

Specimen Collection and Preparations

Introduction

The quality of results from laboratory testing depends on the proper collection and handling of specimens submitted for analysis. Correct patient preparation, specimen collection, accurate test ordering, specimen packaging and transportation are essential factors.

Volumes of plasma and serum listed in this manual are conservative and are provided in the “Alphabetical Test Listing.” To avoid additional inconvenience and expense, please make sure you have submitted the quantity listed.

As a rule of thumb, the volume of blood drawn should equal 2.5 times the plasma or serum required. For example, to obtain 4.0 mL of serum, draw 10 mL of blood. An exception to this rule is blood drawn for coagulation testing. To maintain the blood anticoagulant ratio, allow the tube to fill until the vacuum is exhausted when drawing blood for coagulation tests.

When inappropriate specimens are submitted, the client will be contacted and requested to redraw the specimen. A written report explaining the problem will be issued.

If you have any questions about a minimum specimen requirement, call Meriter Laboratories’ (ML) Client Services at 608-417-6529 or 800-236-0465.

Courier Services

Daily courier service is available Monday through Saturday from many locations throughout the Madison metropolitan area and South Central Wisconsin. Courier service can be provided on a daily or an on-call basis. Requests for pickup or delivery are called to Client Services at 608-417-6529 or 800-236-0465. Requests received before 12 noon can usually be scheduled for pickup that same day. Advanced scheduling is appreciated for pickup of specimens that require prompt delivery or processing to avoid deterioration of the analyte(s) or loss of microbial viability in specimens for culture.

Routine courier service is not provided on the following holidays:

- New Year’s Day
- Memorial Day
- Independence Day
- Labor Day
- Thanksgiving Day
- Christmas Day

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 test directory 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 5 to 10 times immediately after draw. If required, separated plasma from cells by centrifugation within 20 to 30 minutes.
- **Serum:** Draw a sufficient amount of the blood to yield the necessary serum volume. Allow blood to clot at ambient temperature and then separate serum from clot by centrifugation within 20 to 30 minutes.
- **Whole Blood:** Draw a sufficient amount of blood with the indicated anticoagulant. Gently mix the blood collection tube by inverting 5 to 10 times immediately after draw.

Precautions in Specimen Handling

The potential for transmission of disease is present in the collection and handling of all biological specimens. Therefore, health care professionals should always be aware of this potential, and treat all specimens using standard blood and body fluid precautions. All specimens of blood or other potentially infectious materials should be placed in a container which prevents leakage during collection, handling, processing, storage, transport or shipping. A biohazard label must appear on the specimen containers when being stored, transported, or shipped.

For the convenience of our customers, ML provides specimen bags that comply with OSHA guidelines.

Specimen Collection Guidelines

This reference manual will assist you in providing optimal care to your patients and ensure reliable test results. Prior to collection of any specimen, review the specimen requirements in this reference manual. Note the patient preparation requirements, the type of specimen to be obtained, the collection procedure and the handling requirements. Please contact Client Services at 608-417-6529 or 800-236-0465 if you have any questions prior to collection.

Good laboratory procedure requires that the phlebotomist practice standard blood and body fluid precautions when doing a venipuncture. The phlebotomist must wash their hands or use an alcohol-base hand cleanser before collecting a specimen and between patients. They must also wear gloves for all blood collections including venipuncture, syringe, fingerstick and heelstick.

Patient Identification: The single most important step in any collection is ensuring the patient's identification. Two identifiers must be used. The following guidelines can be used to guarantee the correct specimen is obtained:

- If the patient can respond, ask the patient to spell their last name, state their first name and birth date.
- If the patient cannot speak, the patient may be able to communicate their full name and birth date in writing.
- If the patient is wearing a wristband, compare the full name on the band and another identifier with a computer label or requisition form.
- If the patient cannot respond or identify himself, positive identification must be made by personnel from the facility that must go into the room with the phlebotomist and establish the patient's identification before the blood collection is performed.

Venipuncture Procedure:

- Collection of a blood specimen is obtained by using the usual venipuncture technique. New gloves must be worn for every procedure. Make sure all materials are readily available before starting the procedure.
 - The National Committee for Clinical Laboratory Standards (NCCLS) recommended order of draw is:
 1. Blood culture bottle
 2. Citrate-containing tube (light-blue top)
 3. Serum tubes with or without clot activator or gel separator (red or gold top)
 4. Heparin- containing tubes with or without gel separator (dark-green top sodium heparin and light-green top lithium heparin)
 5. EDTA- containing tubes (lavender top)
 6. Sodium fluoride- containing tube (grey top)
- **Note: Always follow your facility's protocol for order of draw.**
- Apply a tourniquet to the patient's extended arm and select the best vein.
- Swab the site with an alcohol prep pad (sterile alcohol 70%) or Betadine, except when drawing an "alcohol level" use a nonalcoholic cleanser. Allow the cleanser to air dry.
- Use the following tips when selecting a vein:
 - The median cubital and cephalic veins are normally the preferred veins, but wrist and hand veins are also acceptable.
 - Ankle veins should be avoided unless permission is obtained from the physician.
 - Healed burned areas should be avoided.
 - A cannulated arm should be used only after consulting with a physician.
 - A specimen should be drawn distal to a hematoma if another site is not available.
 - Mastectomy patients: A specimen should never be drawn on the same side as the mastectomy.

- Intravenous therapy: Optimally, specimens should be drawn from the opposite arm.
- “Anchor” the vein in position and with the needle at an acute angle; quickly penetrate the skin and vein. Push the vacuum tube onto the needle, puncturing the stopper diaphragm. This initiates the vacuum suction.
- Remove the tourniquet as soon as possible.
- Allow the tube to fill until the vacuum is exhausted before withdrawing the tube from the holder. If multiple tubes are to be drawn, follow the recommended order of the draw.
- Mix all tubes containing additives at least 5 times, as soon as each is filled.
- When all tubes are filled, place dry gauze over the venipuncture site and withdraw the needle carefully.
- Apply pressure to the site until bleeding stops. If bleeding persists for more than 3 minutes, apply a pressure bandage and notify appropriate personnel.
- Dispose of the needle promptly in an appropriate container. **Do not recap the needle.**
- Label the specimens appropriately.

Microtainer Collection:

- Prewarm the heel with a heel warmer for 3 minutes.
- Prior to blood collection procedure, put on new gloves and assemble supplies.
 - If using an **additive** tube, remove the plug from the top of the tube and attach to the bottom. For **non-additive** tubes, FloTop Collector is already in place. Remove attachable plug from the plastic bag and attach to the tube bottom.
- Select the puncture site and cleanse with antiseptic. Capillary blood may be obtained from:
 - Lateral heel surface (infants <6 months of age). If the heel surface is to be used, the site should be on the lateral surface medial to a line drawn posteriorly from the middle of the large toe to the heel or lateral to a line drawn posteriorly from the fourth or fifth toe to the heel.
 - Plantar surface of the big toe (infants <1 year of age).
 - Plantar surface of the tip of the finger.
- Allow the site to dry.
- Puncture skin with sterile lancet.
- With gauze, absorb the first drop of blood.
- Hold the tube with collector vent hole in upward position.
- Touch tip of collector to underside of drop. Blood will flow freely through the collector and down the tube wall. Gently tap bottom of tube on a flat surface to help the blood flow easier to the bottom.
- Fill tubes to the required volume.
- After blood has been collected, remove and discard the collector. Insert plug on top of tube.
- Carefully hold the plug in place and immediately invert tube 5 to 10 times.
- Label tube with patient’s name.
- Dispose of lancet and gauze in an appropriate disposal device.

We recommend the use of plasma gel tubes for most analyses. Please check individual specimen requirements for restrictions.

When using a serum gel tube, follow these instructions:

- Perform venipuncture using the usual venipuncture technique.
- Invert the tube gently no more than 5 times.
- Allow the blood to clot in a vertical position for at least 20 minutes but no longer than 45 minutes. Do not remove the stopper.
- Centrifuge at 3,000 rpm to 3,500 rpm for at least 15 minutes.
- Remove from centrifuge. Barrier will have formed separating cells from serum. All of the separation gel should have moved from the bottom of the serum tube to form a barrier layer between the serum and cells. Do not re-centrifuge the tube. The specimen is now ready for transfer to ML.
- If multiple aliquots or specially prepared specimens must be submitted, use plastic serum vials to submit specimen.

When not using a serum gel tube or when plasma or serum is required, follow these instructions:

- Draw specimen in the appropriate specimen tube.
- If Serum is required, allow the specimen to clot for at least 20 minutes, but no longer than 45 minutes, before

centrifugation.

- Centrifuge at 3,000 rpm to 3,500 rpm for at least 15 minutes.
- Pipette the plasma or serum into a clean plastic vial and attach the label. Make sure that the plasma or serum is free of red cells.

Specimen Collection Tubes Available

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

- Amber Top (Serum Gel, 0.6 mL Microtainer): This tube contains gel and a clot activator—used for pediatric specimens that require serum.
- Dark-Green Top (Sodium Heparin, 4.0 mL): This tube contains sodium heparin—used for cytogenetic studies, flow cytometry, blood mycobacterium cultures, and LAP stain.
Note: After tube has been filled with blood, immediately invert 5-10 times to prevent coagulation.
- Gold Top (Serum Gel and Clot Activator, 3.5 mL): This tube contains gel and a clot activator—used for specific serum testing. Do not use for therapeutic drug monitoring.
Note: After tube has been filled with blood, immediately gently invert 5 to 10 times. This mixes blood with clot activator to accelerate clotting. Allow blood to clot in an upright position for 20 minutes at ambient temperature. Do not remove stopper. Centrifuge within 1 hour of draw. Follow special instructions listed for those tests that need to have serum separated.
- Green Top (Lithium Heparin, 4.0 mL) No-Gel: This tube contains lithium heparin—used for whole blood, venous testing. If plasma is needed, see note.
Note: After tube has been filled with blood, immediately invert 5 to 10 times to prevent coagulation. Centrifuge immediately. Transfer plasma to a plastic vial within 20 minutes, and freeze immediately.
- Lavender Top (EDTA, K₂, 4.0 mL): This tube contains EDTA as an anticoagulant—used for most hematological procedures.
Note: After tube has been filled with blood, immediately invert 5 to 10 times to prevent coagulation. Follow specimen instructions for those tests which need to have plasma separated.
- Lavender Top (EDTA, 0.5 mL Microtainer): This tube contains EDTA as an anticoagulant—for pediatric use
Note: Fill to a minimum of 250 µL with blood, immediately invert at 5 to 10 times to prevent coagulation.
- Light-Blue Top (Sodium Citrate, 2.7 mL): This tube contains sodium citrate as an anticoagulant—used to draw blood for coagulation studies.
Note: It is imperative that tube be completely filled. Ratio of blood to anticoagulant is critical for valid coagulation results. Immediately after draw, invert gently 5 to 10 times to activate anticoagulant. Check individual tests for specific instructions and for specimen stability.
- Light-Blue Top (Sodium Citrate, 1.8 mL): USE FOR DIFFICULT DRAWS OR VET USE. This tube contains sodium citrate as an anticoagulant—used to draw blood for coagulation studies.
Note: It is imperative that tube be completely filled. Ratio of blood to anticoagulant is critical for valid coagulation results. Immediately after draw, invert gently 5 to 10 times to activate anticoagulant. Check individual tests for specific instructions and for specimen stability.
- Light-Green Top (Lithium Heparin, 600 µL Microtainer): This tube contains lithium heparin—for pediatric use.
Note: After tube has been filled with blood, immediately invert gently 5 to 10 times to prevent coagulation.
- Light-Green Top, (Lithium Heparin, 3.0 mL) Plasma Gel: This tube contains gel and lithium heparin—used for many analytes.
Note: After tube has been filled with blood, immediately invert 5 to 10 times to prevent coagulation. Centrifuge immediately.
- Navy-Blue Top, Metal-Free (EDTA, 7.0 mL): This tube is a Monoject tube containing disodium EDTA—used for collecting trace elements (lead).
- Navy-Blue-Top, Metal-Free (Plain, 7.0 mL): This tube is a plain Monoject tube containing no anticoagulant—used for nortriptyline and tricyclics. Transfer serum to a polypropylene tube.
- Pink Top (EDTA, 6.0 mL): This tube contains K₃ EDTA as an anticoagulant – for Blood Bank Use.
Note: After tube has been filled with blood, immediately invert at least 5 times to prevent coagulation.
- Red Top (Plain, No-Gel 4.0 mL): This tube is a serum tube containing no gel, coated with a clot activator— used

for some therapeutic drug monitoring.

Note: Allow blood to clot in an upright position for 20 minutes. Specimen should be centrifuged 30 minutes after draw, and serum should be transferred into a plastic vial.

- ***Special Collection Tubes:*** Some tests require specific tubes for proper analysis. Please contact ML prior to patient draw to obtain correct tubes for metal analysis or other tests as identified in individual test listings.
- ***Yellow Top (ACD-A 9.5 mL):*** This tube contains ACD-A (acid citrate dextrose)—used for HLA typing.

Note: After tube has been filled with blood, immediately invert at 5 to 10 times to prevent coagulation. Keep specimen at ambient temperature after draw and during transit.
- ***Yellow Top (SPS, 8.3 mL) Tube:*** This tube contains sodium polyethanol-sulfonate (SPS)—used for blood mycobacterium culture only.

Note: After tube has been filled with blood, immediately invert 5 to 10 times to prevent coagulation. Forward to the laboratory as soon as possible.

Histopathology

Guidelines for Histopathology Tissue Specimens

- A. A requisition form must be submitted with every tissue specimen. The requisition is either produced by the client EMR system or “Histopathology Requisition” (Form #811587) supplied by Meriter Laboratories (ML).
- B. *Specimens from the Operating Rooms/Medical Imaging:*
 1. All patient data requested on the Histopathology Requisition should be filled in, including preoperative and postoperative diagnoses. The requisition must have the surgeon’s name printed in the correct space.
 2. All containers must be properly labeled with the patient’s identification label. The label must be affixed to the face (side) of the specimen container.
 3. The following specimen containers are available:
 - i. Bottle with fixative – use for small specimens where size permits. Call the Histopathology Laboratory (ext. 77817) for additional containers or questions.
 - ii. Multi-purpose containers – assorted sizes are available. Histopathology Laboratory (ext. 77817) for additional containers or questions.
 4. All specimen containers are to be put into a specimen bag with an attached pouch. This pouch is where the tissue requisition is to be placed. This will keep the specimen container and requisition together and keep the requisition from being contaminated. Most containers will fit in the various size bags that are available from the Meriter storeroom. The use of this bag with the pouch is mandatory for infection control and to keep specimens and requisitions together as they are transported through the processing system.

Note: Writing on the container lids or wrapping the requisition form around the specimens without a label being affixed to the container is not sufficient to ensure proper identification. These specimens will require proper identification prior to being processed for analysis. **Plastic bags are not to be used as the primary specimen containers.**
 5. **If specimen is normally considered to be a “gross only” but a microscopic examination is required, please note “Microscopic Histologic Exam” on requisition form and contact the Histopathology Department at ext. 77817 to convey this information.**
 6. **Limbs for examination should be refrigerated. The limb should be placed in multiple plastic bags and sealed tightly. The requisition should stay with the specimen and may be attached to the outside of the bag. A “Disposal Permit,” supplied by Meriter Laboratories, should be signed by the patient and sent with the specimen to Pathology.**
- C. *Frozen Sections:*
 1. **Monday through Friday, 7 a.m. to 4:30 p.m.:** If there is not a pathologist already in the fourth floor Pathology Laboratory (where frozen sections are performed), page the pathologist at 129-1331 at least 10 minutes before the tissue is to be delivered. If there is no response to the page, call ML at 608-417-6317.
 2. **Evenings, weekends, holidays:** Page the pathologist on call via the switchboard at 608-417-6000 to notify the on-call pathologist that a frozen section will be needed.
 - i. Fresh tissue is brought to the fourth floor Pathology Laboratory for frozen section

accompanied by a completed Histopathology Requisition as produced by your EMR or by using Form #811587 supplied by Meriter Laboratories.

- ii. The specimen should be logged in according to the information located in the log book in the fourth floor Pathology Laboratory.
- iii. **Specimens for frozen section exam should not be placed in fixative.** For transportation purposes, however, they must be covered in a manner consistent with proper infection control practices.
- iv. All specimens submitted for frozen section exam will also be processed routinely.

D. *Breast Specimens:*

1. Specimens should be immersed in formalin within 1 hour of the biopsy or resection procedure.
2. For any breast specimen, please document not only the collection time but also the time the tissue was placed in formalin.
3. The volume of formalin should be at least 10 times the volume of the specimen.
4. For larger resections, CAP recommends the tumor be bisected prior to immersion in the fixative. In such cases, it is important to retain the orientation and margins. Alternatively, the margins may be separately submitted if orientation is clearly indicated.

E. *Special Studies Requests:*

1. The pathologist must be contacted immediately for any special studies that may be requested on a specimen. Do not put the tissue into fixative or any other solution until the pathologist is contacted and has indicated the correct solution to use. (Many special studies cannot be performed on formalin-fixed tissue.)
2. Indicate what type of special studies are being requested.
3. If a pathologist cannot be contacted, call the Histopathology Laboratory at ext. 77817 from 7 a.m. to 4:30 p.m., Monday through Friday for information. The tissue may be put in a saline solution only and refrigerated until a pathologist is contacted.
4. If a biopsy is required STAT or a diagnosis is needed on Saturday, the staff pathologist on call must be consulted by 3 p.m. on Friday.
5. If special studies on tissue are going to be sent out to a reference laboratory (i.e. genetic studies, muscle or nerve biopsy, etc.) these specimens must go through the ML Histopathology Laboratory. They will be recorded and sent out to the laboratory as requested. **Specimens should never be sent out before being processed through the Histopathology Laboratory.**
6. **If a specimen is to have a microbiology study done also, write "Microbiology Also" on the requisition. Do not place these specimens in formalin.**

F. *Specimens from Meriter Hospital:*

1. All specimens should be submitted to the Histopathology Laboratory via Surgical Pathology Laboratory, 4 Tower or Specimen Processing at ML.
2. All patient data requested on the "Histopathology Requisition" should be filled in, including working diagnosis and the requested physician.
3. Bottles with fixative and other multi-purpose specimen containers, including cytogenetic tissue media, are available from ML Histopathology and 4 Tower Pathology Laboratory.
4. All containers must be properly labeled with the patient's identification label. The label must be affixed to the face of the specimen container. The container is to be put in a plastic Ziploc pouch bag. The requisition is to be put in the pouch (not with the specimen). Do not write on the container lids or wrap the requisition form around the specimen. A label must be affixed to the container to ensure proper identification.
5. All specimens from isolation patients should be labeled, put in a fluid-tight container and then into the plastic biohazard Ziploc bag. (Biohazard plastic Ziploc pouch bags are not to be used as the primary specimen containers.)
6. IF the specimen is normally considered to be a "gross only" (per the Practice Committee), but a microscopic examination is requested by the physician, this should be noted "Microscopic Histologic Exam: on the requisition from.
7. Contact the Histopathology Laboratory at ext. 77817 for more information.

G. *Specimens from Clinics or Outside Hospitals:*

1. All specimens should be submitted to the Histopathology Laboratory.

2. All patient data requested on the Histopathology Requisition should be filled in, including working diagnosis and requesting physician.
3. Bottles with fixatives and other multi-purpose specimen containers are supplied by ML.
4. All containers must be properly labeled with the patient's identification label. The label must be affixed to the face of the specimen container. The container is to be put in a plastic Ziploc pouch bag. The requisition is to be put in the pouch. Do not write on the container lids or warp the requisition form around the specimen container.
5. All specimens from isolation patients should be labeled, put in a fluid-tight container, and then into the plastic biohazard Ziploc bag. (Biohazard plastic Ziploc pouch bags are not to be used as the primary specimen containers.)
6. If the specimen is normally considered to be a "gross only" (per the Practice Committee), but a microscopic examination is requested by the physician, this should be noted "Microscopic Histologic Exam" on the requisition form.
7. Contact the Histopathology Laboratory at ext. 77817 for more information.

Specimen Collection, Tissue

ML provides 120-mL, screw-capped, plastic-top containers with no preservative which may be used for histology specimens. ML also provides prefilled 20-mL, 40-mL, 60-mL and 120-mL bottles with formalin for histology specimens (formalin label attached).

Specimen Labeling

In order to maintain a high standard of clinical laboratory service and quality patient care, all specimens submitted to ML must be properly labeled and accompanied by a completed requisition or electronic order. Every specimen tube, slide, or container submitted to ML must be properly labeled with the **two patient specific identifiers** on the tube or container (not the lid).

Patient Specific Identifiers include but are not limited to:

- Patient full name (first and last)
- Date of Birth
- Requisition Number
- Medical Record Number

The date and time of collection and the origin (source) of the specimen, when applicable, must also be included. Please identify all tubes and containers using these labels. The patient's name as it appears on the specimen tube, slide, or container **must** be written exactly as it appears on the test requisition or within the electronic order.

Specimens drawn for compatibility testing or for blood products require a Meriter Hospital key number arm band or a Typenex (red band) key number arm band for outpatient/reference samples collected. The patient medical record number serves as the key number for Meriter inpatients. The key number arm band must be worn by the patient, and the key number must appear on all specimens drawn for compatibility testing. See Transfusion Service in General Information.

Common labeling errors that delay testing include:

- Labeling specimen with patient's last name only
- Name on tube, slide or container is not written exactly as it appears on the requisition
- Names of tests written on the specimen container or tube do not match the tests requested on the requisition
- No label

If the identifying information is in question, ML will contact the client and encourage redrawing the specimen before proceeding with testing. If redrawing is not possible due to unstable or impossible to duplicate specimens, such as timed specimens and tissues, testing will be performed and results held until verbal authorization has been received. The final report will include a comment indicating that the specimen identity needed verification after receipt in the laboratory.

Therapeutic Drug Monitoring

One of the most important considerations for meaningful therapeutic drug monitoring is the **timing of specimen collection**. In general, plasma drug concentrations should be determined after the drug in the patient has reached a steady-state. If a plasma determination is made prior to achieving the steady-state, the measured concentration will underestimate the steady-state concentration and could lead to inappropriate dosage adjustments.

Another important variable is whether a peak or trough measurement is to be done. During the drug dosing interval, the **peak** is the highest concentration obtained and may occur immediately after an intravenous dose or may require 1/2 hour to 2 hours or longer after oral dosage. The **trough** is the lowest concentration of drug observed during the dosing interval and is usually measured just before the next dose. For most therapeutic drug monitoring requests, a trough concentration is recommended.

Measurements of both peak and trough concentrations may be indicated for some drugs (e.g., gentamicin, tobramycin, vancomycin). To facilitate collection and interpretation, the recommended specimen times for monitoring a drug given intravenously are:

Peak: 1/2 hour after end of first dose
Trough: Up to 1/2 hour before next dose

For most drugs, once the steady-state has been achieved (at least 5 doses), peak and trough values are not critical. It is important to avoid the immediate post-ingestion period when the drug is redistributed from the gastrointestinal tract to its site of action via the blood stream. Falsely elevated blood levels can result.

As a guide in monitoring some commonly used orally ingested drugs after a steady-state has been achieved, and when peak and trough values are not critical, the following draw times are recommended after an oral dose:

Amitriptyline (Elavil)	8 to 24 hours
Carbamazepine (Tegretol)	4 to 8 hours
Desipramine (Norpramin)	8 to 24 hours
Digitoxin	8 to 24 hours
Digoxin (Lanoxin)	8 to 24 hours
Doxepin (Sinequan, Adapin)	8 to 24 hours
Lithium	8 to 12 hours
Phenytoin (Dilantin)	4 to 8 hours
Primidone (Mysoline)	4 to 8 hours
Procainamide (Pronestyl)	3 to 6 hours
Theophylline (Aminophylline, etc.), coated capsule	3 to 8 hours
Theophylline (Aminophylline, etc.), slow-release	8 to 24 hours

The following draw times are recommended when other methods of administering theophylline are used:

Theophylline (Aminophylline, etc.), intravenous	1/2 to 6 hours
Theophylline (Aminophylline, etc.), suppositories	3 to 8 hours

Indicate date and time of last dose on the ML client requisition.

Urine Collection

24-Hour Urine Collections: Proper collection and preservation of 24-hour urine specimens are essential for accurate test results. Patients should be carefully instructed on the correct collection procedure and handling precautions. Unless the physician indicates otherwise, instruct the patient to maintain the usual amount of liquid intake but not to consume alcoholic beverages. Other instructions specific to a test are listed in the Alphabetical Test Listing.

Use the following procedure for specimen collection and preparation.

- Have the patient empty his/her bladder, in the morning, into the toilet (not to be included in the 24-hour collection). Write the date and time of voiding on the container label.
- Collect the patient's next void and add it to a 24-hour urine container supplied by Meriter Laboratories (ML).
- Add all subsequent voiding to the container as in Step 2. The last specimen collected should be the first specimen voided the following morning at the same times as the previous morning's first void.
- Refrigerate urine during the collection process.
- Mix the contents of the container gently but thoroughly.
- Measure and note the total volume of the urine. Record the 24-hour urine volume on the ML requisition or within the electronic order.
- Record the following information on the screw-capped, plastic container:
 - Date and time of collection
 - 24-Hour urine volume.
 - Patient's name
 - Test name
- If required, refrigerate specimen until it can be forwarded to the laboratory.

If the patient is to collect the urine, give the patient the clean, labeled container supplied by ML. Instruct the patient not to remove any preservative (powder, liquid, or tablets) that may be in the container. **Alert the patient that preservatives are hazardous chemicals.**

Timed Collections:

Use the following procedure for specimen collection and preparation:

- Have the patient empty his/her bladder, in the morning, into the toilet (not to be included in the timed collection period). Write the date and time of voiding on the container label.
- Collect the patient's next void and add it to urine container supplied by ML.
- Add all subsequent voiding to the container as in Step 2.
- At the end of the collection period, the patient should void to empty the bladder and this last voided specimen should be added to the container.
- Refrigerate urine during the collection process.
- Mix the contents of the container gently but thoroughly.
- Measure and note the total volume of the urine. Record the total timed urine volume on the ML requisition or electronic order.
- Record the following information on the screw-capped, plastic container:
 - Date and time of collection
 - Urine volume
 - Patient's name
 - Test name
- If required, refrigerate specimen until it can be forwarded to the laboratory.

Random Collections:

Use the following procedures for specimen collection and preparation:

- Random urines for urinalysis or culture
 - Sterile, screw-capped, plastic container supplied by ML:

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- Specimens should be a freshly collected, midstream, clean-catch or catheterized collection.
 - Refrigerate specimen after collection.
 - The test should be completed within 24 hours of collection
 - Label the container with the following information:
 - Date and time of collection
 - Patient's name
 - Name of test requested
 - CAUTION: Do not use the test name UA culture.** Always write "urine culture". The term "UA" may be interpreted as the source or urinalysis.
 - Urine Specimen method of collection (voided, straight catheter, or indwelling catheter) is required.