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SPECIMEN LABELING

Laboratory personnel cannot accept improperly labeled specimens. To do so would directly jeopardize the HEALTH and SAFETY of the patient.

- 1) Specimen containers sent to the laboratory must be labeled as follows:
 - a) Patient’s First and Last Name
 - b) Patient’s Date of Birth
 - c) Collection Date & Time
 - d) Collector’s Initials
 - e) Additional information required for Pre-Transfusion specimens.
 - i) See Blood Bank, Typenex Procedure.
- 2) Blood Tubes - Place any label flat on blood tubes. Do not wing the label.

Important Notes:

- Patient Identification: At least 2 identifiers must be used to identify the patient and two that must be used are name and date of birth.**
 - The person who collects the specimen will properly identify patient by asking the patient to state their *name and date of birth*.
 - All information must be matched with identifying labels and with requisition information.
 - The person who collects the specimen must label all specimens at the time of collection and in the presence of the patient.
- For in-house patients**
 - The specimen must be labeled at the bedside and patient information must also be verified by checking the patient's wristband.
 - For orders placed in the EMR electronically: the bar-coded specimen label must be verified with the patient’s wristband. No requisitions are generated.
- For out-patients**
 - The samples received from offices ordering via EMR interface: The sample label and electronic order are compared (patient name and DOB) to verify the sample ID.
 - For a patient whose specimen is obtained at one of the phlebotomy sites: The bar-coded label obtained after the orders are pulled in are compared to the patient’s verbal statement of name and date of birth.



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- ☒ **Requisitions** must be properly completed and include the patient demographic data, tests to be performed, and special processing information, pertinent clinical information and the requesting physician name.
 - Blood Bank requisitions for Type & Screen/Crossmatch specimens require the collector's signature. Blood Bank specimen: See Blood Bank, Typenex Procedure for specific collection procedures.

SPECIMEN COLLECTION CONTAINERS

Blood Tube Types:

- ☒ **Blue Top** - Light blue top, contains 3.2 % Sodium Citrate (Must fill this tube completely.)
- ☒ **Lavender Top** - Contains K3 liquid EDTA
- ☒ **Green Top** - Contains Lithium Heparin
- ☒ **Gray Top** - Contains Sodium Fluoride/Potassium Oxalate
- ☒ **Pink Top [EDTA]** - Used for Blood Banking that is collected by laboratory personnel.
- ☒ **Red Top** - Contains no additives
- ☒ **Red with Yellow Top** - Contains a gel barrier to separate serum from red cells.
 - Sample should be spun within 1 hour of collection.
- ☒ **Special Heparin Tube** - Special tube prepared by FAHC
- ☒ **Trace Element Kits** – Royal Blue Tubes – Lavender Serum and Whole Blood Kits
 - Kits provided by Mayo Medical Laboratory
- ☒ **Yellow Top** - ACD tube
- ☒ **Other specialized tubes**

COLLECTING A BLOOD SAMPLE

General Information:

- ☒ It is important to have all equipment, supplies and requisitions ready for the procedure.
- ☒ Wash your hands before each patient.
- ☒ Gloves must be worn when performing any venipuncture or capillary collections.

Factors in Site Selection

- 1) Extensive Scarring: Healed burned areas should be avoided
- 2) Mastectomy: Because of potential harm to the patient due to lymph stasis, a physician should be consulted before collecting blood from the side on which a mastectomy was performed. Please document written order.
- 3) Hematoma: Specimens collected from a hematoma area may cause erroneous test results. Phlebotomy must not be performed on any size hematoma. If another vein site is not available, the specimen is collected distal to the hematoma.



Venipuncture

- 1) Properly identify the patient by having them state their name and date of birth. Confirm this information with the written order/requisition to be sure they match exactly.
- 2) Apply a soft rubber tourniquet to help find a site for venipuncture. Place the tourniquet around the arm above the bend of the elbow (2-3 inches) in such a way that a pull of the end will allow for easy release. It should be tight, but not painful to the patient.
 - a) **Do not leave the tourniquet on for more than one minute.**
- 3) Examine both arms and locate the best vein for venipuncture.
 - a) Palpate the vein.
 - b) Do not slap the site in an attempt to locate a vein.
- 4) Put on gloves.
- 5) Once the site has been selected, it should be decontaminated.
 - a) Decontaminate the venipuncture site with alcohol by cleansing using a circular motion. The alcohol should be allowed to air dry or be wiped off with dry gauze after preparing the site. If this is not done, it will sting at the puncture site and can interfere with some test results.
 - b) Note: Once the site has been decontaminated DO NOT touch the actual puncture site.
- 6) Once the site has been cleansed, the patient's arm may be held below the site, pulling the skin tightly with the thumb. It is very important to anchor the vein to prevent it from rolling. Arm should be in a downward position with the tube in as near a vertical position as possible.
- 7) To draw blood with a vacuum system, put the needle on the vacuum tube holder. Do not uncap the needle until you are ready to do the venipuncture. Hold the assembly with the first tube in place between your thumb and third and fourth fingers.
 - a) Your fingers should never come in contact with the exposed needle. The needle should run the same direction as the vein and should be inserted at approximately a 15-degree angle with the bevel side upward, slightly below the prominent/palpable vein.
 - b) Once the needle is in the vein, the test tube should be gently pushed forward to puncture the rubber stopper and allow blood to fill the tube. Hold firmly onto the vacuum tube holder to prevent the needle from moving as you push the test tube onto the needle. The tube should be filled until the vacuum has been exhausted. The blood should not come in contact with the stopper. This is achieved by keeping tube in downward position.
 - c) Use gentle inversion (invert 5 to 10 times) to mix the blood and anticoagulant together. Never shake a tube containing blood. When drawing multiple tubes each tube should be gently removed from the vacuum tube holder and replaced with the next tube.
- 8) The correct order for tubes to be collected in so there is no contamination/transfer of anticoagulants is as follows:
 - a) Blood Culture collection. See Blood Culture Collection
 - b) Royal blue tops/Red tops
 - c) Light blue top (Citrate); tube must be filled to within the full (wedge) indicator.
 - d) Serum gel tube(s)
 - e) Green top (Heparin)
 - f) Lavender top (EDTA)
 - g) Yellow Caps (ACD)
 - h) Gray top (Glucose preservative tube)
- 9) Once good blood flow has been established, release the tourniquet.
 - a) Tourniquets left on for more than 1 minute or vigorous hand exercise will elevate potassium and lactic acid levels and decrease blood pH.



Venipuncture (cont.)

- 10) Once all necessary tubes are collected, place a dry gauze pad over the needle and withdraw the needle quickly and activate safety device on needle immediately. Apply pressure with the gauze pad for two minutes, or until bleeding has stopped.
 - a) Bending the arm is not sufficient in obtaining the proper pressure for closure of the puncture site.
- 11) Remember to mix the tubes by gentle inversion.
 - a) Note: If blood has been collected into one tube, it should never be transferred to another tube.
- 12) Dispose of needle and safety device into a puncture proof needle disposal container.
- 13) Label the tubes at the patient's side.
 - a) **Patient's complete name, Date and time of collection is minimum labeling requirements.**
 - b) **They should not be left anywhere unlabeled.**
- 14) Check the patient's arm and wrap the site using gauze and flexible wrap if necessary. Use paper tape over a small piece of gauze on inpatients only if necessary. Instruct the patient to remove the bandage after one hour.

Blood Collection, Capillary (Finger, Toe, Heel stick)

NOTES:

- If the patient's hands are cold, wrap one of them in a warm to hot towel (or use pediatric heel warmer) for 10 to 15 minutes before the puncture is performed.
 - A free flowing puncture is essential to obtain accurate test results. Do not use excessive squeezing to obtain blood.**
 - Gloves are mandatory for this procedure.
 - Special Additional Instructions for Lead Testing:** Wash the child's foot/hand thoroughly with soap and copious amount of water. Dry with a lint free towel. DO NOT let the child's foot/hand come in contact with any surface once washed.
- 1) Choose a finger that is not cold, cyanotic or swollen, the puncture should be at the tip of the fourth or ring finger of the non-dominant hand.
 - 2) Gently massage the finger five or six times from base to tip to aid blood flow.
 - 3) With alcohol swab, cleanse the ball of the finger. Allow to completely air dry or wiping with clean gauze. Alcohol needs to remain on site for 60 seconds to disinfect the site.
 - 4) Remove the retractable lancet device from its package.
 - 5) Hold the patient's finger firmly with one hand and make a swift, deep puncture with the lancet halfway between the center of the ball of the finger and the side of the finger.
 - a) The cut should be made perpendicular to the fingerprint to produce a large, round drop of blood.
 - b) Allow blood droplets to form and drip into the micro-sample tubes.
 - 6) **Wipe the first drop of blood away with clean gauze.**
 - 7) Gently massage the finger from base to tip to obtain the proper amount of blood for the tests required but DO NOT SQUEEZE.
 - 8) Each type of micro-sample has a different collection tube and blood volume requirements.
 - 9) Dispose of lancet in a puncture proof container.
 - 10) Label the blood tubes at the patient's side with first and last name. They should not be left on a countertop unlabeled.



Blood Collection from Unidentified Emergency Department Patients

When a patient is in extremis and the Emergency Department requires blood to be obtained for testing and the patient has not yet been identified by routine methods (hospital wristband), the following procedure will be followed:

- ☒ The phlebotomist or technologist who draws the specimen will place a blood bank wrist identification (Typenex) band on the patient at the time the blood is drawn.
- ☒ The specimen(s) will be drawn and identification numbers (Typenex) will be used to identify the specimen(s), requisitions, and the patient, until routine identification is accomplished. The temporary identification assigned will be used on laboratory reports as well as the positive identification for clarity.
- ☒ Under no circumstances will results of laboratory determinations be released without positive patient identification. The patient is assigned a Typenex number in the Emergency Department, which will remain with the patient after admission to assist in identification and reporting of results.

Blood Collection from Indwelling Lines or Venous Access Devices (VAD)¹

- 1) **Definition:** A line is a piece of tubing inserted into a patient's vein or artery for administering fluids and medications, monitoring pressures, and obtaining blood samples for diagnostic tests.
- 2) **Policy:** Phlebotomists do NOT draw blood from indwelling cardiovascular (arterial, central venous) or umbilical lines.
- 3) **Collection Information:** Under certain circumstances, blood specimens for clinical laboratory testing may be drawn from a vascular access device (VAD) using a blood collection system or a syringe.
 - a) When obtaining a blood specimen from a VAD, the components of the blood collection system (VAD, connecting device, syringe, needle, and collection device) should be checked to ensure compatibility to avoid air leaks, which may cause hemolysis and incorrect draw volumes.
 - b) Collection of the blood through lines that have been previously flushed with heparin should be avoided, if possible. If the blood must be drawn through a VAD, possible heparin contamination and specimen dilution should be considered.
 - c) The line should be flushed with 5 mL of saline, and the first 5 mL of blood or six dead space volumes of the VAD discarded.
- 4) **Potential Error** - Obtaining blood specimens from indwelling lines or VADs may be a problem and a potential source of test error because of incomplete flushing of collection site resulting in contamination and/or dilution of the specimen contributing to inaccurate results.
- 5) **Flushing Lines** - Because it is normal practice to flush lines with a solution to reduce the risk of thrombosis, lines must be cleared of this fluid before blood specimens can be drawn for diagnostic testing. An adequate amount of blood must be withdrawn from the line and discarded before drawing a specimen to ensure that the actual specimen is not diluted or contaminated with the flush solution. Discard volume is dependent on the dead space volume of the particular line. Discarding two times the dead-space volume is recommended for non-coagulation testing, and 5 mL or six times the dead-space volume for coagulation tests.

¹ NCCLS. *Procedures for the Collection of Diagnostic Blood Specimens by Venipuncture; Approved Standard—Fifth Edition*. NCCLS document H3-A5 [ISBN 1-56238-515-1]. NCCLS, 940 West Valley Road, Suite 1400, Wayne, Pennsylvania 19087-1898 USA, 2003.



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Blood Collection from The Operating Room

- 1) For Blood Bank Testing
 - a) Blood specimens are to be collected by the anesthesiologist and witnessed by a nurse.
 - b) The witnessing nurse or designee is to hand the blood directly to a laboratory phlebotomist or technologist.
 - c) The lab employee will complete a Blood Bank wrist identification (Typhenex) band with the patient's name, time, date and physician's name with location listed as "OR"
 - d) The label from the Typhenex bracelet is placed on the tube of blood by the lab employee and the Typhenex bracelet is given to the witness to be placed on the patient.
- 2) For Other Testing
 - a) Blood specimens are to be collected by the anesthesiologist and placed in appropriate tubes.
 - b) Specimens must be labeled with the patient's name, medical record number (if available), the date and time of collection, and initials of the person collecting the sample.
 - c) Specimens are then submitted to the laboratory through specimen receiving.



COAGULATION SPECIMEN COLLECTION & HANDLING

Specimen Requirements

- 1) Please indicate on laboratory requisition if patient is on heparin or Coumadin.
- 2) Under-filled tubes are **unacceptable** for coagulation testing.
- 3) Samples from patients receiving heparin should be processed immediately.
 - PT with INR, APTT, and D-Dimer or any combination of these tests can be performed on a single 1.0 ml plasma aliquot.
 - Any Coagulation test that is referred to a Reference Lab requires TWO 1.0-ml aliquot of plasma.
 - Platelet Function Analysis requires a separate whole blood tube.

Collection

- 1) ANTICOAGULANT: Use 3.2 % sodium citrate anticoagulant.
 - NOTE: The majority of coagulation tests require sodium citrate anticoagulant but there are exceptions. **Refer to the individual tests in the directory for specific specimen requirements.**
- 2) **Usual blood drawing technique except for the following situations:**
 - a) **If using a vacuum system with a butterfly**, the coagulation tube must not be the first drawn. Draw at least two mL of blood into a red top tube (not serum gel tube) and then discard that tube.
 - b) **If using the syringe technique.**
 - When adding blood to a vacuum tube from a syringe, use a transfer device. Do not remove cap of tube.
 - The sample must be into the anticoagulant within one minute of drawing. Allow the appropriate amount of blood to flow into the tube.
 - Make sure that the syringe is held vertically so that no air bubbles from the syringe enter the tube.
 - Immediately after filling the tube, invert the tube GENTLY five or six times to mix.
- 3) The sample must be drawn as a traumatically as possible to avoid contamination with tissue factor, activation of clotting factors or platelets, and hemolysis.
 - a) Avoid leaving the tourniquet on for an extended time (over 1 minute), excessive pumping of the hand, or slapping to raise a vein. If a good blood flow has been established, loosen the tourniquet before drawing the coagulation samples.
- 4) HEMOLYSIS IS UNACCEPTABLE for the more specialized coagulation tests. Screening tests (PT with INR, APTT, Fibrinogen, and Thrombin Time) will be performed on a slightly hemolyzed specimen, but no hemolysis is preferable for the screening tests as well.
 - MODERATE TO MARKEDLY HEMOLYZED SECIMENS WILL BE REJECTED.**
- 5) **Under Filled Tubes Are Unacceptable.**
 - a) Even though minimum plasma requirements for a test may be as little as 0.1 mL, minimum whole blood requirement is a full coagulation tube. Tubes that are filled with less than 90% of the stated tube volume will be rejected.
 - b) Coagulation testing and accurate test results are based on a ratio of 9 parts blood to 1 part anticoagulant and since the anticoagulant stops blood from clotting by removing a portion of the calcium from plasma, under filling the tube removes too much calcium leading to inaccurate patient results.



- 6) This ratio must also be maintained when coagulation samples are obtained from patients whose Hematocrit are 55% or higher. The smaller plasma volume leads to a disproportionately higher calcium loss therefore anticoagulant volume must be adjusted for patients with a high Hematocrit. Call Porter Hospital Laboratory at 388-4747 for instructions if your patient has a Hematocrit >55%.

**REFER TO INDIVIDUAL TEST DESCRIPTIONS
 FOR EXCEPTIONS TO THIS PROTOCOL**

Delivery of Samples

Test	Sample Time
NON-HEPARINIZED PATIENT	
APTT and/or PT with INR	Deliver capped <u>room temperature</u> whole blood within 3-hours of collection. For delayed delivery, send frozen plasma. PT with INR can be included with this collection and sample time. <u>Refrigerated whole blood unacceptable.</u>
D-Dimer	
Fibrinogen	
Other Coag Testing	Deliver within 1-hour of collection. For delayed delivery send individual frozen aliquots for each test requested.
Platelet Function Analysis	MUST BE DRAWN AT PORTER LAB. REQUIRES APPOINTMENT
PT with INR only (no other coagulation testing requested)	Deliver capped <u>room temperature</u> whole blood within 22-hours of collection, if delayed, send frozen plasma. <u>Refrigerated whole blood unacceptable.</u>
HEPARINIZED PATIENT	
Heparin Assay (Unfractionated or low molecular weight)	Deliver immediately; sample must be processed as soon as possible after draw, preferably within 30 minutes. For delayed delivery send frozen plasma. <u>Refrigerated whole blood unacceptable.</u>
APTT, D-Dimer, Fibrinogen, PT with INR, Other Coag testing.	
Samples from patients receiving heparin must be processed immediately	



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Processing

- 1) **If only a PT with INR is ordered and the sample will reach the lab within 22 hours of collection, the whole blood sample should be sent at room temperature/ambient.**
 - a) **DO NOT refrigerate.**

- 2) If only screening tests are requested (APTT, Fibrinogen, D-Dimer, Thrombin Time), the patient is not on heparin, and the sample reaches the laboratory within 4 hours of collection, the whole blood sample may be sent at room temperature.
 - a) Do not refrigerate or freeze a whole blood sample for coagulation tests.
 - b) All other tests and circumstances require that the specimen be spun and the plasma frozen as quickly as possible after the specimen is drawn. The plasma must remain frozen until the test is performed.

- 3) If a tabletop centrifuge is used, the specimen should be spun at maximum speed for a minimum of 10 minutes. Transfer the upper portion of plasma (see next step) to plastic vials and freeze at the lowest temperature available. The plasma should be sent to the laboratory frozen.

- 4) It is recommended that any Special Coagulation tests be collected at the laboratory.



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INSTRUCTIONS FOR CENTRIFUGING BLOOD SAMPLES

Refer to specific specimen needed for correct handling instructions. For each specimen there will be briefly outlined steps followed by a brief rationale.

SERUM from GEL BARRIER TUBE or RED top tube

- 1) Following collection, gently invert 10 times. This mixes clot activator with the blood.
- 2) Allow sample to clot for 30 minutes. This minimizes hemolysis and yields more serum.
 - a) If time goes beyond 1-hour glycolysis occurs (decreasing glucose) and there can be a shift of substances from cells to the serum (increasing potassium and interfering with most enzyme assays).
 - b) Samples not spun within 2 hours of collection should not be submitted for testing.
- 3) Centrifuge at least 10 minutes at 2000 - 3000 rpm. This removes all red cells.
- 4) Keep the serum separator tube upright after spinning. If blood sample cannot be kept upright after spinning, transfer the serum to a plastic transport tube.
- 5) **IMPORTANT:** If any red cells remain, respin and transfer to another plastic tube. Store as indicated and submit to laboratory.
- 6) **BLOOD BANK SPECIMENS DO NOT NEED TO BE SPUN.**

WHOLE BLOOD (BLD): Lavender top, Yellow top, or Green Top

- 1) Gently invert specimen 10 times immediately following venipuncture. This mixes anticoagulant with blood to prevent clotting.
- 2) **DO NOT SPIN.** Store as indicated until submitted to laboratory.

PLASMA (PL): Light Blue top; Lavender top, Green top

- 1) Gently invert specimen 10 times immediately following venipuncture. This mixes anticoagulant with the blood to prevent clotting.
- 2) Centrifuge at least 10 minutes at 2000 - 3000 rpm. This removes all red cells.
- 3) Immediately transfer the plasma to the plastic tube provided. Label the tube "plasma". **DO NOT** store plasma on cells. Hemolysis can result which can interfere with testing.
- 4) **IMPORTANT: If any red cells remain, spin again and transfer to another plastic tube. Store as indicated and submit to laboratory.**

TRANSPORT OF HAZARDOUS SPECIMENS

All specimens are considered an infectious hazard and must be placed in a labeled leak proof container (screw-capped plastic specimen jar, vacuum tube or other suitable container) and then sealed in a clear protective plastic bag which is clearly labeled as to the hazard present. Biohazard bags should be used for transport of ALL specimens to the laboratory.