Obtaining Patient Specimens (Blood, Timed Urine Collections and others)

I. OBTAINING THE SPECIMEN

For specific information about individual tests refer to the **Alphabetical List of Tests** section of the manual. The following information is helpful for obtaining any specimen submitted to the clinical laboratory. For 24 hour urine collection guidelines, see section V, below. See also the Pediatric Blood Specimens section for specific information regarding obtaining blood specimens from pediatric patients and a list of minimum blood requirements.

Instructions for obtaining specimens for particular tests, tube type, and the amount of specimen required are included in the Alphabetical List of Tests section. The amount listed is the amount that is adequate for obtaining accurate test results. Every effort should be made to obtain the required amount of specimen.

II. CONTAINERS USED FOR LABORATORY SPECIMENS

The container to be used in collecting a specimen for individual tests is specified in the Alphabetical List of Tests section of this manual. Use only containers with "in-date" expiration dates. To ensure that the specimen is routed immediately to the appropriate laboratory area, use the correct container and provide the specified amount of specimen for each test.

III. TRANSPORTING LABORATORY SPECIMENS

All containers of patient specimens must be protected by plastic or similar bags during transportation to the laboratory. The requisition must be placed in the **outside** pocket of the bag. **Do not staple the requisition to the bag.**

IV. BLOOD SPECIMEN TUBES

Please use the correct tube type to ensure accurate results. Measuring potassium on a sample using potassium EDTA as the anticoagulant will be inaccurate, as will measuring calcium on a specimen containing EDTA, which chelates calcium. Oxalate inhibits several enzymes, including LD, and acid phosphatase. Do not mix the contents of different tubes to avoid cross- contamination with tube additives. Small volume pediatric tubes (1.8 mL light blue top) should be used for pediatric patients, and patients with difficult veins.

A. Order of Draw: The following order is recommended when drawing several tubes during a single venipuncture to avoid test result error due to cross-contamination from tube additives, according to the National Committee for Clinical Laboratory Standards (CLSI, document H3-A5):

1. Blood culture tube or blood culture bottles
2. Light blue top coagulation tube
3. Gold top serum tube with clot activator/serum separator
4. Plain red serum tube with clot activator
5. Royal blue top serum tube for trace metals
6. Light green with lithium heparin and gel separator; dark green lithium heparin, without gel; bright green sodium heparin, without gel separator
7. Pink top plasma tube for blood bank; white top (PPT) with separator; tan top for blood

lead; lavender top tubes – all containing EDTA preservative

8. Gray top plasma tube with glycolytic inhibitor

Order of Draw:	
1	Blood Cultures
2	Light Blue
3	Gold
4	Red
5	Royal Blue
6	Green
7	Lavender
8	White
9	Pink
10	Tan
11	Gray

Thoroughly mix all specimens by inversion 8-10 times.

B. A description of blood specimen tube types, including size of the tube, maximum volume of blood drawn, contents (preservatives, anticoagulants or clot activator, recommended times to invert tubes to facilitate mixing of the sample, and comments follows:

Light Blue Top Tube, 2.7 mL whole blood draw volume. Contains 0.3 mL of 3.2% (109 mM) buffered sodium citrate to chelate calcium, preventing coagulation. Invert gently 3 – 4 times to mix. **Tube must be filled completely for tests requiring plasma, mainly coagulation studies.**

Gold Top Gel (SST) Tube, 13 x 100 mm, 5 mL. Contains silica particles on tube walls that act as clot activator, and a gel separator. Invert 5 times to mix. Use for chemistry and serology determinations requiring serum.

Red Top (non gel) Tube, 13 x 100 mm, 6 mL. Does not contain preservative, gel separator, or anticoagulant. Silica particles on the tube wall act as clot activator. Invert 5 times to mix. Use for certain reference laboratory tests. Not acceptable for Transfusion Service (Blood Bank) specimens.

Royal Blue Top Tube – Trace Metals. 13 x 100 mm, 6 mL. Does not contain preservative, gel separator, or anticoagulant. Silica particles on the tube wall act as clot activator. Invert 5 times to mix. For trace element studies such as copper and zinc.

Light Green Gel (PST) Tube, 13 x 100 mm, 3.5 mL. Contains 59 USP units of lithium heparin and gel separator. Invert 5 times to mix. Used for STAT chemistry tests, troponin, liver and metabolic panels, ammonia.

Dark Green Top (non gel) Tube, 13 x 75 mm, 3 mL. Contains 51 USP units of lithium heparin. Invert 8 – 10 times to mix. Use for ionized calcium, methemoglobin when not ordered as part of arterial blood gas.

Bright Green Top (non gel) Tube, 13 x 100 mm, 6 mL. Contains 86 USP units sodium heparin. Invert 8 – 10 times mix. Use for Mycobacteriology (AFB) culture, and for bone

marrow bacterial, fungal and mycobacteriology cultures.

Pink Top Tube, 16 x 100 mm, 10 mL. Contains 18 mg of K_2EDTA (sprayed on) to chelate calcium, preventing coagulation. Invert 8 – 10 times to mix. Use only for the Transfusion Service (Blood Bank) testing. Requires a full tube of blood.
White Top EDTA (PPT) Tube, 13 x 100 mm, 5 mL. Contains 9 mg of dried K_2EDTA and gel separator. Invert 8 – 10 times to mix. This tube is used for HIV-1 and HCV viral quantitation.

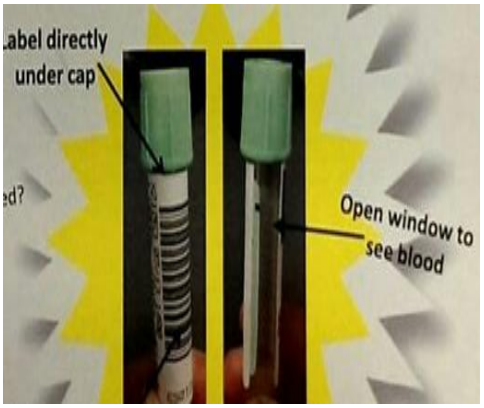
Tan Top Tube - 13 x 75mm, 3 mL. Contains 5.4 mg of powdered K_2EDTA for blood lead and heavy metal screen. Invert 8 – 10 times to mix. Requires a full tube of blood.
Lavender Top Tube, 13 x 75 mm, 4 mL. Contains 7.2 mg K_2EDTA to chelate calcium, preventing coagulation. Invert 8 – 10 times to mix. Minimum required volumes: CBC + PLT - 1 mL, ESR - 2 mL, hemoglobin electrophoresis, Hgb A_2, and F - 5 mL, G6PD, quantitative - 1 mL, and renin - 5 mL. Hgb H prep, Heinz bodies, fetal hemoglobin stain - 1 mL, CD4/CD8 - 1 mL.

Gray Top Tube, 13 x 75 mm, 4 mL. Contains 10 mg sodium fluoride to inhibit glucose metabolism; 8 mg potassium oxalate to chelate calcium and prevent coagulation. Invert 8 – 10 to mix. Minimum required volume: Glucose determination 2 mL. There is no preservative to inhibit glucose degradation in green or gold top tubes.

C. Capillary Blood Collection Tubes. Capillary Blood Collection Tubes have non-sterile interiors and contain the following:

Lavender Tube (250-500 mcL) - Contains EDTA Na_2 (Disodium EDTA) sufficient to anticoagulate 500 mcl of capillary blood. Mix by inverting 10 times. This tube is used for hematology tests and blood lead on pediatric and newborn patients.
Amber Tube (500 mcL) - This tube is used to collect and separate capillary blood samples for maximum usable serum yield. This system is composed of a plastic tube with inert barrier material and a yellow lid. Mix by inverting 10 times. This tube is used for bilirubin and drug levels on pediatric and newborn patients.
Green Tube (200-400 mcL) - Contains lithium heparin. Mix by inverting 10 times. This tube is used for most STAT chemistry tests.

D. Placement of label on the specimen tube: Place label directly under the specimen cap. Label must be straight and not crooked. Leave a window to see level of blood in the container.



E. Labeling a “bullet” or microtainer tube: Partially affix the label on the tube as shown in the picture to make barcode scanning easier.

Common blood tests and corresponding collection container

Tests	Tubes
Metabolic Panels (Basic and Comprehensive) Lipid Panel, Liver Panel (LFT), Renal Panel, Hepatitis Tests, Mg/PO4, CK, HIV 1 and 2, Vitamin D, Vitamin B12, RPR, Prenatal tests	SST/Gold Gel top tube 
CBC, Platelet, ESR, Manual Screen, HgbA1c or Glycohemoglobin, BNP, C3/C4, C4/C8	Lavender top 
PT/PTT, Thrombin, Fibrinogen	Blue top 
Troponin, Rapid Creatinine	Green Top- Gel 
Ammonia	Green Top on ice 
HIV and Hepatitis Viral Load, BNP	PPT 
Lactic Acid	Gray on ice 
Blood Bank (Type and Rh, Antibody Screen, etc.)	Pink 

V. URINE:

Special Instructions For Collection of Urine Specimens; timed collection, preservatives

The Clinical Laboratory furnishes containers for timed (ex.: 5, 12, 24 hr) urine specimen collection, with preservative as necessary, upon request. Call Laboratory Support Services (Mon. - Fri.) 415-206-8199 to request a container. Containers may be stocked in the Main Lab as well; call 415-206-8590 for availability.

Directions for 24 Hour Urine Collection

Refrigeration is the most important aspect of specimen preservation. All timed urine collections must be refrigerated during and after collection. Each container will be labeled with the preservative used, and instructions for collection of the urine specimen will accompany the container. Lab Support Services will supply properly cleansed and prepared bottles for other 24- hr urine tests or special tests not listed below. Call Specimen Collection and Management division at 415-206-8590 for further information.

URINE COLLECTION LIST (Special tests that are not included in the Alphabetical List of Tests. When prompted, click on link for more information regarding patient preparation and specimen collecion. Please contact the Inquiry Desk, Specimen Collection and Management, at 415-206-8590 for further assistance.)	
**** All urines are to be refrigerated during collection. ****	
Aldosterone	24 hr collection, no preservative
Amino Acid Screen	random, no preservative; first morning urine preferred
Aminolevulinic Acid (ALA)	24 hr or random collection
Catecholamines	24 hr collection; random acceptable
Citrate	24 hr or random collection, no preservative preferred. Boric acid acceptable.
Copper	24 hr or random collection, no preservative, use plastic container
Cortisol (Free)	24 hr or random collection, no preservative
Creatinine	24 hr collection, no preservative
Cystine	24 hr or other timed collection, no preservative
Epinephrine	see Catecholamines
Heavy Metal Screen (Arsenic, Lead, Mercury)	24 hr or random collection , use plastic container, no preservative
Homovanillic Acid	24 hr or random collection, no preservative

URINE COLLECTION LIST (Special tests that are not included in the Alphabetical List of Tests. When prompted, click on link for more information regarding patient preparation and specimen collecion. Please contact the Inquiry Desk, Specimen Collection and Management, at 415-206-8590 for further assistance.)	
**** All urines are to be refrigerated during collection. ****	
17-Hydroxycorticosteroids	24 hr collection; 10 gm boric acid at start of collection, or no preservative OK. Random, no preservative OK if frozen within 15 mins of collection.
5-HIAA	24 hr collection or random; no preservative
Inborn Errors of Metabolism (Metabolic error screen)	10 mL (3 mL minimum), no preservative
17-Ketosteroids	24 hr collection, no preservative
Lead	See Heavy Metal Screen
Magnesium	24 hr collection, 10 mL 6N HCl at start of collection
Metanephrines	24 hr collection, no preservative. Random acceptable.
Norepinephrine	see Catecholamines
Organic Acids Screen	random collection only, **freeze immediately** 9 mL (3 mL minimum), no preservatives
Oxalate	24 hr collection, no preservative
Porphobilinogen	24 hr collection in dark bottle, **protect from light, refrigerate.** Random acceptable.
Porphyrin	24 hr collection in dark bottle, **protect from light, refrigerate.** Random acceptable.
Porter Silber	see 17-Hydroxycorticosteroids
Supersaturation Profile	24 hr collection only, no preservative.
Vanillylmandelic Acid (VMA)	24 hr collection, no preservative. Random acceptable.

Containers for blood culture and other non blood specimens

BACTERIOLOGY

Urine Culture

Refrigerate if unable to deliver to lab immediately. Stability: 24 hours refrigerated

Blood Culture

ANAEROBIC
AEROBIC

- 10 mL optimal per bottle
- Deliver to Lab ASAP
- If short draw, or after ABX, collect in Aerobic (**Blue top**), not for AFB or Fungus

Routine Bacterial Culture

Includes Misc, EENT, GBS Screen, GC, MRSA

- Provide the source
- Not for tissues, body fluids, cath tip, Viral cultures, or Bordetella PCR

Anaerobic Culture

- For fluids or abscesses only

GC & Chlamydia Screen

A. Swab
- For cervix, urethra, throat & rectal only, no vaginal
- Clean with white swab & discard
- Collect & Transport with **BLUE SWAB** only

B. Urine
- Collect 20-30 mL urine **AND**
- Transfer to transport tube within 24 hrs of collection (fill between the 2 arrows)

C. Multi-test swab
- vaginal only (PINK SWAB)

Rapid Group A Strep

- For Throat only
- Use both swabs. Lab will reflex to culture if rapid test is negative.
- Stability: 24 hours

Enteric Stool Culture

- Preserves stool specimen for 72 hours.
- Unpreserved stool specimen (collected in plain container) is stable for only 2 hours.
- Not acceptable for C. difficile or parasites

Bordetella pertussis Culture/PCR

- Kit provided by Lab Support Services (x68199). Follow kit instructions.

Sterile Container for Specimen Collection and C. difficile

- Provide the source
- Add 0.5 mL saline to biopsy & tissue specimens
- Acceptable for body fluids, sputum or urine specimens, AFB & Mycology cultures
- C. difficile stability: 24 hours

Additional containers for non blood specimens

AFB & MYCOLOGY

AFB & Mycology Cultures

- Specimens for Dermatophytes – Do not refrigerate
- Collect in plain sterile container
- For Urine, collect entire morning specimen in brown plastic bottle, sterile, no preservative

Blood/Bone Marrow Specimens for AFB/Fungal Culture

- SPS – Glass tube – Do not send via pneumatic tube
- Minimum 5 mL
- Collect blood using aseptic technique

Cryptococcal Antigen Testing

A. CSF

B. serum

- No Body Fluids

VIROLOGY

Universal Viral Transport

- Use appropriate swab for site
- For all Viral/HSV/Chlamydia culture
- For all Respiratory Viral Testing by PCR
  - Influenza A/B/RSV by PCR
  - Respiratory Pathogen Panel

PARASITOLOGY

Giardia, Intestinal parasites

- Preserves stool specimen for 7 days.
- Use for O & P, Giardia Antigen, Microsporidia
- Unpreserved stool specimen (collected in plain container) is stable for only 2 hours

Malaria Screen

- Submit specimen within 1 hour of collection

PARASITOLOGY

Pinworm Prep

- Source: Perianal
- Follow kit instructions

Trichomonas/Vaginal Wet Prep

- Do not refrigerate specimen
- Stable for 24 hours