

London Laboratory Blood Sample Guide

Preparing Samples for the Laboratory

- Centrifuge SST (Serum Separator Tube) samples after they have been sat for 30 minutes to allow coagulation. Coagulation is important as it prolongs the viability of the sample.
- Ensure samples are kept at 2-8 degrees centigrade during transit to the lab. This is important to prolong the viability of the sample.
- If sending samples with paperwork, please ensure all forms contain: Patients full name; Date of Birth, Home Address, Sex at birth.

Sample Storage and Packaging Prior to Collection

- Please place all vacutainers in the transport bag provided.
- Ensure the transport absorbent pad is included.
- Apply printed barcode and paperwork to the vacutainer.
- If sending samples with a physical sample request form, please ensure the patient name and dob are written on the vacutainer.
- Ensure the transport bag is sealed correctly.
- If possible please store samples at 2-8 degrees (refrigerated) and mark on the bag accordingly.

Additional Tests for Samples Already Received

- Additional tests can be carried out upon request, however for SST samples they can only be stored for 5 days whilst whole blood (EDTA-Ethylenediaminetetraacetic acid) can only be stored for 2 days for accurate results.
- London Lab will require all the patients' details and what test they require. This means an additional patient detail form will have to be completed and sent to the lab.

Specimen Collection and Labelling

- London Lab reserves the right to reject unlabelled samples
- London Lab reserves the right to reject samples that do not come with the mandatory unique identifiers in the paperwork as listed above. i.e. Patients full name; Date of Birth, Home Address, Sex at birth.

High Risk Specimens

Please ensure any high risk specimens are clearly labelled appropriately.

Patients with infectious diseases

- Patients with HIV (Human Immunodeficiency Virus) infection.
- Patients with Hepatitis B or Hepatitis C infection.
- Patients with Tuberculosis (TB).

Patients with drug dependence or substance abuse

- Patients who are dependent on drugs, such as opioids or other controlled substances.

Patients with suspected or known communicable diseases

- Patients suspected or known to have diseases of public health concern, such as viral hemorrhagic fevers (e.g., Ebola, Lassa fever) or other highly infectious diseases.

Patients with potential occupational exposure

- Healthcare workers or individuals who may have been exposed to bloodborne pathogens in their occupation, such as needlestick injuries or other incidents.

Sample rejection Criteria

- Clotted EDTA samples
- Grossly haemolysed samples
- Grossly icteric samples
- Grossly lipemic samples
- Incorrect label/ patient info
- Incorrect sample tubes
- Incorrect sample type
- Insufficient sample
- Expired samples - Samples greater than 48 hours from time of draw

Sample Collection Procedure

- It is crucial to invert the tubes immediately after collection. Inverting the tubes ensures proper mixing of the blood with any additives or anticoagulants present in the tube. This mixing action helps prevent clotting of the samples, as clotting can interfere with accurate laboratory testing. By gently and thoroughly inverting the tubes several times, the blood and additives are properly blended, maintaining the integrity of the sample and allowing for accurate analysis.
- Adhering to the correct order of draw is essential to prevent contamination during blood collection. The order of draw refers to the sequence in which different types of tubes are filled with blood during a venipuncture procedure. Following the recommended order of draw helps prevent cross-contamination between tubes, minimising the risk of introducing any unwanted substances or additives that may affect the accuracy of subsequent tests. (for info on order of draw please see **'Pre-Centrifugation Phase Criteria' section of this brochure**)

Factors Affecting Sample Results

- Hemolysis: Hemolysis refers to the rupture of blood cells, which can significantly impact the accuracy of test results. When hemolysis occurs, the released contents of the red blood cells can lead to falsely elevated electrolyte levels. Hemolyzed samples typically appear red or pink in colour. To ensure reliable results, it is crucial to avoid hemolysis during the blood collection process.
- Lipemic Samples: Lipemic samples contain a high concentration of triglycerides, which can interfere with accurate laboratory measurements. Elevated triglyceride levels can cause falsely elevated electrolyte levels and impact assays such as lactate dehydrogenase. Lipemic samples can be identified by their milky or turbid appearance. To obtain reliable results, it is important to minimise lipemia during blood collection.
- Icteric Samples: Icteric samples exhibit excessive levels of bilirubin in the bloodstream. The presence of elevated bilirubin can affect the analysis of certain analytes, including creatinine, total protein, and bilirubin itself. It is important to be aware of the impact of icterus on test results and consider appropriate measures for accurate interpretation.

- **Order of the Draw:** The order in which different tubes are filled during the blood collection process, known as the order of draw, is critical to prevent contamination and ensure accurate results. EDTA contamination can occur if the order of draw is not followed correctly, leading to abnormally high
- Electrolyte levels such as magnesium and potassium and a decrease in calcium. Following the recommended order of draw is essential to maintain sample integrity.
- **Storage of the Sample:** Proper storage of blood samples is crucial to maintain sample integrity and prevent degradation. Incorrect storage conditions, such as exposure to extreme temperatures or prolonged storage beyond recommended timeframes, can affect the stability of analytes and potentially compromise test results. Following appropriate storage guidelines is essential for reliable analysis.
- **Improper Handling:** Mishandling of blood samples, such as vigorous shaking, can cause hemolysis, leading to inaccurate test results. It is important to handle blood samples gently and follow proper handling techniques to maintain the integrity of the specimens. Haemolysis- A rupture of blood cells, can lead to falsely elevated electrolytes. (Appear red/pink)

Health and Safety Considerations












- **Personal Protective Equipment (PPE):** In accordance with UK regulatory bodies and best practices, it is essential to wear appropriate PPE when handling blood samples. PPE serves as a vital barrier, protecting individuals from direct contact with blood and other potentially infectious materials, reducing the risk of transmission of pathogens.
- **Handling and Transport:** Blood samples should be handled with utmost care to prevent spills or leakage during transportation. It is crucial to use leak-proof containers specifically designed for blood sample transport. This ensures that samples remain contained and do not pose a risk of exposure to healthcare professionals or the surrounding environment.
- **Disinfection and Decontamination:** To maintain a safe working environment and prevent the spread of infections, all equipment and surfaces that come into contact with blood samples must undergo proper disinfection and decontamination procedures. Following UK regulatory guidelines, appropriate disinfectants should be used, and thorough cleaning practices should be implemented to minimise the risk of cross-contamination.
- **Sharps Safety:** Emphasis on the proper handling and disposal of needles and other sharps used during blood collection procedures. Safe handling practices, including using puncture-resistant sharps containers and never recapping needles, should be strictly followed to prevent accidental needlestick injuries and exposure to bloodborne pathogens.
- **Training and Education:** Adequate training and education on the handling of blood samples and the potential hazards associated with bloodborne pathogens are essential for laboratory personnel. Regular training sessions and updates ensure that healthcare professionals are knowledgeable about best practices, safety protocols, and emergency response procedures. By being
- well-informed laboratory personnel can effectively mitigate risks and maintain a safe working environment.
- **Proper Labelling and Tracking:** Accurate labelling and tracking of blood samples are paramount to ensure their proper identification and prevent mix-ups or contamination. Each sample should be

appropriately labelled with patient information, collection date, and any necessary identifiers and helps maintain sample integrity and traceability throughout the testing process.

-
- Waste Disposal: Blood-contaminated waste must be disposed of in compliance with local regulations. Follow guidelines on the proper disposal of blood-contaminated materials, including sharps, biohazardous waste, and other related items. Adhering to these guidelines ensures safe and responsible disposal, reducing the risk of exposure to infectious agents.
- Emergency Response: Laboratory personnel should be well-trained in emergency response procedures to effectively handle spills or other exposure incidents involving blood samples. By having a clear and practised plan in place, prompt actions can be taken to contain and manage potential hazards, protecting both laboratory staff and the wider environment.

Pre-Centrifugation Phase Criteria

- All tubes containing additives, except sodium citrate, should be inverted gently at least 5-10 times to ensure the contents are fully mixed. Sodium citrate should be gently inverted 3-4 times to allow the contents to mix.
- In the case of multiple collections of blood specimens with varying tubes, the order of draw needs to be considered before taking blood to prevent contamination via additives present in specimen tubes. The order of draw that should be followed is demonstrated below:

Tube type by Order of draw		Additive (helps or prevent clotting)	Mixing – Inversion (I)  (Secures good mixing with additive)	Let Clot For (Clot traps away from serum or plasma)
Top	Top			
Blue		Citrate	4 times	N/A
Dark Blue		Clot activator	8 times	60 minutes
Red		Clot activator	8 times	60 minutes
Gold		Clot activator with gel	5 times	30 minutes
Green		Lithium (Li) Heparin with gel	8 times	N/A
		Sodium (Na) Heparin		
Lavender		K ₂ EDTA	8 times	N/A
Pink		K ₂ EDTA	8 times	N/A
Dark blue		K ₂ EDTA	8 times	N/A
White		EDTA with gel	8 times	N/A
Grey		Sodium Fluoride Potassium oxalate	8 times	N/A

Serum

Anticoagulation therapy (AT)

- Patients not on AT: The SST should sit undisturbed for around 30 mins at room temperature to allow proper clot formation
- Patients on oral anticoagulants such as warfarin, should sit undisturbed for 60 mins before centrifugation, this is because the clotting cascade will be affected by the anticoagulant and thus a longer time is needed to clot

- Patients on Heparin therapy: Although heparin is an anticoagulant, because it is injected the drug acts quicker than oral anticoagulants and also has a shorter duration of action as a result the sample should sit for 30 mins before centrifugation to allow the clot to form

Glucose

- To ensure accurate glucose measurements, it is recommended to stabilise the sample within specific time frames. At room temperature (20-25°C), the stabilised sample remains viable for 24 hours. When chilled (4-8°C), the sample can maintain stability for 48 hours. Adhering to these storage conditions helps preserve the integrity and reliability of glucose test result

Centrifugation Phase Criteria

- Whole blood (EDTA) analysis does not require centrifugation.
- Serum (SST) samples should be clotted before centrifugation and spun down at 2000g for 10 minutes.

Pre-analytical Considerations- Biochemistry

Subject Preparation	Specimen Collection	Specimen Handling
<ul style="list-style-type: none"> • Prior diet • Fasting vs nonfasting • Abstinence from pharmacologic agents • Drug regimen • Sampling time in relation to biological rhythms • Physical activity • Rest period before collection • Stress 	<ul style="list-style-type: none"> • Environmental conditions during collection • Time • Body posture • Specimen type • Collection site • Site preparation • Blood flow • Equipment • Technique • Tourniquet time 	<ul style="list-style-type: none"> • Transport • Clotting • Separation of serum/plasma • Storage • Preparation for analysis

Biochemistry - Considerations Elaborated

- Sample Collection Technique: Accurate sample collection techniques are vital to ensure reliable results. Using the correct collection tube, following the proper order of draw, and ensuring adequate mixing are essential. For instance, using an EDTA tube instead of a serum tube for
- Haematology tests can affect parameters such as complete blood count (CBC) and coagulation studies.
- Sample Quality: Maintaining sample integrity, stability, and avoiding contamination are crucial for accurate results. Factors like haemolysis (red blood cell breakdown), lipemia (excessive fat in the sample), and icterus (excessive bilirubin) can impact laboratory measurements. Proper collection, handling, and storage techniques must be followed to preserve sample quality.
- Patient Preparation: Certain tests require specific patient preparation instructions, such as fasting before lipid profile testing or avoiding certain medications or food items. Failure to comply with these instructions can lead to erroneous test outcomes.

- **Timing of Sample Collection:** The timing of sample collection is critical for some tests, including hormone assays and drug concentration monitoring. Factors like the specific time of day, fasting or postprandial status, or other time-dependent considerations may influence test results. Adhering to proper timing is crucial to obtain accurate and meaningful results.
- **Interfering Substances:** Substances present in the patient's body, such as drugs, medications, or endogenous substances, can interfere with laboratory assays. Certain drugs may cross-react with immunoassays or affect enzymatic reactions, leading to false-positive or false-negative results.
- **Transport and Storage Conditions:** Proper transport and storage conditions are essential to maintain sample stability and integrity. Temperature fluctuations, exposure to light, or delays in sample processing can compromise results by degrading analytes or promoting microbial growth.
- **Patient Identification and Labelling:** Accurate patient identification and proper sample labelling are crucial to ensure correct matching of samples and results. Errors in patient identification or mismatched labels can lead to misdiagnosis or incorrect treatment decisions.
- **Specimen Volume:** Adequate sample volume is necessary for accurate testing. Insufficient volumes may lead to inadequate testing or dilutional errors, while excessive volumes can affect reagent concentrations or cause sample carryover issues.
- **Pre-analytical Documentation:** Complete and accurate documentation of patient information, sample collection details, and relevant factors or medications is vital for correct result interpretation.
- **Sample Clotting:** Proper clotting or adequate anticoagulation of blood samples is necessary to prevent clot formation, which can interfere with testing and yield inaccurate results.
- **Patient Demographics:** Factors such as age, gender, ethnicity, and underlying health conditions can influence normal reference ranges or biomarker levels. They should be carefully considered during result analysis.
- **Medications and Supplements:** Some medications or dietary supplements can directly interfere with laboratory assays or affect the physiological processes being measured.
- **Time of Day:** Circadian rhythms and diurnal variations can affect analyte levels in the body. Therefore, the time of day at which samples are collected may be important for certain tests, such as cortisol or testosterone measurements.
- By adhering to these best practices and considering the specific requirements mentioned on this blood collection form, healthcare professionals can ensure accurate and reliable laboratory results for patient care and diagnosis.

Complaints

- For a comprehensive explanation of our complaints procedure, please refer to appendix 1 of our terms and conditions at <https://www.londonlab.health/terms-conditions/>

