

BLOOD COLLECTION & HANDLING

A specimen is the biological representation of a patient. Anytime an error is introduced to a specimen, that specimen is affected. Errors such as leaving the tourniquet on too long, not using the proper order of draw, letting the specimen sit too long, hemolyzing the sample, or any other of the multitude of possible errors change the biological make up of that specimen and it no longer is a true representation of the patient.

Patient Identification:

Identify patients with two identifiers (patient name and medical record number from patient's armband). Compare information on the armband to information on order requisition. Ask the patient to give his/her full name (including middle name) and compare to the requisition. When possible, have patient or guardian check the ID on the requisition and sign indicating the information is correct.

If there is a discrepancy, even a minor one such as the slight misspelling of the name, have a second person identify the patient by name and/or identification number before collecting any specimen. For a patient who is unconscious, too young, mentally incompetent, or does not speak the language of the venipuncturist, ask a relative, friend, or the attending nurse to identify the patient by name, identification number and/or birth date.

In rare situations where patients cannot wear armband (burns, amputations), contact a nurse or a second person to positive identify the patient.

In outpatient clinics, ask the patient to give the full name and date of birth which is then compared to the information on the orders. Ask patients to spell their name when a Blood Bank specimen is required. A parent, guardian, or other responsible person can answer for minors or persons who are not able to respond.

Collection and Handling of Blood Specimens

Test results may be invalidated if the correct order of draw (see below) is not followed when collecting multiple blood specimens due to interaction of the tube additives.

Order of Draw for Collection Tubes*

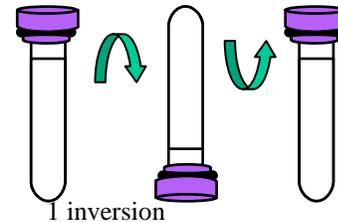
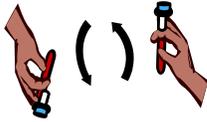
Mix by Inverting

1. Blood Cultures	8 to 10 times
2. Blue top tubes (coagulation tubes)	3 to 4 times
3. Serum Tubes: Plain Red top tubes* (no gel) and SST Gel tubes* (Gold and Red/Gray <i>*Plain Red Top and SST plastic collection tubes contain a clot activator</i>)	5 times
4. Heparin (e.g., green or pale green stopper) with or without gel	8 to 10 times
5. EDTA (e.g., lavender stopper)	8 to 10 times
6. Oxalate/fluoride (e.g., gray stopper)	8 to 10 times
7. Other additive tubes (Black, Yellow, Pearl, Royal Blue...)	8 to 10 times

1. When collecting blood with a butterfly needle, allow tubing to fill before filling additive tubes. Failure to do so can result in an unacceptable low volume specimen requiring recollect. Vacutainer tubes containing additives are manufactured to fill with the proper amount of blood. Allow tubes to fill until the blood flow stops. Do not overfill or underfill. Do not remove tube stoppers or "force" blood through stopper. Allow blue tube to draw completely until blood ceases to flow into the tube.

2. Immediately after filling tubes with additives, mix by **gently inverting 4 times for CoagTubes**. Mix SST tubes **5** times and EDTA all other tubes **8-10** times. *This is a critical step for purple and blue top tubes.*

- **Do not set tubes down and mix later.**
- **Do not “shake” tubes.**
- **Do not wait to mix until all tubes are filled.**

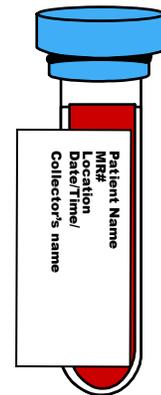


Mixing

- Holding tube upright, gently invert 180° and back.
- Repeat movement as prescribed for each tube.
- **Mix immediately after drawing each tube**

Consequences if not mixed

- Tubes with anticoagulants will clot.
- Gel tubes may not clot completely.
- Specimen will often need to be redrawn



Label specimen with the following information: *required information

- * patient name (preferably last name first)
- * medical record number
- * date and time of collection
- * initials of the person collecting the specimen

Place labels vertically on specimens

- The patient's label **must** be placed over the manufacturer's label so the blood contents are easily seen on the backside of the tube.
- Labels should **not** extend beyond the tube length **or** wrap around the tube like a flag. (Exception for microtainers: Labels can be wrapped around the microtainer tubes)

Do not use addressograph labels

Do not use oversized labels

Make sure all information fits on the label

Make sure information is legible.

Label specimens at patient's bedside.

Do not pre-label tubes before collection.

Do not bring labels from another area or take specimens to another area to label later.

Label specimen with other appropriate information, such as “trough” or “peak” or “fasting” or “left arm”, etc.

3. If a syringe is used, do not remove stoppers from tubes.

- Do not force blood into tubes after the flow has stopped if transferring blood from a syringe.
- Heparinized syringes should not be used to fill vacutainers as the heparin can contaminate the tubes and yield erroneous results.

4. Specimens collected in tubes containing additives must **never** be combined / poured off into other tubes.

Supplies

Specimen containers and phlebotomy supplies can be ordered from Materials Management.

Venipuncture Procedure

1. Wash hands and put on gloves.
2. Identify the patient using 2 identifiers (patient name and medical record number). See *"Patient Identification" Section for specifics.*
3. Assemble supplies and check paperwork and tubes. Check for latex allergy and take appropriate actions.
4. Apply tourniquet. Never leave the tourniquet on for longer than one minute. If the patient has a skin problem, put the tourniquet over the patient's gown/clothing or use an open sponge so as not to pinch the skin.
5. Select the vein site. Burn areas and the side on which a mastectomy was performed should be avoided. Specimens collected from a hematoma area may cause invalid test results. If unable to find another vein site, draw the blood specimen from a site distal (remote) to the bruised area. Do not draw the blood sample from an arm receiving fluids. If this should prove impossible, collect the blood specimen from a vein site distal to the I.V. site and comment on the request so the technologists performing tests will be alerted and the appropriate comment can be made with the results. It is best not to draw a blood specimen while a patient is receiving a blood transfusion unless the physician specifically requests it.
6. Cleanse the venipuncture site with an alcohol prep pad. Allow alcohol to air dry before collecting blood.
7. Perform venipuncture.
 - A. Make sure that patient's arm is in a downward position to prevent backflow.
 - B. Line up the needle with the vein from which the blood will be drawn.
 - C. Turn the needle so that the bevel is in an upward position.
 - D. Push the needle into the vein.
 - E. Push the tube to the first resistance. Maintain the tube below the site when needle is in the vein.
 - F. Do not change the position of the tube from the time the draw starts until it is withdrawn from the needle.
 - G. Remove the tube from the holder as soon as the blood flow ceases. This helps ensure that the blood withdrawn has been mixed with the proper amount of anticoagulant. If multiple samples are needed, place a second tube in the holder. Puncture the diaphragm of the stopper and withdraw another sample.
 - H. Mix immediately after drawing each tube that contains an additive by gently inverting the tube 6-8 times except blue top tubes which are inverted only 3-4 times. To avoid hemolysis, do not mix vigorously or shake tubes.
 - I. If unable to obtain a blood sample, try another tube, change the position of the needle or loosen the tourniquet. Probing is not recommended because this is painful to the patient. In most cases another puncture in another site is advisable.
 - J. Release the tourniquet.
 - K. Ask patient to open his/her hand.
 - L. Lightly place gauze over venipuncture site.
 - M. Remove the needle from the patient's arm.
 - N. Apply an adhesive or gauze bandage over the venipuncture site after making sure that stasis is complete. If the patient continues to bleed at the venipuncture site, apply pressure to the site with a gauze pad until the bleeding stops. Wrap a bandage tightly around the arm over a pad. Tell the patient to leave the bandage on for 15 minutes. If bleeding persists longer than 5 minutes, notify the attending physician of the problem. Continue pressure on the site as long as necessary to stop the bleeding.
8. Dispose of needle promptly in appropriate sharps container.
9. Correctly label the tubes of blood. All tubes should be labeled immediately upon collection at the patient's bedside or in the exam room with the patient's name (preferably last name first), the medical record number of the patient, date and time of collection, and location of the patient. Blood Bank specimens must be labeled from the patient's armband and must be initialed by the phlebotomist,

dated, and timed.

10. Remove gloves and discard in appropriate container in patient's or exam room.

Skin Puncture (Capillary) Procedure

1. Wash hands and put on gloves.
2. Choose the appropriate collection site. Skin puncture blood may be obtained from:
 - A. the lateral or posterolateral area of the heel
 - B. the big toe
 - C. the lateral side of the last digit of the finger
 - D. the ear lobe
3. The heel is generally used for children less than 1 year of age. After age one, the palmar surface of the last digit of the finger is most frequently used. The skin puncture site must be non-edematous as the accumulated tissue fluid will contaminate the blood specimen.
4. The skin puncture site may be warmed to increase blood flow through arterioles and capillaries. The simplest and least expensive method of warming the skin puncture site is to cover the site for 3 minutes with a hot moist towel previously soaked with hot running water. This technique will adequately increase the blood flow, will not burn the skin and will not result in a significant change in the values of any chemical constituent routinely measured in hospital chemistry laboratories.
5. Remove the alcohol pad from the sterile wrapper. Cleanse the site. Allow the site to completely dry before skin is punctured as alcohol will cause rapid hemolysis.
6. Skin puncture:
 - A. Heel stick:
 - (1) Firmly hold the foot with the forefinger at the arch of the foot and thumb below and away from the puncture site.
 - (2) The puncture should be made in one swift movement.
 - (3) Depth should not exceed 2.4 mm.
 - B. Finger stick:
 - (1) Hold the finger firmly with the thumb away from the puncture site.
 - (2) The puncture should be done in one sharp movement across the lines of the fingerprint. The average depth is 2-3 mm.
 - (3) Do not massage or squeeze the site as this introduces tissue fluids that contaminate the specimen and may also cause hemolysis.
7. Wipe the first drop of blood with a gauze pad. Blood can then be collected in the capillary, microtainer, or slide.
 - A. Avoid air bubbles in capillary tubes as this yields erroneous lab results.
 - B. Fill microtainers to the appropriate fill line.
8. Wipe the first drop of blood with a gauze pad. Blood can then be collected in the capillary, microtainer, or slide.
 - A. Avoid air bubbles in capillary tubes as this yields erroneous lab results.
 - B. Fill microtainers to the appropriate fill line.
 - C. Microtainer Order of Draw
 - EDTA (Purple) – mix by gently inverting 10 times
 - Lithium Heparin (Green) with or without gel – mix by gently inverting 10 times
 - Fluoride (Gray) – mix by gently inverting 10 times
 - Gel SST (Gold) with gel – mix by gently inverting 5 times
 - No additive serum tubes (Red) - mixing not required
9. Attach a label around the capillaries, microtainer, or slide. This label should contain all necessary patient information.
10. When collection is completed, check the puncture site to assure bleeding has stopped. Bandages are not advisable for infants as there is a possibility of swallowing or aspiration.
11. Remove all collection supplies and wrappers from patient's side. Use a sharps waste container for lancets.

Adverse Reactions to Blood Collection:

1. If the patient is in a sitting position, lower his/her head and arms.
2. Loosen tight clothing.
3. Administer ammonia inhalant. The patient will respond by coughing.
4. Apply cold compresses to the forehead and back of the neck if necessary.
5. If the patient does not respond, notify a physician.
6. Nausea
 - Make the patient as comfortable as possible.
 - Instruct the patient to breathe deeply and slowly.
 - Apply cold compresses to the patient's forehead.
7. Vomiting
 - Give the patient an emesis basin or carton and have tissues ready.
 - Give the patient water to rinse out his/her mouth.
8. Convulsions
 - 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.
 - Call someone to help. Call METS (4-6387) and ask for a physician at once.
9. For cardiac difficulties follow the protocol for cardiac code (Code Blue within UAB in-patient areas) For other areas, call 911.
10. For semi-conscious or comatose patients 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, inform a nurse or doctor who will examine the patient for possible damage.

Requests/Orders

All specimens must be accompanied by a written request signed by the ordering physician. The request must indicate patient name, medical record number, test(s) ordered, type and source of specimen (when appropriate), date and time of collection, person who collected test, and person ordering test.

Within University Hospital and associated clinics, this can be accomplished with the electronic requisition generated when tests are ordered in the hospital computer system.

Specimen Handling

Specimens must be submitted in an appropriately labeled and well-constructed container with a secure lid to prevent leakage during transport. Seal specimens in a fluid-tight specimen bag and deliver to the appropriate laboratory as soon as possible after collection. Specimens that must be stored for more than one hour prior to delivery should be refrigerated unless otherwise indicated under specimen requirements.

Specimens from UAB Outreach clients are picked up by courier service and delivered to UAB Outreach Services. Within UAB Hospital, specimens (except anatomic pathology specimens) may be sent through the pneumatic tube system or delivered to the laboratories as listed below:

Blood Bank Specimens	Spain Wallace W293
Microbiology Specimens	Spain Wallace S218
General Lab Specimens	Spain Wallace S288
Blood Gases	North Pavilion 1334
Cytology Specimens	Kracke Building K631
Pathology Specimens	North Pavilion 3501

Pneumatic Tube System (Within UAB Hospital):

Please refer to the *Pneumatic Tube System* policy on the SCR Website. Laboratory specimens may be transported to Hospital Laboratories through the pneumatic tube system (PTS) 24 hours a day, 7 days a week. Several receiving stations are located in the Spain Wallace laboratories, each used for a specific sample type. In order to ensure timely processing and analysis of specimens, please send specimens to the appropriate station based on the order priority and specimen type.

PTS Restrictions:

1. Do not send nor return any leaking or broken specimens in the PTS.
2. Do not send radioactive specimens or materials in the PTS.
3. Anatomic Pathology specimens (Biopsies, PAP) cannot be sent through the PTS.
4. Use appropriate foam inserts. Towels and other items CANNOT be substituted for the foam inserts.
5. Do not send over ten tubes per carrier.
6. Do not place more than four blood culture bottles per carrier.
7. Place blood gas specimens in two bags. Do not place the syringe directly in contact with the ice. Make sure ice does not leak. Place the requisition in the outer pocket of the second bag.
8. Failure to comply with these guidelines can result in tube breakage and shut down of the PTS.