

SPECIMEN COLLECTION

Valid laboratory results are dependent upon proper specimen collection and handling prior to the arrival of the sample in the laboratory. Clinical Reference Laboratory receives samples from three (3) different types of sources: insurance examiners, clinics, and in-house collections. The following is a basic phlebotomy procedure, followed by procedures specific for each type of collection.

PHLEBOTOMY

- 1) Wash hands thoroughly before beginning any phlebotomy procedure.
- 2) Confirm the identity of the patient. This can be done by asking the patient's name or requesting to see the patient's driver's license.
- 3) Explain the procedure, including small risk of hematoma, slight pain, and some light-headedness. Inquire whether patient has a history of fainting or dizziness with phlebotomy procedures so that ammonia inhalants can be obtained. Explain that loss of vacuum or collapsed vein might necessitate another draw.
- 4) Position patient so that they are seated comfortably in a chair with arm extended on armrest or desk or table to form a straight line from the shoulder to the wrist. Arm and elbow should be firmly supported and not bent at the elbow.
- 5) On a table or desk, assemble all necessary equipment: cotton balls, tubes, needle, alcohol swab, tourniquet, gloves, and Bandaid. Wearing latex gloves is **MANDATORY**. Wear additional protective equipment if contamination is expected.
- 6) Check both arms to select the larger and fuller veins. Palpate and trace the path of the veins several times with your index finger. Tap the vein at the site of the draw with your index finger and second finger. This will cause the vein to dilate.

The following factors should be considered in site selection:

- a. **Extensive scarring.** Healed burn areas should be avoided.
 - b. **Hematoma.** Specimens collected from an area of hematoma may yield erroneous test results. If another vein site is not available, the specimen should be collected distal to the hematoma.
- 7) Apply tourniquet.

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- 8) Ask patient to open and close his/her fist so veins will become prominent. Vigorous "hand pumping" is not necessary to activate blood flow and should be avoided.
- 9) Clean the venipuncture site with the alcohol swab in a circular motion from the center of the area to the outside. Allow the area to air-dry to prevent hemolysis and a burning sensation to the patient.
- 10) Insert the stopper of the first tube to be drawn into the adaptor. Do not push too far as that might cause premature loss of vacuum if it is punctured by the needle.
- 11) Insert the needle into the vein; bevel up. Puncture the stopper on the tube and grasp the edge of the adaptor to provide stability once the blood flow has begun. Have the patient open his/her fist.
- 12) Fill the tube until the vacuum is exhausted. Remove tube from adaptor and insert subsequent tubes. Be sure that all tubes are completely filled to ensure sufficient blood sample for laboratory analysis.
- 13) Remove tourniquet after filling all necessary tubes. Remove needle, placing cotton ball or 2 x 2 square over the site. Apply pressure for 2-5 minutes. Place a bandaid over puncture site in case of any further bleeding.
- 14) Wash hands thoroughly after phlebotomy.

ADDITIONAL VENIPUNCTURE CONSIDERATIONS

- 1) Prevention of Hematoma:
 - a. Puncture only the uppermost wall of the vein.
 - b. Remove the tourniquet before removing the needle.
 - c. Use only the major veins; not superficial veins.
 - d. Make sure that the needle fully penetrates the uppermost wall of the vein. Partial penetration may allow blood to leak into the soft tissue surrounding the vein by way of the needle bevel.
 - e. Apply a small amount of pressure to the area with the gauze pad when bandaging the arm.

- 2) Prevention of Hemolysis:
 - a. Mix anticoagulated specimens thoroughly by inverting each tube gently 5 to 10 times.
 - b. Avoid drawing blood from an area of hematoma.
 - c. Ascertain that the venipuncture site is dry without touching it.

- 3) If a Blood Sample is Unobtainable:
 - 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 needle a half-turn.
 - b. Try another tube; the tube may not have any vacuum.
 - c. Loosen the tourniquet. It may have been applied too tightly, thereby stopping the blood flow. Reapply the tourniquet loosely. This procedure can be accomplished easily when using the velcro-type tourniquet by releasing it and quickly pressing it together again.
 - d. Probing for the vein is NOT recommended as it is painful to the patient. In most cases, another puncture in a site below the first site is advised.
 - e. Never attempt a venipuncture more than twice.

SPECIMEN HANDLING

- 1) Gently invert all tubes with anticoagulant at least 10 times. This includes all tubes except red-top tubes.

- 2) Label all tubes with patient's name or identification number, date, time and phlebotomist's initials.

- 3) Let red-top tube clot, preferably in an upright position, for 10-20 minutes, but not to exceed 45 minutes. Centrifuge tube for 10 minutes at 1000g to 1500g and draw off serum into a properly labeled pour-off tube.

- 4) Some other factors that can affect the sample are:
 - A. Hemolysis: The breaking down of red blood cells. This can be slight, moderate or severe. The three (3) causes of hemolysis are ***TIME, TEMPERATURE and TRAUMA.***

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- 1) **TIME.** Holding blood over two (2) hours before centrifuging can and usually does cause some hemolysis. You must wait at least 10-20 minutes for the blood to clot prior to centrifuging.
- 2) **TEMPERATURE.** Never hold blood in too warm an area; hot cars, hot sun, etc.
- 3) **TRAUMA.** Going through the vein can cause hemolysis, and when a vein collapses can also cause some hemolysis. **USING A NEEDLE THAT IS TOO SMALL CAN CAUSE HEMOLYSIS.** The needles provided by the labs are usually 21 or 22 gauge. If you switch to a 23 gauge, it is very possible that hemolysis can occur. Only use a smaller needle when absolutely necessary.

When doing fingersticks, DBS, etc., squeezing the finger is the main cause of hemolysis.

- B. Lipemia: Abnormal amount of fat in the blood. The biggest cause that can affect results is that the client is not fasting when required.

URINE COLLECTION

To collect a routine urinalysis, a clean mid stream specimen should be obtained. *Refer to pages 7 and 8 for mid-stream urine collection instructions.* Urine cultures should be collected in a sterile container. Collected urines should be kept refrigerated until shipment to retard the growth of bacteria.

If a 24-hour urine collection is required, it should be submitted in a properly labeled container. Many urine chemistry tests require that the specimen have a preservative added before collection. Refer to the test catalog for special instruments.

To collect a 24-hour urine, the patient should do the following:

- 1) Discard the first urine passed in the morning.
- 2) Except for the first urine, all urine passed during the next 24-hour period up to and including the first voiding of the following day should be collected.
- 3) Refrigerate the entire collection until shipment to the laboratory.

BACTERIOLOGY SPECIMEN COLLECTION

Collection of Specimens for Culture: General Information

- 1) Labeling. Appropriate information is critical to proper processing of test requests. Although pertinent clinical information is highly desirable, if it is not available, please provide at least the following information.
 - a. Patient's name
 - b. Source of specimen or collection site
 - c. Date
 - d. Specimen
 - e. Test desired

- 2) Obtain specimen correctly.
 - a. Explain completely to the patient.
 - b. Use a sterile container.
 - c. Label correctly and send the specimen to the laboratory promptly.
 - d. Avoid contamination of the container.

- 3) Timing of collection.
 - a. Sputum, urine, stool, etc. are best collected in early morning and sent to the laboratory the same day.
 - b. Blood
 - A blood culture requires two bottles of blood — one for aerobic and one for anaerobic culture. Each blood culture should be collected from a separate venipuncture.
 - Collect blood specimens before treatment is initiated, if possible.
 - Collect two or three sets early in the illness; repeat if they are negative after 48 hours of growth.
 - Organisms are continuously shed during intravascular infections, such as endocarditis, but they are intermittently shed during occult infections. In some instances of occult infection, there is a predictable fever pattern. If this is the case, the blood for culture is best collected 30 minutes prior to the fever spike.

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- The yield beyond three or four cultures is minimal in most circumstances, and collection of more than this is discouraged.

Procedure for Specific Specimen Collection

Upper Respiratory Tract. This section describes procedures for obtaining culture specimens from the nasopharyngeal area and the throat.

- 1) A nasopharyngeal culture is obtained by inserting a thin sterile swab gently through the nose to touch the pharynx; gently rotate and remove.
- 2) A throat culture is obtained by introducing a sterile swab into the mouth. Use a tongue blade to avoid contaminating the specimen with oral secretions. Firmly swab both tonsillar fossae, posterior pharynx, and any inflamed or ulcerated areas.

Lower Respiratory Tract: Sputum. This section discusses sputum cultures, including such alternatives as induced sputum, tracheal aspiration, and bronchial washings.

- 1) Rinsing the mouth with saline or water (but not mouthwash) may reduce contamination with normal oropharyngeal flora.
- 2) Encourage deep cough with expectoration of the sputum into a sterile specimen collection cup that is labeled with the patient's name.
- 3) Do not send saliva (spit) for culture.
- 4) When the patient is unable to cough productively, notify the physician. An alternative method may be ordered, such as:
 - a. Induced sputum. This is done by a respiratory therapist on the orders of the physician. Involuntary deep coughing is induced by irritation.
 - b. Tracheal aspiration. The trachea is gently irritated with a small lumen suction catheter, which causes deep, productive coughing. Also, the specimen may be aspirated with a syringe.
 - c. Bronchial washings. These are done by the physician in the operating room at the time of bronchoscopic examination.

- 5) A small amount of sputum is all that is required, but it must be sputum and not oral secretions.

Specimens of Wound Exudate. Follow these steps for using a sterile transport swab in collecting wound exudate specimens.

- 1) Gently cleanse the area, using dry, sterile gauze to remove any contaminants.
- 2) Using a sterile red-stopper swab culture collection system, introduce deeply enough to obtain a moist specimen; replace the swab in the container. Do **not** break the container.
- 3) Store at room temperature.

Urine for Culture. When a urine culture is ordered, follow the steps for collection a clean-catch specimen outlined below.

- 1) Explain carefully to patients the mechanics of midstream collection and the importance of collecting an uncontaminated specimen. Teach them how to handle the specimen container to keep it sterile.
- 2) A clean-catch specimen is necessary to confirm the presence or absence of infecting organisms in urine. The specimen must be free of any contaminating matter that might be present on the genital organs; therefore, patients should be urged to follow the steps outlined below.
 - a. Instructions for the Female Patient.
 - If you are menstruating, first insert a fresh tampon or use cotton to stop the flow.
 - Separate the skin folds around the urinary opening.
 - Wash the urinary opening and its surroundings from front to back with a sterile antiseptic pad.
 - Begin urinating into the toilet, making sure you keep the skin fold apart with the fingers of one hand.
 - Wait until the urine stream is well established before moving the container into the path of the stream to catch the rest of the urine. Do not touch the container to the genital area.

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- **Refrigerate** the specimen immediately. Label the container with your name and the time of collection, and deliver it as soon as possible to your physician.
- b. Instructions for the Male Patient.
- Wash the end of the penis well with soapy water. Let it dry.
 - Begin urinating into the toilet. Wait until the urine stream is well-established before moving the container into the path of the stream to catch the rest of the urine. Do not touch the container to the genital area.
 - **Refrigerate** the specimen immediately. Label the container with your name and the time of collection, and deliver it as soon as possible to your physician.
- 3) Cleansing agents, such as soap or detergent, must be rinsed away from the urethral area before the specimen is collected.
- 4) A urine specimen from a catheterized patient is obtained by using a sterile 21- to 23-gauge needle and a 3 mL syringe. Prepare an area on the distal end of the rubber catheter with an antiseptic sponge. Insert the needle at a 45° angle, pointed toward the drainage tubing carefully. If necessary, kink the tubing 3 inches from the catheter and hold in place with a rubber band until urine is visible.
- 5) Urine for culture must be kept refrigerated or placed in a urine transport tube that contains preservative.

Note: Do not collect urine specimens from a drainage bag.

Stool for Culture. When collecting stool specimens, follow these guidelines.

- 1) A small amount is all that is required, about the size of a walnut. If several different types of cultures are requested, submit a walnut-sized sample for each. Place the specimen in transport medium or in a sterile leakproof container.
- 2) When stool cultures are not readily obtainable, rectal swabs are acceptable; however, it must be indicated whether the specimen is a stool or a rectal swab.

Use of Sterile Swab (Red-Stopper) Collection Kit

The swab system is guaranteed sterile until the seal is broken. Directions for use:

- 1) Peel open and remove the swab from the package.
- 2) Remove the cap/swab stick from the tube.
- 3) Collect the appropriate specimen and put the cap/swab into the tube. Push the cap to bring the swab into contact with the transport medium.
- 4) Print the patient's name and the culture site on the specimen tube.
- 5) Place the specimen in a zip-lock bag and put the completed test request form in the side pouch.
- 6) Store it at room temperature.
- 7) Send specimen to the laboratory.

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CLINICS

- 1) Fill out requisition with the following information: patient name or identifying number, sex, birth date, date drawn and authorized person ordering the test. (Include any additional clinical information that may be available; i.e., fasting status, time of draw if applicable, diagnosis, etc.).
- 2) Mark tests ordered by physician or write in under "other requests".
- 3) Place specimens and corresponding paperwork in shipping container for transport to laboratory.
- 4) Refer to the section on *Clinical Profiles & Tests - Descriptions* for specimen requirements and preservatives, if needed. All clients are supplied with customized specimen collection kits, shipping containers and courier transport. If the tests ordered are not present in the catalog, or there are any further questions concerning collection, please contact Customer Service or your Account Executive at 800/445-6917.
- 5) If additional tests are ordered by an authorized person via the telephone, the laboratory subsequently attempts to obtain a written or electronic requisition within 30 days from the client and/or physician.

COLLECTION TUBES

The following is a list of the most commonly used specimen collection tubes listed in our catalog:

Mottled Red Top - contains clot activator with serum separator in bottom, for collection of serum samples.

Red Top - contains no anticoagulant, for collection of serum samples.

Purple Top - contains EDTA (ethylenediaminetetra-acetate) for collection of hematology, cytofluorography and hemoglobin analysis samples.

Green Top - contains sodium heparin for hematology and chemistry samples.

Gray Top - contains sodium fluoride and potassium oxalate, inhibitors of glucolysis.

Light Blue Top - contains sodium citrate for coagulation samples.

Royal Blue Top - may contain sodium heparin for trace metal studies.

SPECIMEN SHIPMENT

1. Wrap labeled blood/serum/urine tubes with absorbent packing (i.e., dri-lok pads) or place into sponge insert in the rigid plastic container. (For drugs of abuse screening, following instructions supplied with the chain of custody documentation and specimen collection kit).
2. Place plastic container into the supplied corrugated cardboard box.
3. Ship to laboratory via prearranged courier transport (FedEx, Airborne, UPS, etc.)

All packaging and shipping material supplied by Clinical Reference Laboratory complies with ABRA Shipping Recommendations.