



PRE-ANALYTICAL QUALITY HANDBOOK

**Practical Guide for Error-Free Sample
Collection & Handling**

By
AyusLab Team

Why

Pre-Analytical Quality Matters

60% - 70% laboratory errors occur in pre-analytical phase

Incorrect
Sample
Handling



Wrong
Results



Wrong
Treatment
Decisions

Recollection increases cost, delays care, damages lab reputation

Remember 

**A GOOD ANALYZER
CANNOT FIX
A BAD SAMPLE**



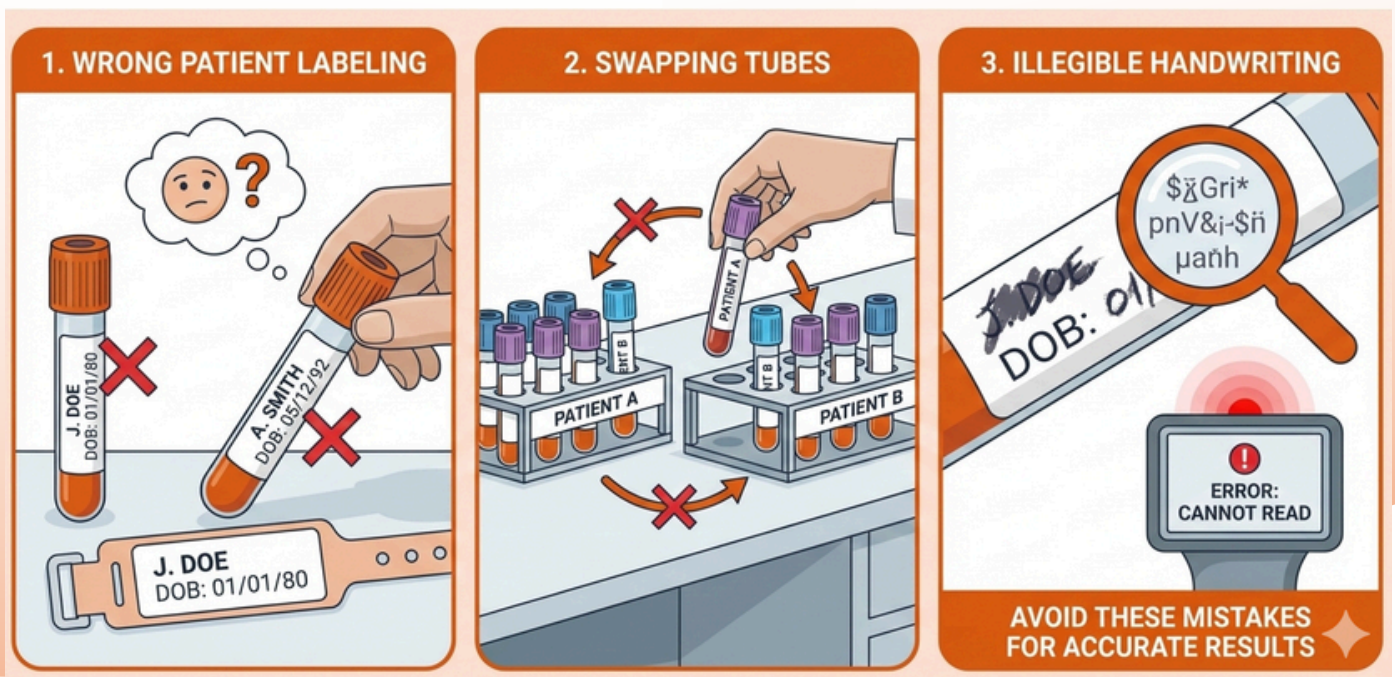
Patient Interaction

Make the patient feel comfortable when drawing sample.

Be gentle and polite - This is the direct interaction of the patient with the lab team.






Follow these best practices during sample collection :

- Greet the patient warmly
- Explain the procedure briefly
- Always confirm the patient's name before drawing sample
- Label the tube immediately using barcoded labels



Phlebotomist Checklist

Certain tests require specific preparation



Test Type	Requirement
 Fasting Glucose	8–12 hours fasting
 Lipid Profile	9–12 hours fasting
 Postprandial	Exactly 2 hours after meal
 Hormone Tests	Morning collection preferred
 Drug Monitoring	Collect at specified time

Always Ask

- ✓ Fasting status
- ✓ Current medications
- ✓ Recent illness
- ✓ Recent transfusion
- ✓ Pregnancy status (if relevant)

Tube Selection – Additive Matters

Using the wrong tube = wrong result

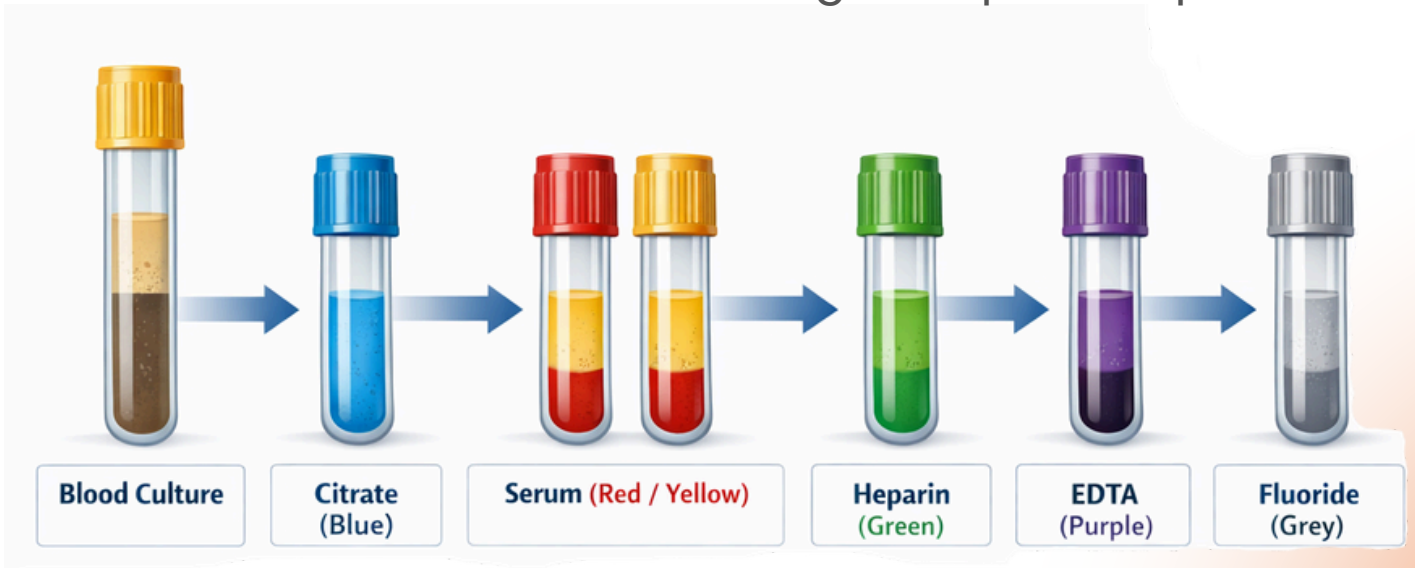
Tube Cap Color	Additive	Sample	Common Laboratory Tests
 Purple	K2/1K3 EDTA	Whole Blood	CBC, HbA1c, Blood Film
 Red	Clot Activator / None	Serum	Serology, Immunology, Blood Bank
 Yellow	Clot Activator / Gel	Serum	Biochemistry, Hormones, Drug Levels
 Blue	Sodium Citrate (9:1)	Plasma	PT, APTT, D-Dimer
 Grey	Sodium Fluoride / Oxalate Oxalate	Plasma	Glucose, Lactate
 Green	Heparin	Plasma	Electrolytes, ABG
 Black	Citrate	Whole Blood	ESR
 Pink	EDTA	Whole Blood	Blood Bank



Use correct tube for test
 Check expiry date
 Ensure Tube Integrity
 Ensure Vacuum strength

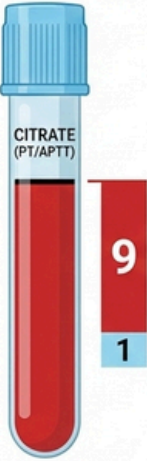
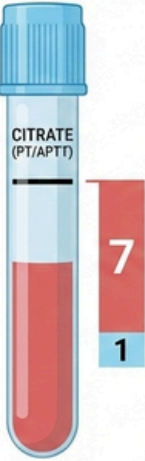

Order of Sample Draw

follow this order when collecting multiple samples



Remember  Incorrect order may cause additive contamination

Fill Volume Accuracy

CORRECT FILL: TO THE MARK	UNDERFILLED: COAGULATION ERROR	OVERFILLED: CLOTTING RISK
 <p>✓</p> <p>CITRATE (PT/APTT)</p> <p>9 1</p> <p>■ Blood ■ Anticoagulant</p> <p>9:1 RATIO ACHIEVED. Accurate Results.</p>	 <p>✗</p> <p>CITRATE (PT/APTT)</p> <p>7 1</p> <p>■ Blood ■ Anticoagulant</p> <p>EXCESS ANTICOAGULANT. Falsely Prolonged PT/APTT.</p>	 <p>✗</p> <p>CITRATE (PT/APTT)</p> <p>11 1</p> <p>■ Blood ■ Anticoagulant</p> <p>INSUFFICIENT ANTICOAGULANT. Microclots may form.</p>

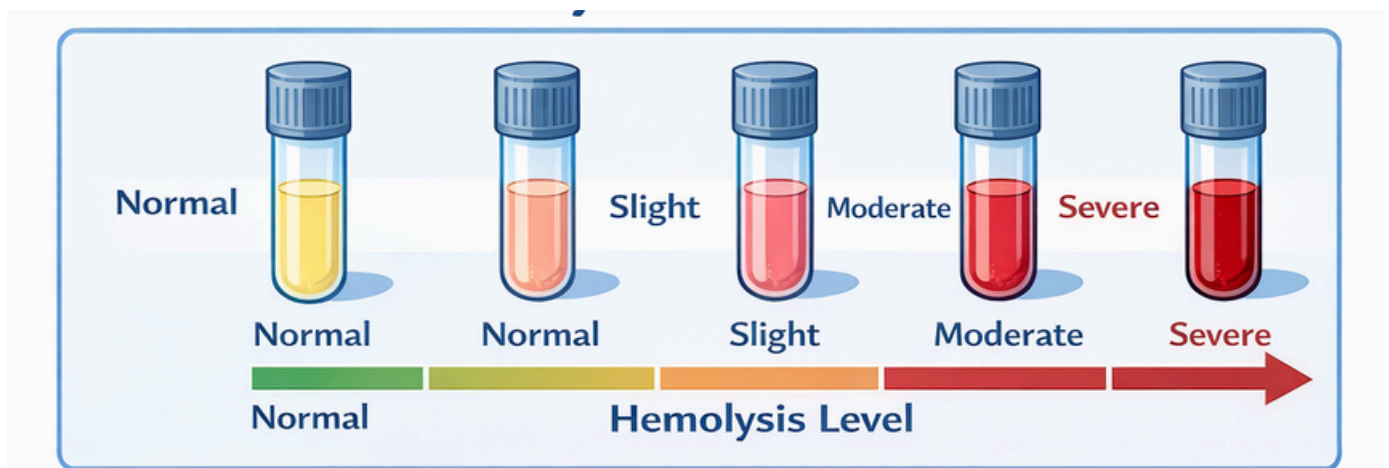
Mixing of Tubes



Hemolysis Prevention

Hemolysis alters:

Potassium | LDH | AST | Bilirubin



Hemolysis is caused by:

- Vigorous shaking
- Delayed separation
- Using small gauge needle
- Forcing blood into tube

Always:

- Always allow alcohol to dry before drawing sample
- Avoid drawing from IV line
- Avoid excessive tourniquet time

Tourniquet Time

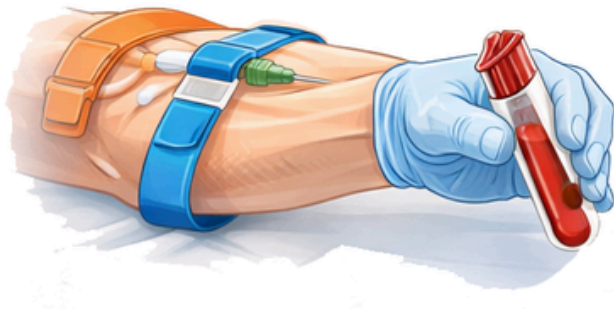


Do not exceed
1 minute



Release immediately
after blood flow starts

Prolonged tourniquet



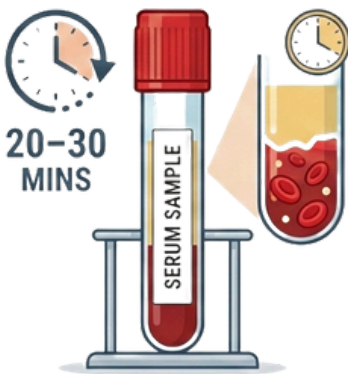
Alters potassium

Increases proteins

Changes hematocrit

Clotting Time for Serum Samples

1. Allow to Clot



Upright at
Room Temp. ✓

2. Do NOT Centrifuge Immediately



Wait for complete clotting.
Risk of hemolysis.

3. Do NOT Delay > 1 Hour



Affects analyte stability.
Process promptly.

**OPTIMAL CLOTTING TIME:
20-30 MINUTES BEFORE CENTRIFUGATION**

Centrifugation Parameters

- ✓ Balanced tubes
- ✓ Correct RPM and time
- ✓ No vibration

CONSEQUENCES OF IMPROPER CENTRIFUGATION

1. Incomplete Separation



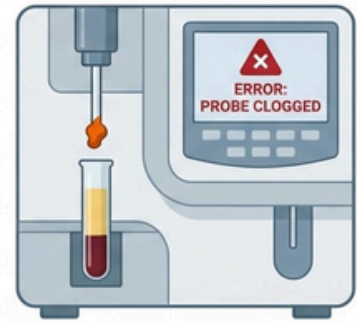
Poor interface. Cells remaining in serum/plasma.

2. Fibrin Strands



Micro-clots and artifacts form.

3. Analyzer Blockage



System error, downtime, and failed test.

PREVENT ERRORS:
Ensure Correct RPM & Time!

Sample Transport & Storage

Recommended Practice



Temperature

2 - 8 °C



Follow Test Requirements



Process Time



< 2 Hours



Deliver to Lab Promptly

Light Sensitive



Protect from Light
(e.g., Bilirubin).



Excessive Shaking **X**
Causes Hemolysis

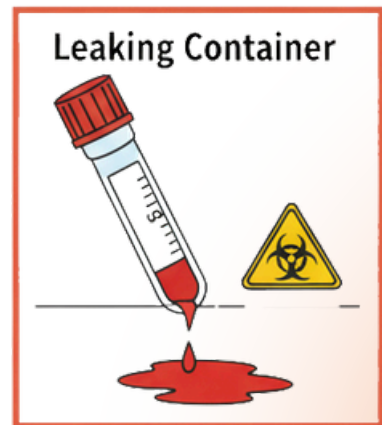
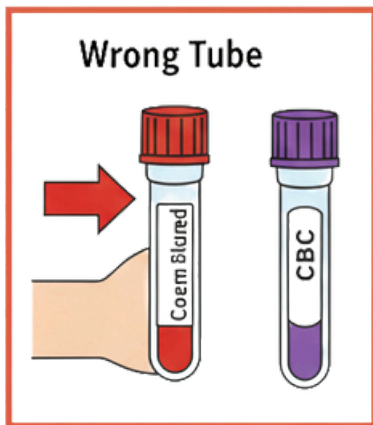
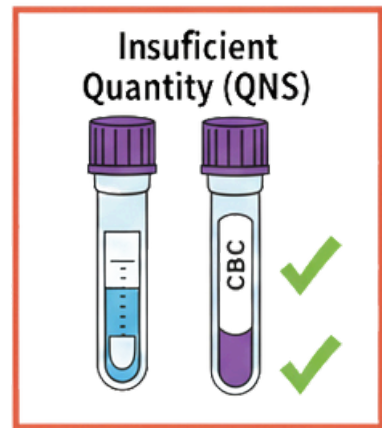
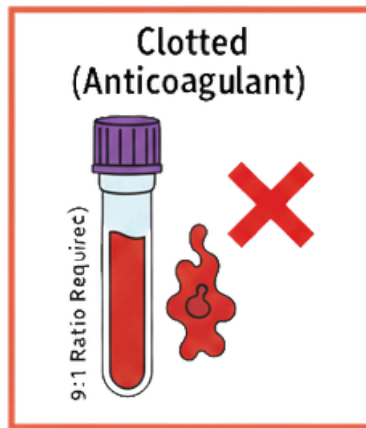
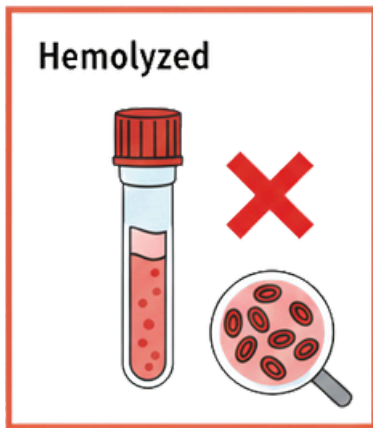


Heat Exposure **X**
Maintain Stable Temp.



Sunlight **X**
Degrades Analytes

Rejection Criteria



Documentation & Traceability



Traceability improves quality audits (NABL compliance)

Quality Indicators Lab Should Monitor



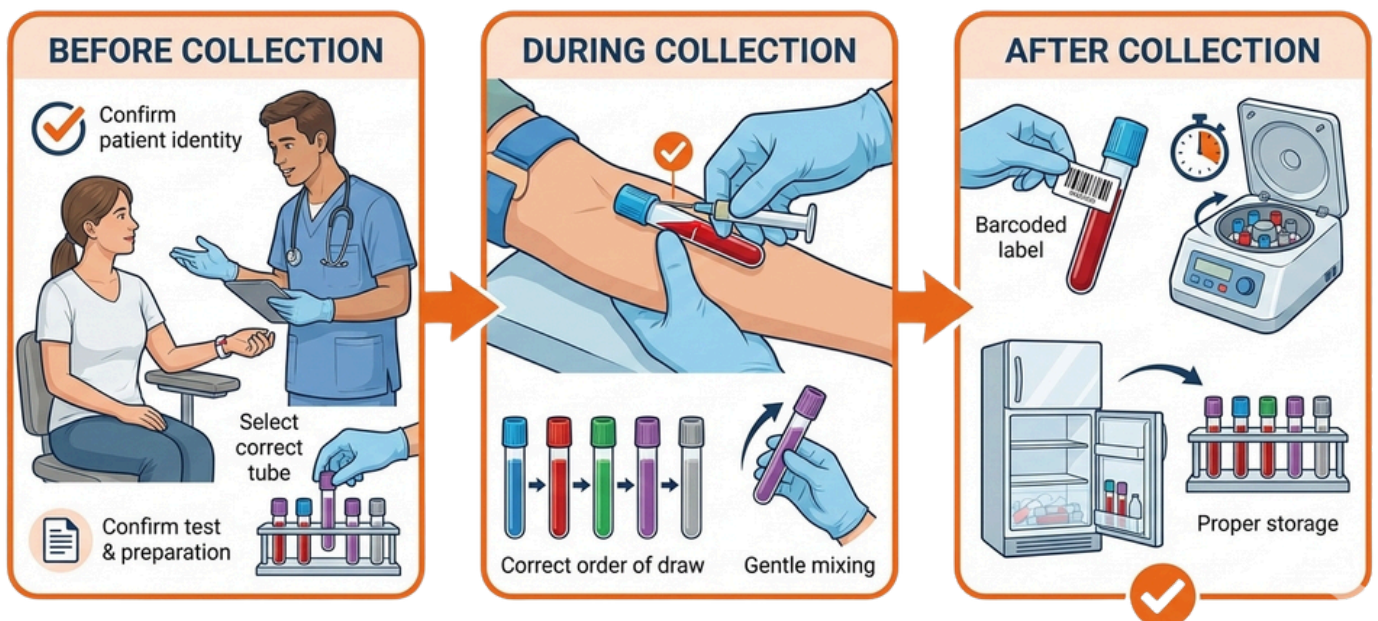
- Sample rejection rate (%)
- Hemolysis rate
- Clotted sample rate
- Recollection rate
- TAT delay due to pre-analytical error
- Tracking improves lab reputation

Infection Control & Safety

- Use gloves
- Dispose sharps in puncture-proof container
- No recapping needles
- Follow biomedical waste guidelines



Technician Quality Checklist





Pre-analytical excellence is the foundation of laboratory accuracy. Every accurate report begins at the collection chair.

QUALITY STARTS WITH YOU



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