



Blood Collection

Most laboratory tests are performed on anticoagulated whole blood, plasma or serum. In general, specimens should be refrigerated until placed in the courier box for transport to the laboratory. Please see our individual User's Guide section for specific requirements.

- **Plasma:** Draw a sufficient amount of blood with the indicated anticoagulant to yield the necessary plasma volume. Gently mix the blood collection tube by inverting 6-10 times immediately after draw. If required, separate plasma from cells by centrifugation within 20 minutes. See "Specific Guideline for Coagulation" attached to Coagulation Assays in the alphabetical list.
- **Serum:** Draw a sufficient amount of blood to yield the necessary serum volume. Gently invert tubes immediately following collection. Allow blood to clot at ambient temperature and then, separate serum from clot by centrifugation within 20-30 minutes of collection. Hemolyzed samples are not always acceptable.
- **Whole Blood:** Draw a sufficient amount of blood with the indicated anticoagulant. Gently mix the blood collection tube by inverting 6-10 times immediately after draw.

Blood Gas Analysis

Capillary: Absolute minimum collected in a special heparinized collection device is 125 mL.

Heparinized Syringe Collection: Absolute minimum in a special heparinized syringe is approximately 0.5 mL

Order of Draw

	Blood Cultures
	Blue (Sodium Citrate)
	Red Plain Royal Blue (No additive Aluminum, Zinc and Copper)
	Gold
	Sodium Heparin Lithium Heparin
	EDTA Lavender EDTA Pearl or White Tan (Heptamax) Royal Blue (EDTA - Arsenic, Lead, Mercury, Cadmium)
	Grey (Lactic Acid)
	ACD Yellow
	FDP Tube (Thrombin-Soybean Trypsin Inhibitors)

Lab Recommendations for Blood Collections from Lines

Drawing blood for routine testing below an IV:

1. Turn fluid off
2. Wait 2 minutes
3. Discard 5 mL of blood
4. Collect blood tubes according to the "Order of Blood Draw" instructions

Drawing blood for routine testing from central lines, implanted ports, and central venous catheters:

1. Turn off all fluids
2. Flush (all ports) with 5 mL of normal saline (if there was fluid in the line/s).
3. Wait 2 minutes

4. Discard first 5 mL of blood
5. Collect blood tubes according to the "Order of Blood Draw" instructions

Drawing blood for coagulation testing through any lines that have been flushed with heparin should be avoided if possible. If unavoidable, for collection from central lines, implanted ports and central venous catheters:

1. Turn off all fluids
2. Flush (all ports) with 20 mL of normal saline (if there was fluid in the line/s)
3. Wait 2 minutes
4. Discard first 10 mL of blood
5. Collect blood tubes according to the "Order of Blood Draw" instructions

Processing Blood Specimens

Gold or red top tubes

Allow blood to clot, usually 15-30 minutes, but no more than 1 hour except when a test specifies differently. Centrifuge for approximately 10-15 minutes until there is complete separation of cells from the serum.

Prolonged centrifugation may cause hemolysis or evaporation. Short centrifugation will not separate serum from packed cells. Serum should not be in contact with cells for more than 45 minutes.

Do not re-spin the primary serum samples if the cells have been in contact with the serum for more than 2 hours. If a sample is over 2 hours old and the cells are remixed with the serum, aliquot the serum into a pour-off tube and re-spin aliquot tube.

Dark green tops - generally used for inpatient testing:

- Must be 90% filled
- Do not spin Ionized Ca or Quick Chem. These tests use whole blood and must be delivered to the lab immediately.

Light green top with separator (Lithium Heparin plasma):

- Sample will not clot, otherwise, handle as stated above for gold or red top tube.

Lavender top - whole blood for CBC testing (Must be potassium EDTA)

1. Visibly check for over-or-under fill, peeling back the labels if needed. Reject and recollect when:
 - Tube has less than 1/2 the stated volume of tube's capacity
 - Tube contains more blood than the stated volume. Example: a capillary tube with blood

above the 500 ul mark or a 2 mL fill tube above the 2 mL mark is over-filled.

2. Gently rock the tubes by hand 2 or 3 times and inspect for gross clotting. If sample is questionable or a capillary collection, use wooden applicator sticks to rim sample. If clots are found, reject.

Blue top - vacutainers (3.2% buffered Na Citrate Plasma)

1. Visibly check to ensure tube is adequately filled. Tube must be no less than 90% of the total volume. See the BD Vacutainer chart for the correct fill, if available.
2. Gently rotate/rock tubes by hand to check for visible clots before centrifugation. If clotting has occurred, the sample must be rejected.
3. Centrifuging: NOTE – Spin all blue tops for 3 minutes at the “Normal Setting” in the Statspin, if available. Otherwise, spin at 17000 x g for 15 minutes. If the coagulation testing will not be completed within the whole blood sample stability time, aliquot the plasma into a plastic aliquot tube, removing only the top 2/3 of the platelet poor plasma from the specimen.
4. Visually inspect centrifuged coag samples for hemolysis. Check DH Test Directory for acceptability.
5. Visually inspect level of RBCs and plasma to determine if the HCT is above 55%. If above 55%, contact Hematology at 812-450-2482 or Gateway Hematology at 812-842-3170 for further instructions.
6. Visually inspect the plasma for clotting. Clotting will appear as fibrous strands with captured red cells “stringing” through the plasma or stuck to the side or top of the tube. If clotting is present, the sample must be rejected.

Aliquoting Any Specimen

Some samples may need to be aliquoted due to not having enough original tubes, the test not being performed that day or for samples to be sent to a reference lab. Aliquot the samples by:

1. Print a computer label and place on the aliquot tube.
2. Always check the accession number and the name of the aliquot with the original tube to ensure the same number and name before pipetting the sample into the aliquoted tube.
3. Pipet the sample from the primary tube using a clean disposable pipette into a new disposable plastic, labeled aliquot tube.
4. Write “Serum” or “Plasma with the anticoagulant” on the aliquot tube i.e. Plasma-citrate or Plasma-blue top.

5. Write the collection date/time/initials of collector on the aliquot tube unless these are available in the lab's computer by viewing the accession #.

Specimen Collection Tubes

The following is a list of tubes referred to in the Laboratory User's Guide specimen requirements:

Green-Top Tube (Sodium Heparin) and Green Top Tube (Lithium Heparin): This tube contains sodium or lithium heparin – used for drawing heparinized plasma or whole blood for special tests.

Note: After the tube has been filled with blood, immediately invert the tube several times in order to prevent coagulation.

Grey-Top Tube (Potassium Oxalate/Sodium Fluoride): This tube contains potassium oxalate as an anticoagulant and sodium fluoride as a preservative.

Note: After the tube has been filled with blood, immediately invert the tube several times in order to prevent coagulation.

Lavender-Top Tube (EDTA): This tube contains EDTA as an anticoagulant.

Note: After the tube has been filled with blood, immediately invert the tube several times in order to prevent coagulation.

Light Blue-Top Tube (Sodium Citrate): This tube contains sodium citrate as an anticoagulant – used for drawing blood for coagulation studies.

Note: It is imperative that the tube be completely filled. The ratio of blood to anticoagulant is critical for valid prothrombin time results. Immediately after draw, invert the tube 6-10 times in order to activate the anticoagulant.

Red-Top Tube: This tube is a VACUTAINER® containing no anticoagulant – used for drawing serum for selected tests.

Royal Blue-Top Tube: There are two types of royal blue-top Monoject® tubes – one with the anticoagulant EDTA and the other plain. These are used in drawing whole blood or serum for trace element analysis. Refer to the individual metals in the individual test listing to determine the necessary tube type.

Serum Separator (SST) Tube: This tube contains a clot activator and serum gel separator – used for various laboratory tests.

Note: Invert the tube to activate the clotting. Let stand for 20-30 minutes before centrifuging for 10 minutes. If frozen serum is required, pour off serum into plastic vial and freeze. Do not freeze VACUTAINER(S)®.

Special Collection Tubes: Some tests require a specific tube for proper analysis. Please contact the Deaconess Laboratory prior to patient draw to obtain the correct tubes for metal analysis or other tests as identified in the individual test listing.

Yellow-Top Tube (ACD): This tube contains ACD – used for drawing whole blood for special tests.



Specimen Handling and Transportation

Serum plasma samples - Unless specific handling instructions are listed in the alphabetical listing (to follow), samples need to be processed within 2 hours of collection.

After centrifugation, samples should be refrigerated or frozen or testing performed within 8 hours unless other specific instructions are listed in the alphabetical listing.

Samples should be maintained at the same temperatures as required for sample stability whether samples are handled and processed in the building or samples are transported from other locations.

The correct sample type and special instructions are listed in the alphabetical test listing.

The collection of urine specimens is the responsibility of the nursing unit or client office except for those collected in the Laboratory Outpatient Area.

Specimens for routine urinalysis and cultures should be freshly collected specimens. All urines should be collected utilizing clean catch, sterile technique.

The nursing unit, attending physician or office staff will collect specimens for culture. See the Microbiology / Infectious Disease Specimens collection section of this User's Guide.