a premature loss of vacuum.

(d) Make sure the patient's arm or other venipuncture site is in a downward position to prevent reflux.

(e) Grasp the patient's arm firmly. The phlebotomist's thumb should be used to draw the skin taut to anchor the vein. The thumb should be one or two inches (2.5 cm or 5.0 cm) below the venipuncture site.

(f) With the bevel up, line up the needle with the vein and puncture the vein. Grasp the flange of the needle holder and push the tube forward until the butt end of the needle punctures the stopper. Maintain the tube below the site when needle is in the vein.

(g) Remove the tourniquet as soon as blood flow is established. Once the draw has started, do not change the position of the tube until it is withdrawn from the needle. Movement of the fluid back and forth in the tube can cause backflow of blood into the venous system and possible adverse patient reaction.

(h) Fill the tube until the vacuum is exhausted and blood flow ceases. This will ensure that there is a correct ratio of anticoagulant to blood. It is normal for the tube not to be completely filled.

(i) When the blood flow ceases, remove the tube from the holder. The shutoff valve re-covers the point, stopping blood flow until the next tube is inserted.

(j) Immediately after drawing, mix each tube that contains an additive by gently inverting the tube 5-10 times. Do not mix vigorously to avoid hemolysis.

(k) Insert the next tube into holder and repeat the above procedures to obtain additional specimens.

(2) Venipuncture procedure using a winged infusion set (butterfly)

(a) All routine venipuncture procedures utilized with evacuated tubes apply to blood collection using a butterfly. By folding the plastic needle attachments upward while inserting the needle, the angle of insertion can be lowered to 10-15 degrees, thereby facilitating entry into small veins.

(b) Blood will appear in the tubing when the vein is entered.

(c) The needle can then be threaded securely into the vein and kept in place by holding the plastic wings against the patient's arm.

(d) Blood is collected into evacuated tubes depending on the type of butterfly apparatus used.

NOTE: Whenever a butterfly is used to draw a blue top (coagulation) tube, a discard tube must be drawn first to account for the dead space in the tubing.

(3) Multiple specimen collection

(a) The recommended "order of draw" when drawing several specimens during a single venipuncture is as follows:

1 Blood culture tube

2 Non-additive tube

3 Coagulation tube

4 Additive tube

(b) Non-additive tubes are drawn before additive tubes to avoid additive contamination of the non-additive tube. Cross-contamination between different additive tubes can also occur, making test results erroneous.

(4) The recommended "order of draw" for additive-containing tubes is:

(a) Citrate-containing tube (light blue stopper)

(b) SST with clot activator

(c) Heparin-containing tube (green stopper)

(d) K²EDTA-containing tube (lavender/pink stopper)

(e) Oxalate/fluoride-containing tube (gray stopper)

(5) Additives used in collecting blood specimens

(a) K²EDTA: This anticoagulant is used for hematology specimens: CBC, sed rate, reticulocyte count, and other tests requiring an EDTA tube. Blood Bank uses the pink top

version K²EDTA for most Blood Bank related testing.

(b) Citrate: This anticoagulant is used only for coagulation studies: prothrombin and activated partial thromboplastin time, fibrinogen, D-dimer.

(c) Lithium Heparin: This anticoagulant is used to collect all STAT chemistry specimens - except Lithium - and T-spots.

(d) Sodium Heparin: This anticoagulant can only be used to collect human leukocyte antigen (HLA) testing for send-outs.

(e) Sodium fluoride: This anticoagulant is used to draw blood alcohol levels.

(6) Blood sample that cannot be obtained. When a blood sample cannot be obtained, it may be necessary to:

(a) Change the position of the needle. If the needle has penetrated too far into the vein, pull it back a bit. If it has not penetrated far enough, advance it farther into the vein. Rotate the needle half a turn.

(b) Try another tube. The tube being used may not have had sufficient vacuum.

(c) Loosen the tourniquet. The tourniquet may have been applied too tightly, thereby stopping the blood flow. Reapply the tourniquet loosely.

(d) Probing is not recommended. Probing is painful to the patient. In most cases another puncture in a site below the first site, or use of another vein on the other arm, is advisable.

(e) Do not attempt a venipuncture more than twice. Have another laboratory staff member attempt to draw the specimen or notify the physician.

(f) Notify the requesting physician, or covering resident, of the problem before removing the order as not collected.

r. Release the tourniquet: The tourniquet must be removed when blood collection is nearly complete. Removing the tourniquet also reduces bleeding at the venipuncture site after the specimen is obtained.

s. Ensure patient's hand is open: Opening the patient's hand reduces the amount of venous pressure as muscles relax.

t. Place the gauze: The gauze pad should be placed lightly over the venipuncture site.

u. Remove the needle: The needle should be removed quickly while keeping the bevel in an upward position. The phlebotomist must exercise care not to scratch the patient's arm.

v. Bandage the arm: Under normal conditions, the phlebotomist should:

- (1) Slip the gauze pad over the site, continuing mild pressure
- (2) Apply an adhesive or gauze bandage over the venipuncture site or wrap with self-sticking adhesive bandage (Coflex).
- (3) Ask the patient to apply pressure to the bandage for at least 5 minutes (15 - 20 minutes if the patient is on anticoagulant therapy)
- (4) Excessive bleeding - The phlebotomist should be alert to excessive bleeding. If bleeding persists longer than five minutes, a nurse should be alerted so that the attending physician can be notified of the problem. Pressure must be continued on the site as long as necessary to stop the bleeding.
 - w. Dispose puncturing unit and tourniquet: Dispose of needles and tourniquet promptly to prevent their reuse or accidental injury. Needles must be covered with the safety sheath before disposal.
 - x. Labeling of specimens must be done immediately following the venipuncture procedure in front of the patient or at bedside.
 - y. Verify the patient name and SSN on the label. Time of draw and phlebotomist's initials must be recorded on the tube of blood.
 - z. Distribution of collected specimens
 - (1) Appropriately labeled tubes should be placed in the designated racks located in each department. Specimens requiring centrifugation should be spun in the processing department.
 - (2) All STAT and ASAP specimen collections will be hand delivered to the designated location within the laboratory. **Notification of a technologist of the specimen arrival is mandatory.**
 - (3) Follow any special handling instructions for specimens that required distribution outside normal channels (e.g. specimens collected for bone marrow donor testing).

5. **PERFORMING PHLEBOTOMIES ON PATIENT WARDS:**

- a. Check-in – It is advisable to check-in with the nursing staff to find out if there are any additional blood draws required or special instructions before performing the phlebotomy.
- b. Knock before entering a room and state your name and reason you are there. Place the phlebotomy box and/or cart next to the patient's bed so that all supplies are within reach.
- c. Ask the patient for their full name and social security number. Compare this information with the computer-generated label or orders. Also check this information on

the patient's identification wristband. If the patient is not conscious, then the registered nurse (RN) must identify the patient. Each patient has the VA Photo ID card in the chart to be used on these occasions. As in the Blood Lab (Outpatient) Collection section, all discrepancies must be resolved prior to venipuncture.

d. Return the patient's room to the condition it was in upon entering (e.g. bed rails returned to the upright position, bed trays returned to bedside, lights off, etc.)

e. Semi-conscious or comatose patients – The phlebotomist must take special care when drawing blood from these patients to anticipate any unexpected movements or jerks either while introducing the needle, or while it is in place in the arm. Gauze should be readily available and the tourniquet quickly released in the event the needle is violently removed or repositioned. If the needle accidentally goes much deeper into the arm, the phlebotomist should inform the doctor or nursing staff. An occurrence report must be completed in the lab.

f. Isolation

(1) Patients are isolated for two reasons:

(a) To prevent the disease from spreading to other patients, visitors, and employees.

(b) To protect the patient from outside contamination. The patient's normal protective mechanism may be reduced to such a point that infection could be serious or fatal.

(2) There are two tiers of infection control precautions:

(a) Standard, to be used for all patients

(b) Transmission based

(3) Isolation system – An isolation sign is put on the door or window of the patient's room. The sign describes what type of isolation the patient is in and what precautions must be taken by those entering the room.

(4) Types of Isolation – There are three types of isolation based on isolation precautions:

(a) Contact

(b) Airborne

(c) Droplet

(5) Clean Area – Gowns, gloves, masks, etc., are kept in a clean area, usually outside the room. The person entering the room must gown, or apply other protective barriers as necessary, before entering the patient's room.

(6) Isolation room

(a) Read the isolation sign on the door. It will usually explain the type of isolation and what must be worn and done. Check with the nursing station if the sign is ambiguous or if you have any questions. Follow the instructions carefully.

(b) Check the orders and assemble the equipment needed for the patient.

NOTE: Anything taken into the room must be left there, discarded, or thoroughly cleansed immediately upon leaving.

(c) Take in the minimum equipment needed: needle and adapter, a tourniquet, proper tubes, gauze, an alcohol pad, and a bandage (tape or Coflex).

(d) Never take phlebotomy boxes or carts into the isolation room.

(7) Procedures to follow on entering the isolation room:

(a) Wash hands

(b) Put on gloves

(c) Obtain blood specimens in the usual manner, avoiding any unnecessary contact with the patient and bed.

(d) Discard the tourniquet in the trash and the needle with adapter in a puncture-resistant discard receptacle in the patient's room.

(e) Remove gown and gloves and dispose of them in the proper container.

(f) Wash hands or use alcohol-based hand sanitizer.

(g) Return the patient's room to the condition it was in upon entering (e.g. bed rail returned to the upright position, bed trays returned to bedside, lights off, etc.)

6. ADDITIONAL CONSIDERATIONS:

a. Patient inquiry — the phlebotomist should avoid discussing tests being done with the patient. Refer the patient to their provider if necessary.

b. Patient "refusal" – The phlebotomist should not argue with the patient, but instead report the patient's objections to the physician. The physician can explain better to the patient why the tests are needed.

c. Hematoma – To prevent a hematoma when performing a venipuncture, the phlebotomist should:

(1) Use the major superficial veins.

(2) Make sure the needle fully penetrates the uppermost wall of the vein (partial penetration may allow blood to leak into the soft tissues surrounding the vein by way of the needle bevel).

(3) Remove the tourniquet before removing the needle.

(4) Apply a small amount of pressure to the area with the gauze pad when bandaging the arm.

d. Hemolysis – To prevent hemolysis when performing a venipuncture, the phlebotomist should:

(1) Mix anti-coagulated specimens thoroughly by inverting tube gently five to ten times.

(2) Avoid drawing blood from a hematoma.

(3) Avoid drawing the plunger back too forcibly when using a needle and syringe.

(4) Avoid using a needle that is too small.

(5) Make sure the needle is fitted securely on a syringe to avoid frothing.

(6) Without touching, visually determine when the venipuncture site is dry.

7. **SPECIAL SITUATIONS:**

a. Timed intervals – Some specimens must be drawn at timed intervals because of medications and/or biological variations (circadian rhythm). It is important that collection of specimens for timed tests be obtained at the precisely specified interval.

b. Examples of tests requiring timed specimens:

(1) Tests exhibiting a diurnal effect (e.g., glucose, corticosteroids, other hormones, and serum iron)

(2) Therapy monitoring (e.g., troponin, prothrombin time, activated partial thromboplastin time [APTT], salicylic acid, digoxin, and other drugs)

c. Documentation: The time of the specimen collection should be noted. To verify that the correct amount of time has passed between dose and test, check with the appropriate department for the test being collected. If the time span is too short, check with the clinician before collecting.

d. Line Draws: Specimens drawn from peripherally inserted central catheter (PICC) lines or mediports or any other patient access line must be labeled as such. Only nursing personnel or providers may draw these specimens.

e. Special patients: Be patient and supportive of the needs of the patient. If the patient becomes agitated, ask a ward staff person to assist you with the phlebotomy.

8. **SPECIFIC COLLECTION TECHNIQUES:**

a. Chilled Specimens: Some tests require that blood specimens be cooled immediately following the venipuncture to slow down metabolic processes that may alter some chemical values.

(1) Examples of common tests requiring chilling the specimen are:

(a) Ammonia

(b) Lactic acid

(2) Ice packs are maintained in the specimen collection area and ice machines are available in inpatient and clinic areas when needed. Specimens may be chilled by placing them in a biohazard bag containing an ice pack or ice, or by immersing the specimen in a cup of crushed/cubed ice. If using an ice pack, the specimen should not be in direct contact with the ice pack.

b. Cold agglutinins: Autoantibodies react with red blood cells at temperatures below body temperature. Because the cold agglutinins in the serum attach to red cells when the blood cells cool to below body temperature, the specimen must be kept warm until the serum can be separated from the cells.

(1) Pre-warm all tubes using a heel warmer prior to collection. Collect the specimen(s) as quickly as possible.

(2) Specimens must be delivered to the laboratory in Room 3, Building 1 immediately.

c. Specimens sensitive to light: Exposure to light will decrease the concentration of bilirubin, beta-carotene, vitamins A and B₆, thiamine (B1), and porphyrins. Specimens can be protected by wrapping the tubes in an appropriate protective cover until processed and then transferred to a light-resistant container.

d. Heavy metals: Use the royal blue (dark blue) EDTA (NA₂) collection tubes.

e. Collecting blood for blood alcohol level:

(1) Prepare site for venipuncture in the usual way until ready for cleansing.

(2) Use aqueous povidone-iodine 2% to cleanse arm. NEVER USE ALCOHOL PAD.

(3) Draw the specimen into a fluoride anticoagulant Vacutainer tube (gray stopper). Mix until all powdered anticoagulant is dissolved.

(4) After collection, centrifuge sample for ten minutes at 1500 rpm.

(5) The sample can be refrigerated (2-8⁰C) or left at room temperature (22-31⁰C). Do not freeze.

f. Collecting blood cultures:

(1) Apply tourniquet to patient's arm and select a venipuncture site. A different site should be selected for each blood culture set.

(2) Cleanse area of venipuncture site by applying 70% isopropanol in a rotating motion starting from inside to outside; followed by iodine tincture or Chloraprep. Allow to dry. **DO NOT TOUCH AREA AFTER CLEANSING.**

(3) Remove the flip-off caps from the BACTEC culture vials.

(4) Wipe the top of each culture vial with a separate 70% isopropanol pad and allow to air dry. **DO NOT USE IODINE OR CHLORAPREP TO DISINFECT THE VIALS.**

(5) Using a 21 gauge butterfly needle, perform the venipuncture. Starting with the aerobic bottle, carefully monitor the volume of blood collected by using the 5ml graduation marks on the vial label. A total of 8-10mls of blood should be collected into each vial. **DO NOT INVERT THE BOTTLES.**

(6) Label the inoculated vials with labels from the zebra printer or with the accession labels. Identify the site of the venipuncture on the label and in the computer.

g. Drawing Blood Bank specimens: Special consideration is taken when drawing and labeling Blood Bank tubes. The Unique Blood Bank Armband is used to ensure each unit of blood is properly labeled and can be traced to the specimen from whom it was crossmatched. This procedure is to be used for all Blood Bank samples including outpatient chemotherapy patients. The procedure is as follows:

(1) The orders for a type and screen are generated from the lab printer. Inpatient, OR, ASU, and ER patients print labels from the zebra printer.

(2) The phlebotomist takes the order and the Unique Blood Bank Armband label sheet and recipient system labels to the patient's location.

(3) Ask the patient for their full name and social security number while checking this information against the patient's hospital ID band or ID card if in the Outpatient Lab. A second hospital employee needs to also confirm the patient information and verify the labeling of the specimens and paperwork belong to the patient. If the patient is not competent to answer, then the RN or Doctor of Medicine (MD) must confirm this information.

(4) The Unique Blood Bank Armband label at the bottom of the sheet and specimen tube label at the top right-hand corner are then filled out using the information from the hospital ID band. The required information is patient's full name, full social security number, time and date of draw, and the phlebotomist's initials. Draw a pink top EDTA

tube following procedure outlined in either Blood Lab Collection or Ward Collection section of this procedure. Immediately following venipuncture, initial and time and date the specimen label. The tube is to be labeled with the Unique Blood Bank Armband label immediately following the phlebotomy procedure. The recipient system label is initialed, time, dated, and placed into the band and onto the patient's arm or leg. Remove any old Unique Blood Bank Armbands and return them to the Blood Bank for disposal. **DO NOT DISCARD IN REGULAR TRASH.** Label the collection order form with the accession label. Include date and time of draw and phlebotomist's initials on the order form and the initials of the 2nd verifier. Add the Unique Blood Bank Armband number to the form.

(5) Bring the Unique Blood Bank Armband label sheet, the order, and sample to lab for processing. Alert the medical technologist that there is a Blood Bank sample. Specimens will be rejected if any critical information is missing, e.g. phlebotomists initials, patient's full SSN.

(6) Notes:

(a) If the Unique Blood Bank Armband is removed from the patient before the three-day specimen outdate by anyone, a new specimen must be drawn prior to any transfusion of blood products.

(b) If the patient needs adjustment of band because it is too tight or the plastic cover is soiled, the following will be done by Blood Bank personnel:

(1) Go to the patient's bedside with another plastic band

(2) Cut the band from the patient

(3) Remove the original insert label from the band

(4) Write on the original insert "reapplied", date and initial the insert

(5) Reinsert the original insert label into a new plastic band

(6) Attach the new band on the patient's arm/leg

c. The Unique Blood Bank Armband must be applied at the time of draw. This includes chemotherapy patients. It is NOT acceptable to apply the ID band after the phlebotomist has left the patient's bedside or has left the Outpatient Lab.

d. A new Unique Blood Bank Armband with a new number must be applied with each sample drawn for Blood Bank. The old Unique Blood Bank Armband should be cut off and discarded properly in the laboratory.

9. INDWELLING LINES OR CATHETERS: Laboratory personnel do not draw blood from indwelling cardiovascular (arterial, central venous) or umbilical lines. Obtaining blood specimens from indwelling lines or catheters may be a problem and a potential source of test error.

10. **HEPARIN LOCKS:** An indwelling winged infusion set can be successfully left in a vein from 36 to 48 hours for IV administration of medication or as a vein source to obtain a blood specimen. This procedure, known as a “heparin lock”, has become more common in hospitals to “save” veins for therapeutic use and prevent trauma to the patient. With this system, a continuous intravenous infusion is not necessary to keep the vein open, thus allowing the patient more comfort and mobility. Specimen collection from heparin locks is not performed by laboratory personnel. The RN will collect these 5-10 minutes after heparin is stopped.

11. **FISTULA:** A fistula is an artificial shunt connection done by a surgical procedure to fuse the vein and artery together. It is used for dialysis only. **An arm with fistula should not be used for blood drawing.** Specimens should be drawn from the opposite arm.

12. **INTRAVENOUS FLUIDS:**

a. When IV solution is being administered in a patient’s arm, blood should not be drawn from that side. It has been shown that blood drawn above the IV site is diluted with the fluid being administered. Test results from this blood will be erroneous and thus misleading to the physician.

b. The phlebotomist should look for a blood-drawing site in the opposite arm. Occasionally, an IV will be running in both arms and no site can be found except in the area of the IV administration.

c. Satisfactory samples may be drawn below the IV by following these procedures. The phlebotomist should:

(1) Ask the nursing staff to turn off the IV for at least five minutes before venipuncture.

(2) Apply the tourniquet below the IV site. Select a vein other than the one with the IV.

(3) Perform the venipuncture. Draw 5 ml of blood and discard before drawing test specimens.

13. **PATIENT PROBLEMS:**

a. Syncope (fainting): The procedure for dealing with a patient who has fainted is to:

(1) Remove the needle from the patient’s arm and discard needle into sharps container.

(2) Immediately call for help. Have the staff member call extension 4999 to report a “Rapid Response”.

(3) Help the person to lie down. Recline the chair if possible.

(4) If patient is lying, elevate their legs.

(5) Stay with the patient. Shake them gently or call their name. If no response, have a staff member call a "Code Blue." Remain with patient until assistance arrives.

(6) Document the occurrence and submit the documentation to laboratory management.

b. Nausea: The procedure for dealing with a patient who is experiencing nausea is to:

(1) Make the patient as comfortable as possible.

(2) Instruct the patient to breathe deeply and slowly.

(3) Apply cold compresses to the patient's forehead.

c. Vomiting: The procedure for dealing with a patient who vomits is to:

(1) Give the patient an emesis basin, plastic bag, garbage can or any available receptacle. Have paper towels or tissues ready. Call housekeeping if needed.

(2) Do not give the patient anything to drink.

d. Convulsions: The procedure for dealing with a patient who is having convulsions is to:

(1) Prevent the patient from injuring himself/herself. (Do not restrain the movements of the patient's extremities completely, but try to prevent him/her from being injured.)

(2) Immediately call extension 4999 to report a "Rapid Response".

14. **PATIENT INQUIRY:** The phlebotomist should avoid informing the patient of the tests being done. Under most circumstances, the patient should be referred to the provider to answer their questions.

15. **FACTORS THAT AFFECT LABORATORY VALUES:**

a. Major causes of "laboratory error" can be related to non-analytical factors such as specimen collection, handling, and transport. Non-biological factors, such as patient misidentification, and biological factors, such as patient posture and the time a specimen is drawn, all contribute to the total "laboratory error".

b. Physiological factors that influence results include:

(1) Age

(2) Alcohol ingestion

- (3) Race
- (4) Activity
- (5) Menstrual cycle
- (6) Sex
- (7) Bedrest
- (8) Obesity
- (9) Smoking
- (10) Food ingestion
- (11) Posture
- (12) Time of day
- (13) Oral contraceptives
- (14) Pregnancy

16. **SPECIAL CONSIDERATIONS:**

- a. You may use a hand or foot vein. Be sure you have received instruction before attempting these procedures. **Using foot veins requires written permission from the provider.**
- b. The nurse in charge or a physician may disconnect an intravenous fluid and draw blood through the needle or catheter that is already in place. The first 3-5 mLs (one small blood collection tube) of such a sample should be discarded as the intravenous fluid invariably dilutes it. Coagulation studies should not be obtained from intravascular catheters unless absolutely necessary.
- c. Other intravascular lines such as a heparin lock may be used. Only a physician or a nurse can obtain specimens from these lines.
- d. Whenever the specimen is obtained other than by standard venipuncture techniques, it should be noted on the label and subsequent test results.
- e. If you cannot obtain blood, explain the problem to the practitioner.

17. **PROPER LABELING OF BLOOD COLLECTION TUBES:**

- a. Labels are printed on the label printer for each patient. Verify that you have the correct label for the individual patient and that there are labels for all tubes necessary to

complete their order. The following information is required: Patient's full name, full social security number, date, time, and phlebotomist's initials.

b. "Zebra" printer labels should be generated for lab collections ordered as STAT from the Emergency Department (ED), Ambulatory Surgery Unit (ASU), or other areas of the hospital.

c. "Accession" printer labels are generated for morning collections and outpatient draw areas.

d. All tubes must be initialed, dated, and timed for the following reasons:

(1) Clerical error must be prevented in identification of specimens collected.

(2) Should there be any question about the specimen, the initials make it possible to contact the person who drew the specimen.

(3) It may be necessary to interpret the results of the test on the basis of the time when the specimen was collected. For example, it may be important to know that blood was drawn for a glucose level at 1000 and not later.

e. Performing these clerical and identification chores enables you to inspect the venipuncture site for hemostasis (cessation of bleeding) before the patient leaves, and it also gives the patient initial confidence on how the specimen is being handled.

18. **DISPOSAL OF WASTES:**

a. Paper, towels, wrappers, etc. may be discarded in the room's wastebasket if they are not contaminated with blood. Contaminated materials should be placed in a red biohazard bag.

b. DO NOT remove the used needle from the holder with your fingers. DO NOT shear, bend, or break the needle.

c. Dispose of the needle and holder into the specially designed sharps container.

19. **LABORATORY REQUISITIONS:**

a. All routine requests, during normal duty hours, for laboratory bloodwork will be submitted through the VISTA system. Routine requests will be printed on collection lists at 0545.

b. If a request is not for a collection list time, an immediate collect order must be entered. All STAT requests are to be called or paged to the laboratory when the immediate collect order is submitted.

c. Test requests from any clinic area will be entered through VISTA and the appointment list will be printed in the laboratory daily. If the request is not on the

appointment list in the Outpatient Lab, a request must be entered into the computer system by the provider before the patient can be processed.

d. Requests for surgical pathology, cytology and Blood Bank must be requested on the appropriate forms. (VISTA Blood Establishment Computer Software [VBECS] system - a Blood Transfusion Record Form [BTRF] will be generated when testing completed, Tissue Examination Form [electronic SF515]).

20. **SPECIMEN TRANSPORT TO LEBANON VAMC:**

a. Specimens are transported between VA locations by a VA driver who makes regular deliveries and pickups.

b. Specimen samples are prepared for analysis using standard laboratory protocols (centrifugation, etc.). The prepared sample tubes are placed in a test tube rack, which is then placed into a biohazard transport bag. The bag is sealed and then placed in an insulated specimen tote containing ice packs. Two ice packs are used to maintain specimen integrity during transportation.

c. Courier tote must be secured using padlock and key.

d. Specimens that must be maintained frozen are placed between two ice packs, placed in a plastic biohazard bag, and then placed in the specimen carrier.

e. Urines are transported in their original containers after placement into individual biohazard bags.

f. Other specimens, such as swabs, cultures, and Paps, are packaged individually and sent in the tote with the appropriate requisition.

g. Specimens collected, handled, and received into the laboratory are processed using standard precautions.

21. **THERAPEUTIC PHLEBOTOMY:**

Therapeutic phlebotomy is primarily performed in the Hematology/Oncology Clinic. It may be performed on the patient ward.

a. Principle: Therapeutic phlebotomy is prescribed by a patient's physician as treatment for medical conditions such as polycythemia vera, hemochromatosis and porphyria.

b. Materials:

(1) Acetone/alcohol swab stick

(2) ChloroPrep one-step stick

(3) Sterile gauze

- (4) Blood pressure cuff (from ward or clinic) or tourniquet
- (5) Sterile collection bag containing Citrate Phosphate Dextrose Solution with attached tubing and needle
- (6) Scale to monitor blood drawn
- (7) Scissors
- (8) Hemostats
- (9) Tape
- (10) Biohazardous bags
- (11) 21 gauge needles or butterfly needles and vacutainer holder, 10 ml red top tubes for alternate method

c. Quality control: Annual competency audits on all personnel performing therapeutic phlebotomy and calibration of the scale.

d. Procedure: When a patient is diagnosed with polycythemia, hemochromatosis or any other medical condition that requires therapeutic phlebotomy, the attending physician completes a history and physical exam and focuses on potential problems such as cardiac disease or related cardiac problems. The patient's vital signs are documented. The patient, prior to the procedure, signs an electronic consent form (VA522). The form is titled "Request for Administration of Anesthesia and for Performance of Operations Other Procedures and Transfusions". The phlebotomist must collect the doctor's orders from the nurse. The consent form is valid for 360 days. If the patient has continuous orders for therapeutic phlebotomy, then one consent form is valid for the duration unless there is a deviation in the treatment plan.

e. **NOTE:** If the patient does not have good access, a 21 gauge needle, vacutainer holder, and 10 ml red top tubes can be substituted. In this case, up to 50 tubes can be drawn to achieve the desired amount of removal. A larger butterfly needle can be used as well. Draw half the tubes in one arm, and then switch arms to avoid gasket destruction and possible blood splatter.

f. Vein palpating and selection: The median vein is centrally located in the antecubital fossa and is the first choice because it is well anchored. The second choice is the cephalic vein that lies laterally (shoulder side) and is often superficial. The third choice is the basilica vein, which lies on the underside of the antecubital fossa. The basilica vein is not well anchored and may roll during phlebotomy. Excessive probing with the needle should be avoided to prevent nerve injury.

g. Preparing the venipuncture site:

(1) Apply the tourniquet or blood pressure (BP) cuff. If using the blood pressure cuff, add pressure to 40 to 60 mmHg. Palpate the area and select a vein. Loosen the tourniquet or deflate the blood pressure cuff. (The blood pressure cuff belongs to the ward as the lab does not have a BP cuff.)

(2) Scrub the venipuncture site with Chloraprep one-step stick 1.5 inches in all directions for 30 seconds.

(3) Cover the area with dry, sterile gauze until ready for venipuncture. Do not touch or palpate the area after being prepared.

h. Phlebotomy:

(1) Inspect the blood bag for any defects or discoloration. Apply pressure to check for leaks. The anticoagulant should be inspected for any discoloration. Label the donor bag **NOT FOR TRANSFUSION**.

(2) Place a loose loop in the tubing near the needle and place a hemostat just below the needle.

(3) Tear off two pieces of paper tape and have ready on the bed.

(4) Tighten the tourniquet or re-inflate the blood pressure cuff to 40-60 mmHg. Give the patient the sponge grip. Have the donor open and close the fist using the sponge grip until previously selected vein is prominent.

(5) Uncover the needle and perform the venipuncture immediately. Tape the tubing to the patient's arm to hold the needle in place and cover the site with sterile gauze. Open the hemostat and watch the blood flow into the blood collection bag. Mix/invert the blood bag several times and repeat several times more during the collection. Place the bag on the scale.

(6) Instruct the patient to open and close the hand slowly, using the sponge grip, every 10-12 seconds during collection. Keep the patient under observation throughout the process, ensuring that blood flow remains fairly brisk. Collect the volume the physician has ordered. This procedure should take approximately 15 minutes.

(7) When enough blood is collected, clamp the tubing close to the needle. Release the tourniquet or the blood pressure cuff, and then remove the needle making sure the gauze is over the venipuncture site. Have the patient apply direct pressure to the site to stop the bleeding. If bleeding continues, inform the patient's nurse.

(8) Pull the tubing loop and form a tight knot to stop blood from flowing out of the tubing. Place a few large pieces of gauze under the tubing knot and the clamped area of the tubing to catch any blood drips. Place the unit with attached needle and tubing into a biohazard bag. Place the bag into a red sharps box. **DO NOT RECAP.**

(9) Wrap the patient's arm with self-sticking elastic bandage (Coflex). Instruct the patient to remove the bandage in one hour.

(10) Inform the nurse that the procedure is complete and of the patient's condition. Give the patient something to drink and the Post-Therapeutic Phlebotomy Instructions form (see attachment PHL 1-A).

(11) Sign, date, and time the orders for therapeutic phlebotomy, including the start and stop time, and then write "discarded 500 cc (or volume) of blood into a biohazard bag, into a biohazard container."

i. Entering the procedure into the computer for outpatients (CPRS):

(1) In CPRS, select the patient (first initial of last name and last four digits of the SSN)

(2) Select the NOTE tab

(3) If the patient is new, select the consultation listed under the last 100 signed notes (left side of the page)

(4) Select ENCOUNTER

(5) Select EDIT CURRENT ENCOUNTER

(6) Remove yourself from the "provider" list:

(a) Double click on your name

(b) Select REMOVE

(7) Select PROCEDURES

(8) Select THERAPEUTIC PHLEBOTOMY 99195 and Click OK

(9) On the body of the note, right click the mouse to edit the note

(10) Select MAKE ADDENDUM

(11) Select TEMPLATES

(12) Open Shared Templates by double clicking

(13) Select Therapeutic Phlebotomy - double click

(14) Enter results at the prompts and Click OK

(15) Add name of person who performed procedure if different than the person creating the addendum

- (16) Right click the mouse
- (17) Select SIGN NOTE NOW
- (18) Add electronic signature to note

22. **SAFETY:** The American Association of Blood Banks (AABB), College of American Pathologists (CAP), Clinical and Laboratory Standards Institute (CLSI), and the Joint Commission (JC) require safety programs and offer specific guidelines for clinical laboratory safety. The Lebanon VA Medical Center provides the lab with a Pathology and Laboratory Medicine Safety and Chemical Hygiene Manual. Information from this manual is located within the Phlebotomy Manual.

23. **STANDARD PRECAUTIONS:** All blood, body fluids, and tissues from all patients regardless of diagnosis are considered biohazardous. Lab coats and gloves are to be worn when handling these fluids.

24. **BIOHAZARDOUS WASTE MANAGEMENT:** All blood, body fluids, and tissue are considered infectious waste and must be disposed of according to this facility's biosafety program.

25. **SHARPS DISPOSAL:** Be extremely cautious when handling sharps (needles). Used needles must not be sheared, bent, broken, capped, or re-sheathed by hand. Needles are not to be removed from disposable syringes or otherwise manipulated by hand. Sharps should be placed immediately in a puncture-resistant container.

26. **REFERENCES:**

a. Lebanon VA Medical Center, Pathology and Laboratory Medicine Safety and Chemical Hygiene Manual; 1700 S. Lincoln Avenue, Lebanon, PA 17042

b. National Committee for Clinical Laboratory Standards. (1998, June) Procedure for the Collection of Diagnostic Blood Specimens by Venipuncture, H3—A4, Vol. 18 No. 7 (4th ed.)

c. Strasinger, S. K., & DiLorenzo, M. A. (1996). Phlebotomy Workbook for the Multiskilled Healthcare Professional. F.A. Davis Company, PA

d. Westfall, J., & Huerta, A., (1994, December). When Drawing Blood Draws Questions. MLO, 32-33.

e. "BD Evacuated Blood Collection System"; BD Vacutainer Systems, Franklin Lakes, NJ 07417;1/2

f. AABB Technical Manual Current edition; Bethesda, MD 20814-2849