Penn Medicine
Lancaster General Health

Blood Specimen Preparation and Handling

Laboratory test results are critical for making informed decisions about patient care. The accuracy of these results directly depends on the integrity of the specimens collected. Accurate diagnosis and effective treatment depend on the reliability of laboratory data, and that reliability begins with the integrity of the specimen.

Maintaining specimen integrity requires close attention to several critical steps:

- Proper patient preparation
- Correct specimen collection
- Accurate labeling and documentation
- Appropriate handling and storage
- Timely and secure transport

At Penn Medicine Lancaster General Laboratory recognizes that specimen quality is essential for accurate results.

Client Responsibility: It is the client's responsibility to follow all proper guidelines for specimen collection, handling, and storage until the courier picks up the specimen.

Specimen Preparation

Before collecting any specimen:

- Review Test Requirements
  Refer to the LGH Laboratory Test Directory to confirm each test.
  - Correct specimen type
  - Minimum specimen volume
  - Appropriate collection procedure and materials
  - Required handling and storage conditions

The likelihood of critical errors occurs more frequently during these preparatory steps than during the actual testing or examination of the specimen. Improper handling and storage can compromise specimen integrity, ultimately impacting the accuracy of test results.

Clinical Laboratory Requisition

The Clinical Laboratory Requisition must be used when ordering any laboratory tests for patients, whether the specimen is collected in-office or at an LGH facility, and when the order is not entered into Epic. A copy of the requisition or order must accompany the specimen to the laboratory.

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Laboratory Requisition Requirements:

Complete the form fully and legibly, including:

- Patient Information:
  - Patient Full name (first and last)
  - Date of birth
  - Last four digits of Social Security number
  - Address
- Insurance / Guarantor Information
- ICD-10 Diagnosis Codes
- Ordering Provider Information
- Requested Tests or Panels

Do not use physician prescription pads or preprinted forms for laboratory orders.

SOFT Collection Containers Key

24UCC = 24 Hour Collection Container
CC = Clean Container
CSFT = CSF, clear numbered tubes
CULT = Culturette or Swab
SC = Sterile Container – blue screw-capped container
UT = Urinalysis Transport Tube (Conical tube)
UT/TT = Urinalysis and Culture Transport Tubes
ES1 = ESwab Regular Collection Kit (White Cap)
ES2 = ESwab Mini Tip Collection Kit (Blue Cap)

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Soft Tube Designation Key in Order of Draw

	Blood Culture Blue 	Enriched soybean-casein digest broth medium	Aerobic Blood Culture
	Blood Culture Purple 	Preproduced enriched Soybean-Casein Digest broth with CO2	Anaerobic Blood Culture
Y-SPS	SP Tubes Solution B 	Sodium Polyanethol Sulfonate	Reference Laboratory Testing
Yel AB	ACD Solution A 	Acid citrate Dextrose	Reference Laboratory Testing
Lt Blue	Light Blue 	Sodium Citrate	Coagulation Studies – PT/INR, aPTT, Fibrinogen, D-Dimer, Thromboelastography (TEG)
Red	Dark Blue (Red Label 	Metal Free, Clot Activator	Reference Laboratory Testing
PLDKBL	Red (Plastic or Glass Tube) 	Clot Activator	ABORH, Reference Laboratory Testing
SST	Gold 	Serum Separator Gel and Clot Activator	BMP, CMP, some Therapeutic Drugs, Thyroid Testing
	Orange 	Rapid Clot Activator Thrombin	BMP, CMP, Thyroid Testing
GRN LIT GrnNa	Green 	Sodium/Lithium Heparin (with or without Gel)	Ammonia, Methotrexate. Platelet Mapping
EDKBL	Dark Blue (Purple Label) 	Metal Free, EDTA	Reference Laboratory Testing
Pink LAV	Lavender/Pink 	EDTA	CBCD, H&H, Sed Rate, HBA1C
Grey	Grey 	Potassium Oxalate or Sodium Fluoride	Lactate, Glucose Tolerance

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Specimen Labeling Requirements

All patient specimens must be labeled at the collection site before excusing the patient or leaving their side. If the sample is dropped off, staff must confirm that the specimen is labeled with at least the patient's name, DOB, collection date, and time.

Never pre-label specimen containers.

Specimen Labeling Requirements

Each specimen container must include:

- Patient's full name (first and last)
- Date of Birth
- Date and Time of Collection
- Initials of the Collector

**Blood Bank specimen tubes must be labeled with a BBID # and a Red Band placed on the patient showing the patient's name exactly as it appears on the order requisition.

Required for tests such as:

- Hold BB
- Type & Crossmatch
- Type & Screen.

Specimen Collection Documentation

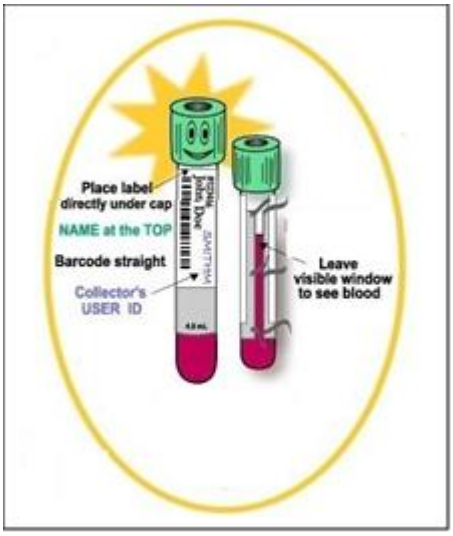
At the time of specimen collection:

- Record the date, time, and collector's initials in the collection section of the Laboratory Requisition.
- Note any pertinent collection details such as:
    - Fasting status
    - Time of last dose (for drug levels)
    - Any special circumstances (e.g., difficult draw, line collection)

When available, apply LIS barcoded labels to blood tubes as follows:

- Align the barcode straight under the cap, with the patient's name at the top.
- Leave a visible window to view the blood level.

- Avoid wrinkles or covering the stopper.



Minimum Tube Volume Requirements

- Full tubes are the standard and preferred specimen volume.
- The minimum volume represents the smallest acceptable amount for analysis but may be insufficient if:
    - The patient has a high hematocrit, or
    - Dilution or repeat testing are required.
    - Review the Lab Test Directory for Minimum required volumes.

Attempting to fill tubes every time is important to ensure accurate and complete testing

Specimen Processing and Storage Guidelines

Following specimen collection, it is crucial to process the specimen in a manner that ensures its identity and integrity are maintained. The specimen storage requirements listed in the Lab Test Directory for each test should be followed carefully. Specimen storage generally falls into three categories: Room temperature, Refrigeration, or Freezing. Blood specimens should handled according to the following guidelines:

- **Tube Closure** – After collection and labeling, tubes should remain stoppered. Removing the stopper too soon can cause inaccurate results and increase the risk of contamination and evaporation.
- **Tube Orientation** – Tubes should be stored vertically, stopper-up, rather than horizontally. This reduces specimen agitation and minimizes the risk of the stopper accidentally coming off.

- **Specimen Agitation** – Avoid vigorous handling to prevent hemolysis (the breakdown of red blood cells). Hemolyzed specimens are unsuitable for many tests, including CBC, Hemoglobin, Potassium (K+), and others.
- **Exposure to Light** – Some analytes, like bilirubin, break down when exposed to light. To prevent this, cover specimens with aluminum foil or use amber-colored containers or bags.
- **Temperature Guidelines:**
    - **Refrigerated:** Specimens should be stored at **2-8°C (35-45°F)** prior to and after centrifugation.
    - **Transport on Ice:** Place specimens in a biohazard bag, insert it into another biohazard bag filled with ice, seal, and include necessary paperwork in the outer pouch.
        - If using the PEVCO tube system, place the sample in the outer pouch of a biohazard bag filled with ice, then place this inside another bag for transport.
    - **Room Temperature:** Store specimens at **22-26°C (70-78°F)** after collection and until receipt in the lab.
    - **Frozen:** For serum specimens, allow specimens to clot for 30-60 minutes, centrifuge, separate the serum into freezer-safe containers, and freeze immediately at **<0°C**. Plasma specimens should be spun and processed immediately after the draw.

Client Responsibility: It is the client's responsibility to ensure specimens are stored at the correct temperature until they are picked up by the courier.

Special Handling

Some tests or panels require special handling or immediate processing to ensure accurate results. These may include using pre-chilled tubes, refrigerated centrifuges, or freezing at **-70°C**. These tests will be noted with the statement: "**Collect at LGH Labs**." Some tests have additional restrictions, such as no overnight holding.

Tests that require immediate transport or processing may be collected in-office, but the office must arrange immediate transport to the laboratory. These specimens must be accompanied by a completed Clinical Laboratory Requisition form when submitted to the third-floor Specimen Receiving Office.