

Specimen Collection and Preparation

Laboratory test results are dependent on the quality of the specimen submitted. It is important that all specimens and request forms be properly labeled with the name of the patient, collection date, and the origin (source) of the specimen, when applicable.

If there is any doubt or question regarding the type of specimen that should be collected, it is imperative that Client Services be called at 781-979-3151 to clarify the order and specimen requirements.

Tourniquet Usage

Tourniquet should only be applied for a maximum of 60 seconds. Prolonged tourniquet usage has been shown to increase hemolysis in specimens.

Blood Collection

Most laboratory tests are performed on anticoagulated plasma, serum or whole blood. In general, specimens should be refrigerated until placed in the courier box for transport to the laboratory. However, see the individual test section for specific requirements. Blood collection tubes are required to be collected in a specific order. This order helps prevent cross contamination of chemicals within the tube of subsequent tubes. Please see the Order of Draw document at the end of this section.

- **Plasma:** Draw a sufficient amount of blood with indicated anticoagulant to yield necessary plasma volume. Gently mix blood collection tube by inverting 8 to 10 times immediately after collection. If required, separate plasma from cells by centrifugation within 20 to 30 minutes.
- **Serum:** Draw a sufficient amount of blood to yield necessary serum volume. Invert the tube 5 to 10 times to activate clotting. Allow blood to clot at ambient temperature for 30 minutes. Separate serum from clot by centrifugation within 10 minutes. Caution: avoid hemolysis.
- **Whole Blood:** Draw a sufficient amount of blood with indicated anticoagulant. Gently mix blood collection tube by inverting 8 to 10 times immediately after collection.

When using a Butterfly-style collection device, or obtaining specimens via a line, an initial Red Top tube should be collected and discarded to remove any air within the lines that may affect blood collection. This is particularly important with the collection of coagulation tests, such as a Protime and INR.

Centrifugation

Centrifuges are used to spin down and separate serum and plasma from blood cells. It is important to run them at the appropriate speed to obtain accurate results and properly separate specimens. Manufacturer's instructions should be followed carefully. Centrifuges should be on a stable level countertop and operate with the lid closed. A centrifuge load should always be balanced by placing tubes of equivalent size, shape, and containing an equal volume of liquid, opposite each other.

Centrifuge speed should be checked annually and corrected for any variance.

- The recommended time for centrifugation is 5 to 15 minutes at 3,200 rpm to 3,500 rpm; however, follow the manufacturer's recommendations.
- To obtain serum, the tube should be allowed to stand for 20 to 30 minutes or until the clot is formed. If the specimen is on ice, it may need to stand much longer. A wooden stick should never be used to release a clot stuck near the top of the draw tube.
 - To obtain plasma, the anticoagulated specimen may be spun down within minutes of draw.
- Transfer of the serum or plasma into an appropriately labeled tube must be done within 1 hour after centrifugation. Pipetting by mouth is prohibited. Some blood draw tubes contain a gel material and a clot activator. Once centrifuged, the tubes will have a gel barrier between the serum and the cells. Serum can be stored on the gel barrier for up to 48 hours with the tube stoppered. After centrifugation, the gel should be intact and the cells and serum completely separated.
- Plasma or serum should be securely covered at all times.
- Separated cell-free plasma or serum is ready for testing. Tests should be conducted within 5 hours. If this is not possible, the specimen should be refrigerated for no longer than 2 days in a sealed container. Specimens kept longer than 48 hours must be frozen at -20° C in a freezer for up to 30 days.
- Plasma or serum specimens sent to a referral laboratory must be submitted in accordance with the laboratory's instructions. Please refer to appropriate laboratory specimen collection in the manual.

Fasting Specimens

An overnight fast is required for most fasting specimens. Some tests, however, particularly for lipids, triglycerides, and lipoproteins, require further dietary restriction. For these tests, nothing should be eaten for 12 to 14 hours prior to specimen collection, but water may be consumed.

The evening before the specimen is drawn, the meal should contain no fatty foods or alcohol, and the meal should be completed before 6 p.m.

Metals Collection

Avoid iodine-containing disinfectant, and always cleanse arm with alcohol swab. Use only stainless steel phlebotomy needles.

Use only Monoject® trace element blood collection tubes as follows:

- For specimen that requires serum, no additive
- For specimen that requires plasma, EDTA is the additive

When multiple blood specimens are to be drawn from a patient, the trace metal specimens should be drawn first. Once the needle has punctured another stopper, it is contaminated and should not be used for trace metal specimen collection.

- *Metal-free tubes*: Special metal-free tubes are available for tests that indicate their use. They are navy blue-top Monoject® tubes. The standard VACUTAINER(S)® contain metals in the stoppers.

Specimen Collection Tubes Available

The following is a list of tubes referred to in Hallmark Health Laboratory specimen requirements:

- *Green-Top (Sodium Heparin) Tube*: This tube contains sodium heparin—used for collection of heparinized plasma or whole blood for special tests.
Note: After tube has been filled with blood, immediately invert tube several times in order to prevent coagulation.
- *Lavender-Top (EDTA) Tube*: This tube contains EDTA as an anticoagulant—used for most hematological procedures.
Note: After tube has been filled with blood, immediately invert tube several times in order to prevent coagulation.

- *Light Blue-Top (Sodium Citrate) Tube*: This tube contains sodium citrate as an anticoagulant—used for collection of blood for coagulation studies.
Note: It is imperative that tube be completely filled. Ratio of blood to anticoagulant is critical for valid prothrombin time results. Immediately after draw, invert tube 6 to 10 times in order to activate anticoagulant.
- *Red-Top Tube*: This tube is a plain VACUTAINER® containing no anticoagulant—used for collection of serum for selected chemistry tests as well as clotted blood for immunohematology. When a test is designated to be drawn in a red-top tube, a serum gel tube should not be substituted. The gel barrier may interfere with analysis.
- *Royal Blue-Top Tube*: There are 2 types of royal blue-top Monoject® tubes—1 with anticoagulant EDTA and the other plain. These are used for collection of whole blood or serum for trace element analysis. Refer to individual metals in individual test listings to determine tube type necessary.
- *Serum Gel (Gold-Top) Tube*: This tube contains a clot activator and serum gel separator—used for routine chemistries. Do not use for drug levels.
Note: Invert tube 8 to 10 times to activate clotting; let stand for 20 to 30 minutes before centrifuging for 10 minutes. If frozen serum is required, pour off serum into plastic vial and freeze. Do not freeze.

Stool Specimen Collection

Random Collections: A random stool specimen collected every other day for a total of 3 specimens is recommended for an accurate examination for intestinal parasites. Specimens should be mixed thoroughly in a preservative according to instructions on outside of special container (Para-Pak™ Kit).



Helping all people
live healthy lives

BD Vacutainer® Order of Draw for Multiple Tube Collections

Designed for Your Safety

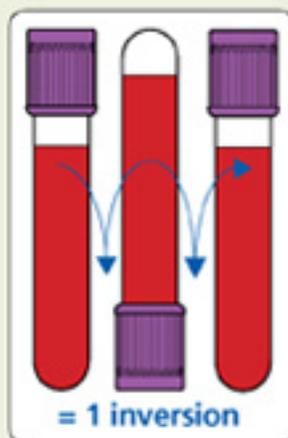
Reflects change in CLSI recommended
Order of Draw (H3-A5, Vol 23, No 32, 8.10.2)

* When using a winged blood collection set for venipuncture and a coagulation (citrate) tube is the first specimen tube to be drawn, a discard tube should be drawn first. The discard tube must be used to fill the blood collection set tubing's "dead space" with blood but the discard tube does not need to be completely filled. This important step will ensure proper blood-to-additive ratio. The discard tube should be a nonadditive or coagulation tube.

| Closure Color | Collection Tube | Mix by Inverting |
|--|---|-----------------------------------|
| BD Vacutainer® Blood Collection Tubes <i>(glass or plastic)</i> | | |
| | • Blood Cultures - SPS | 8 to 10 times |
| | • Citrate Tube* | 3 to 4 times |
| or | • BD Vacutainer® SST™ Gel Separator Tube | 5 times |
| | • Serum Tube <i>(glass or plastic)</i> | 5 times (plastic) none (glass) |
| | • BD Vacutainer® Rapid Serum Tube (RST) | 5 to 6 times |
| or | • BD Vacutainer® PST™ Gel Separator Tube With Heparin | 8 to 10 times |
| | • Heparin Tube | 8 to 10 times |
| or | • EDTA Tube | 8 to 10 times |
| | • BD Vacutainer® PPT™ Separator Tube K ₂ EDTA with Gel | 8 to 10 times |
| | • Fluoride (glucose) Tube | 8 to 10 times |

Note: Always follow your facility's protocol for order of draw

Handle all biologic samples and blood collection "sharps" (ancets, needles, luer adapters and blood collection sets) according to the policies and procedures of your facility. Obtain appropriate medical attention in the event of any exposure to biologic samples (for example, through a puncture injury) since they may transmit viral hepatitis, HIV (AIDS), or other infectious diseases. Utilize any built-in used needle protector if the blood collection device provides one. BD does not recommend resheating used needles, but the policies and procedures of your facility may differ and must always be followed. Discard any blood collection "sharps" in biohazard containers approved for their disposal.



BD Technical Services
1.800.631.0174
BD Customer Service
1.888.237.2762
www.bd.com/vacutainer

Pathology/Cytology

All specimens submitted must be labeled with the patient's full name, DOB, and date of collection in order to maintain patient identification and integrity.

The specimen must also be accompanied by a completed requisition. The submitted requisition must include:

- Tissue submitted
- Clinical history
- Reason for visit
- Insurance information
- Physician
- Date of service

Reasons for Rejection

- Requisition and specimen do not match
- Unlabeled specimen or smear
- Incomplete or incorrect information
- Inadequate material for processing

Rejected Specimens by Laboratory

The physician's office will be notified of any specimen rejection, and a request will be made to submit a new specimen. A written report will be sent with the reason for rejection.

Pathology/Cytology

- Tzanck Smear: Smear is prepared from scraping a bullous skin lesion. Most commonly used to evaluate for herpes simplex, fungal infections. Smear must be air dried, no fixative. Submit in a slide folder. Slides must be labeled patient name, DOB, and hospital number. Test mnemonic: SMR
- Pap Smear: For detection of cervical neoplasia. Pap-Pak cytology kit, submitted in a slide folder at room temperature. Patient's name, DOB, and physician must be on both the requisition and slide. All materials can be obtained through Client Services. Test mnemonic: PAP
- Thin Prep/Sure Prep: For detection of cervical neoplasia. Specimen is collected using thin prep collection kit, with brush or broom. Screw cap securely, keep at room temperature. Patient's name, DOB, and physician must be on both the requisition and slide. All materials can be obtained through Client Services. Test mnemonic: PAP
- Biopsies and Lesions: Specimen is submitted in 10% formalin and stored at room temperature. Patient's name, DOB, and physician must be on both the requisition and slide. 10% formalin and labels are available through Client Services. Test mnemonic: varies by specimen type
- Urine for Cytology: Have patient drink one glass of water every 15 minutes for 2-4 hours. At the end of the two hours, have the patient void and discard the urine. One hour later, have the patient void and save the specimen. Specimen should be fresh, no fixative, and should be kept refrigerated. Minimum urine-50 ml recommended. Patient's name, DOB, and physician must be on the container and requisition. Test mnemonic: URINE(Path) CYO (Lab)
- Bronchial Washings: Fluid obtained by lavage during bronchoscopic examination. Collect specimen in a sterile container, submit fresh, no fixative. Divide specimen in 2 containers for culture and cytology. Transport the specimen to lab immediately. Patient's name, DOB, and physician must be on both the requisition and specimen container. Test mnemonic: WASH
- Esophageal/Gastric Washings: Fluid obtained by lavage during endoscopic examination. Specimen must be submitted fresh, no fixative. Transport the specimen to lab immediately, keep refrigerated. Patient's name, DOB, and physician must be on both the requisition and container. Test mnemonic: WASH
- Endoscopic Brushings: Esophageal, Gastric brushings. Biopsy obtained from brushing the mucosal surface of the esophagus or stomach during fibroscopic endoscopic examination. Apply brush to slide surface, spray immediately with fixative. Slides must be labeled with patient name, DOB and/or hospital number. Transport slides in plastic slide holder, available from Pathology. Test mnemonic: BRX
- Bronchial Brush Biopsy: Biopsy obtained from brushing the bronchial mucosal surface during fiberoptic examination. Apply brush to slide surface, spray immediately with fixative. Slides must be labeled with patient name, DOB, and/or Hospital number, and biopsy location. Transport slides in a plastic slide holders, available from Pathology. Test mnemonic: BRX
- Sputum for Cytology: Deep cough, spontaneous or induced; early AM specimen. No food or drink. Specimen should be fresh, no fixative, send immediately to the laboratory. If culture is also requested, send in 2 separate containers. Containers and requisition must be labeled with Patient's name, DOB, and physician. Recommended collect fresh specimen for 3 consecutive days. Test mnemonic: SPUTUM
- Joint Fluid for Crystals: Evaluate for the presence of crystals, most commonly uric acid (Gout and Calcium Pyrophosphate (Pseudogout)). Collect in green top tube (heparinized). Send immediately to the laboratory, keep at room temperature. Please do not submit in purple top (EDTA) tube. EDTA may contain crystal-like material which will interfere with evaluation. Green top must be labeled with patient name, DOB, and/or Hospital number. Test mnemonic: JFC(Path) CRYSTALS(Lab)
- Fine Needle Aspiration: Submit core biopsy in 10% formalin or cytospin collection fluid. Smears should be fixed immediately with cytofluid fixative spray. Requisition should list biopsy site and clinical information. Smears should be kept at room temperature, send immediately to Pathology. Slides must be labeled with patient name, DOB and/or hospital number and biopsy site. Transport slides in plastic slide containers, available from Pathology. Test mnemonic: FNA

- *Thoracentesis/Paracentesis*: Fluid obtained from the pleural or abdominal cavity. Large volume (greater than 100 mL) should be submitted in a heparinized collection bottle, available from CSP. Lesser volumes should be submitted fresh in a sterile container. Send specimen immediately to the laboratory. If this is not possible, refrigerate until transport. Patient's name, DOB, and physician must be on both the requisition and specimen container.

Test mnemonic: BF

- *Cerebrospinal Fluid*: Fluid obtained by lumbar puncture for evaluation of infection, hemorrhage, malignancy, demyelinating disease. Divide specimen into 4 sterile tubes*

Tube 1: Chemistry

Tube 2: Microbiology: culture and gram stain

Tube 3: Cytology

Tube 4: Cell count and differential

*always perform cell count on last tube submitted

Specimens should be transported to the laboratory immediately and kept refrigerated. All tubes must be labeled with patient's name, DOB and/or hospital number and physician.

Test mnemonic: BF