

GENERAL SPECIMEN COLLECTION GUIDELINES



Instructions for specimen collection and preparation including specific specimen type and volume requirements for a particular test or tests can be found in the [Michigan Medicine Laboratories \(MLabs\) Test Catalog](#) or by calling the MLabs Client Services Center at 800.862.7284. The quality of your test results depends upon proper collection, preparation and transport of the specimen according to the published criteria. In the event a specimen does not meet standards for quality laboratory testing, MLabs may need to cancel the order and will notify you of such cancellation.

Please contact the MLabs Client Services Center for assistance in finding test information for procedures not listed in the Test Catalog.

For additional specimen collection guidelines see [MLabs Guidelines and Protocols](#) or [Clinical Microbiology and Virology Transport](#) documents.

Specimen Labeling

MLabs adheres to established guidelines for proper identification of patient specimens. Each specimen must be properly labeled with the same demographic information present on the accompanying requisition or other paperwork. The referring client will be notified when a name discrepancy is identified, and this may result in test cancellation.

The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) sets specific National Patient Safety Goals to which all JCAHO accredited healthcare organizations are required to conform. A JCAHO requirement states that all specimen labels must have both the patient's first and last name as well as a second identifier such as the patient's birth date or medical record number.

Unlabeled, mislabeled, and under-labeled (only 1-identifier) samples may be rejected. To ensure patient safety, use at least two patient identifiers on every specimen. In accordance with CAP and Joint Commission regulations, MLabs policy requires that ALL specimens, including slides, are labeled with both the patient's FIRST and LAST NAMES as well as a SECOND IDENTIFIER such as the patient's medical record number or date of birth. Acceptable second identifiers include, but are not limited to: date of birth, social security number, medical record number, accession number, requisition number, or specimen barcode label. Specimens without proper labeling including two person-specific identifiers will not be tested and MLabs will recommend that a new specimen be obtained if possible.

Specimen Container Information

Throughout the [MLabs Test Catalog](#), reference is made to various types of evacuated tubes or specimens. The information in these tables describes the tube types by color, additive (if any), the site or material, and the letter code used on the MLabs requisitions. Any deviation from these tubes or specimen types could result in rejection of a specimen for testing.

TUBE TYPE	CODE	ADDITIVE	USE
SST/Gold top (Corvac)	S	Clot activator/Gel	Serum determinations; Chemistry testing, Serology
Light Green top	-	Lithium heparin/Gel	Plasma determinations; Chemistry testing
Red top	R	No additive	Serum determinations; TDM
Green top	G	Sodium heparin or Lithium heparin	Plasma or whole blood determinations
Lavender top	L	EDTA	Plasma or whole blood determinations; Hematology testing
Pink top	P	EDTA	Whole blood determinations; Blood Typing
Blue top	B	Sodium citrate (3.2%)	Plasma or whole blood determinations; Coagulation testing

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TUBE TYPE	CODE	ADDITIVE	USE
Black top ESR-Vacuum tube	BK	Sodium citrate (3.2%)	Westergren sedimentation rate
Tan top	TN	EDTA	Lead
Royal blue top	N	No additive	Trace metal serum determinations; Aluminum, Chromium, Cobalt, Copper, Manganese, Nickel, Selenium, Titanium, Zinc
Royal blue top	N (EDTA)	EDTA	Trace metal plasma or whole blood determinations; Arsenic, Bismuth, Cadmium, Magnesium, Mercury, Thallium
Yellow top – Solution A	Y	Acid citrate dextrose (ACD) 22.0g/L trisodium citrate, 8.0g/L citric acid, 24.5g/L dextrose (blood to additive ratio is 1:67)	Whole blood determinations; Flow Cytometry testing, Tissue Typing
Yellow top – Solution B	Y	Acid citrate dextrose (ACD) 13.2g/L trisodium citrate, 4.8g/L citric acid, 14.7g/L dextrose (blood to additive ratio is 1:4)	Whole blood determinations; Flow Cytometry testing
Gray top	GRAY	Potassium oxalate/Sodium fluoride	Plasma or whole blood determinations; Lactic Acid
Light Yellow top UA Tube	-	No additive	Routine Urinalysis
Cherry Red/Yellow top UA Preservative Tube	-	Chlorhexidine/Ethyl Paraben/Sodium Propionate	Urine only; Routine Urinalysis
Gray top Urine C&S Transport Kit	-	Lyophilized Urine Maintenance Formula (boric acid, sodium formate, and sodium borate)	Urine only; Culture and Susceptibility
G.I. Preservative tube (Red top with preservative)	-	EDTA/ Trasylol	Somatostatin
Pyruvate tube	-	8% Perchloric Acid	Pyruvic Acid

When collecting multiple specimens, blood tubes should be drawn in the following order; mix all tubes by inversion 6 – 8 times. Please refer to the [Order of Draw for Multiple Tube Collections](#) document for detailed descriptions and photos of each of these container types:

1. Blood Culture bottles
2. Isolator tubes
3. Royal blue top (no additive)
4. Blue top (3.2% sodium citrate)

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5. Red top (no additive) and Gold top (SST)
6. Light Green and Green top (sodium heparin)
7. Lavender top (EDTA), Tan top (EDTA), Pink top (EDTA) and Black top ESR-Vacuum tube
8. Gray top (sodium fluoride)
9. Yellow top (ACD) Solution A
10. Yellow top (ACD) Solution B

Supplies

Supplies associated with the collection, transportation and result reporting for specimens assayed by MLabs are provided at no charge. A comprehensive supply order form is available for convenience. Supplies may be requested by faxing the order form directly to MLabs at 734.936.0755 or by calling the MLabs Client Services Center at 800.862.7284. MLabs reserves the right to monitor and adjust supply requests based upon a client's test ordering volume.

Specimen Transport

MLabs provides all necessary supplies to safely transport diagnostic and infectious specimens from the client's facility to MLabs via courier. A client sending a specimen to MLabs via another method (e.g., express courier, UPS, United States Postal Service) is responsible for shipping according to U.S. Department of Transportation (DOT) guidelines for ground transportation and International Air Transport Association (IATA) and International Civil Aviation Administration (ICAO) guidelines if shipped by air.

General Packaging Instructions

1. Place a leak proof primary receptacle such as a Vacutainer® tube, aliquot tube or screw top urine cup in a leak proof secondary transport bag with a biohazard sign and seal. Preprinted transport bags are provided by MLabs with "Room Temperature", "Refrigerated" and "Frozen" designations to inform the courier of specimen storage requirements.
2. Place a completed requisition (or manifest) indicating the tests ordered and the patient's name and demographics (including billing information if the patient or 3rd party is to be billed) in the separate unsealed pocket of the transport bag.
3. Clients sending large numbers of specimens may group their specimens according to temperature requirements.
4. If it is necessary to transport specimens at different temperatures, a copy of the requisition or manifest should accompany all temperatures.

Courier Service

MLabs has a courier delivery system in place for established clients within our geographic service area. Clients may call the MLabs Client Services to schedule a routine or STAT pick-up from their facility. Non-established clients should contact MLabs Client Services to make special courier or other specimen transportation arrangements.

Courier Transport Guidelines:

1. The MLabs courier will transport all specimens according to DOT regulations.
2. The MLabs courier will transport all specimens at the temperature in which the specimen was found when picking up specimens inside a facility.

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3. The MLabs courier will follow the transport bag temperature directions when picking up a specimen from a lock box.
4. Frozen specimens should not be left in a lockbox. If the facility has a frozen specimen and will be closed when the routine courier arrives, then a STAT courier should be called. Please call the MLabs Client Services at 800.862.7284 to request a STAT courier pick-up.
5. In extreme hot or cold temperatures, place specimens in the lockbox at the last possible moment to protect the specimens or call MLabs Client Services to request a pick up during your office hours.

Shipper's Responsibility

The Shipper is required to comply with the rules and guidelines as presented in the Federal Register Part III Department of Transportation (49CFR). By following the guidelines as described in the MLabs Collection, Preparation and Packaging section, the shipper will be in compliance with DOT regulations when transporting via the MLabs courier. The shipper should follow applicable state, federal, and other applicable laws and regulations when transporting via another method. Any personnel who are involved in preparing specimens for transport must receive training to enable them to properly handle and package laboratory specimens.

Specimen Handling Guidelines for Potassium and Glucose Testing

Blood specimens collected for potassium and/or glucose testing must be separated from the red cells within 4 hours of collection or inaccurate test results may occur (ref: NCCLS H18-A2).

Falsely elevated potassium levels or falsely decreased glucose levels may result when the specimen remains uncentrifuged for more than 4 hours after collection. Specimens sent for potassium and/or glucose testing collected at MLabs Blood Drawing Stations will be centrifuged prior to transport to MLabs.

MLabs requests that samples for potassium and/or glucose collected at the client site be centrifuged or delivered uncentrifuged within 3 hours of collection. For all specimens, the collection date and time must be noted on the requisition. When collecting specimens in SST tubes invert the tube gently several times to initiate the clot activator and let stand for at least 10 minutes before centrifuging for 10 to 15 minutes.

If unspun specimens sent for potassium or glucose testing are received without a collection date and time noted, MLabs will make every effort to obtain this information from the client. The specimen will not be rejected for being uncentrifuged; however, the following comment will be added to the report: "Specimen was received uncentrifuged more than four hours after draw. This may cause falsely elevated potassium level or falsely decreased glucose level. Please interpret results accordingly."

Specimens Requiring Protection from Light

Some specimens must be protected from light during storage and transport, since exposure to light can alter the results of several types of tests. Although specimens are protected from light when stored in a dark refrigerator or freezer, they are exposed when the door is opened and during handling and transport to the testing laboratory.

All urine specimens that require protection from light should be collected in a brown tinted container, placed in a brown paper bag, or wrapped in foil (preferred). All serum, plasma, or whole blood specimens that require protection from light should be placed in a brown paper bag or wrapped in foil (preferred).

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The following is a listing of tests that require that the specimen be protected from light:

- Bilirubin, Fractionated
- Bilirubin, Total
- Biotin
- Carotene
- Chlordiazepoxide, Serum
- Folic Acid, Erythrocytes
- Phenezine (Nardil)
- Porphobilinogen (PBG), Qualitative, Urine
- Porphobilinogen (PBG), Quantitative, Urine
- Porphyrins, Quantitative, Urine
- Porphyrins, Total, Plasma
- Pyridoxal 5-Phosphate, Plasma
- Trifluoperazine, Serum
- Vitamin B1, Plasma or Serum
- Vitamin B2
- Vitamin B3 (Niacin)
- Vitamin C, Plasma
- Vitamin K1

Urine Specimen Collection Guidelines

RANDOM URINE COLLECTION

A mid-stream or clean-catch urine specimen is preferred. The patient should urinate into the toilet for a few seconds to clear the urethra of any contaminants and then collect a sample of urine in a clean or sterile container, stop when the urine cup is approximately half full, and finish urinating into the toilet. See [Clean Catch Urine Specimen Collection Instructions](#) for patient instructions.

24 HOUR URINE COLLECTION

The patient should discard the first-morning specimen and record the time and date when this is done on the specimen container or requisition. This is the 'start' of the collection. The patient should then collect all voided urine for the remainder of the day and night. The next morning, at the same time as day 1, collect the first-morning urine and add this to the total, so that a full 24-hour urine has been collected. Store the urine at refrigerator temperature during and after the collection process.

Please note: Potentially hazardous preservatives may have been added to the urine container. Caution must be taken to avoid spilling or splashing the preservative on skin, eyes, or mucosal surfaces.

A variety of preservatives may be used:

No Preservative

Collect in a clean plastic container with nothing added. Refrigerate during and after collection unless otherwise specified.

Glacial Acetic Acid

Collect in clean plastic container to which 25 mL of 50% glacial acetic acid has been added prior to start of collection; use 15 mL of 50% acetic acid for pediatric patients. Protect specimen from light (use brown container) if indicated. Refrigerate during and after collection unless otherwise specified. Containers are available from the MLabs Client Services Center.

Hydrochloric Acid (HCl)

Collect in a clean plastic container to which 30 mL of 6 N HCl has been added prior to start of collection; use 10 mL of 6 N HCl for pediatric patients. Refrigerate during and after collection. Containers are available from the MLabs Client Services Center.

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Sodium Carbonate

Collect in clean plastic container to which 5 grams of Sodium Carbonate have been added prior to start of collection; use 1 gram of Sodium Carbonate for pediatric patients (do not use Sodium Bicarbonate). Protect specimen from light (use brown container) if indicated. Refrigerate during and after collection. Containers are available from the MLabs Client Services Center.

Below is a summary of preferred and acceptable 24 hour urine preservatives for testing performed by the MLabs Chemical Pathology Laboratory:

Test	Preferred Preservative	Urine Preservative Acceptability Quick Reference			
		Glacial Acetic	HCl	Boric Acid w/ Sodium Formate	Toluene
5-Hydroxyindoleacetic Acid (5HIAA)	Glacial Acetic	YES	YES	YES	NO
Amylase (AMYLU)	NONE	No Preservative			
Bence Jones Protein Screen (BJS)	NONE	No Preservative			
Bence Jones Protein, Quantitation (BJQ)	NONE	No Preservative			
Calcium (CALQ)	NONE	YES	YES	NO	NO
Chloride (CLQ)	NONE	No Preservative			
Citrate (UCITR)	Glacial Acetic	YES	YES	YES	NO
Copper (COPPU)	NONE	No Preservative			
Creatinine (CREAQ)	NONE	YES	YES	YES	YES
Cystine (CYST)	NONE	YES	YES	YES	YES
Glucose (GLUCQ)	NONE	YES	YES	YES	YES
Homovanillic Acid (HVA)	Glacial Acetic	YES	YES	YES	NO
Magnesium (MAGQ)	NONE	NO	NO	NO	NO
Metanephrines (METAN)	Glacial Acetic	YES	YES	YES	NO
Osmolality (OSMOU)	NONE	No Preservative			
Oxalate (OXALQ)	Glacial Acetic	YES	YES	YES	NO
Phosphorus (PHOSQ)	NONE	YES	YES	NO	NO
Potassium (POTQ)	NONE	YES	YES	NO	NO
Protein (PROTQ)	NONE	No Preservative			
Sodium (SODQ)	NONE	YES	YES	NO	NO
Catecholamines (UCAT)	Glacial Acetic	YES	YES	YES	NO

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Test	Preferred Preservative	Urine Preservative Acceptability Quick Reference			
		Glacial Acetic	HCl	Boric Acid w/ Sodium Formate	Toluene
Cortisol (UFC)	NONE	No Preservative			
Microalbumin (UMA)	NONE	No Preservative			
Protein Electrophoresis (UPE)	NONE	No Preservative			
Urea Nitrogen (UREAQ)	NONE	YES	YES	YES	NO
Uric Acid (URICQ)	NONE	YES	YES	NO	NO
Vanillylmandelic Acid (VMA)	Glacial Acetic	YES	YES	YES	NO

Questions

Call 800.862.7284 or mlabs.umich.edu