greiner bio-one

PREANALYTIC PULSE

Sample Handling and Transportation

Many preanalytic factors contribute to the quality of a blood sample and subsequent test results generated from these samples. Though good phlebotomy technique and the actual collection process are of utmost importance, the handling of the sample following collection and the transport to the testing laboratory are equally important and must, therefore, adhere to a standardized protocol.

The table below contains some of the factors that should be considered following sample collection.

FACTOR	POTENTIAL IMPACT	CORRECT PROCEDURE
Sample Mixing	Incomplete clotting of serum tubes; fibrin formation or microclots in tubes with anticoagulants.	Thoroughly mix tubes according to manufacturer instructions with the correct number of gentle inversions immediately following collection.
Clot Formation	Incomplete clot formation can result in fibrin strands being trapped in the serum potentially impacting analysis.	Serum tubes should be allowed to sit in an upright position for 30 minutes to allow complete clot formation and retraction.
Tube Orientation	Clot or red cells adhering to the rubber stopper or cap.	Tubes should be kept in an upright position during transport and processing.
Pneumatic Tube Transport	Hemolysis of sample.	Verify that transport of tubes through the pneumatic system does not affect sample quality. This should be done during tube conversion and implementation and following service to the pneumatic tube system.
Courier Transport	Sample jarring during transport; potential for extended periods of excessive heat or cold depending on climate and season.	Tubes should ideally be transported upright in insulated containers appropriate for maintaining a constant temperature as required for testing.
Sample Shipment	Samples may be jarred during transport and subjected to extended periods of extreme temperature.	VACUETTE® Blood Collection Tubes are IATA certified for safe transport of infectious material. Samples should be packed according to DOT regulations for biohazardous material and in an insulated container, ideally in an upright position.
Temperature	Samples stored at an inappropriate temperature for the testing ordered can lead to inaccurate results and inappropriate patient diagnosis and/or treatment.	Samples should be kept at a temperature appropriate for the test(s) ordered during transport and processing. The laboratory must establish storage guidelines for testing offered by the facility.
Time	Cellular metabolism continues following specimen collection, which can affect specific analyte levels. Extended delays from collection to testing can have a significant impact on results.	Cells should be separated from serum or plasma within 2 hours of collection for most plasma/serum tests. If facilities have draw stations or outreach customers unable to transport specimens in this time period, samples should be centrifuged prior to transport to the testing laboratory. The effect of time delays on analysis is dependent on the test ordered and should be evaluated accordingly.
Centrifugation	Fibrin may form in serum samples not completely clotted prior to centrifugation. Analysis of plasma or serum components may be adversely affected if samples are not centrifuged appropriately and in a timely fashion.	Samples should be centrifuged within 2 hours following collection for plasma or serum assessments. Those samples requiring centrifugation for analysis should be spun according to manufacturer's recommendations unless other conditions are appropriately validated by the facility.
Sample Separation	Continued cellular metabolism can adversely impact analysis of serum or plasma analytes.	Tubes with an inert gel barrier, such as those offered by Greiner Bio-One, spun within 2 hours of collection will minimize the impact of cellular metabolism.
Recentrifugation	Recentrifugation will result in a sample that is a mixture of the original plasma/serum sample and the additional serum/plasma that has been sitting on the cells.	Plasma/serum tubes should never be recentrifuged as the resultant sample will not be representative of the original patient sample. If additional sample is required, a new specimen should be obtained.

Handling of the VACUETTE® Blood Collection Tubes: Gently invert tubes using the correct number of inversions immediately following blood collection to achieve a proper mixing of additives and blood. Turn the filled tube upside down and return it to the upright position. This is considered one complete inversion. Do not shake tubes. Vigorous mixing can cause frothing or hemolysis. Insufficient mixing or delayed mixing in serum tubes may result in delayed clotting. In tubes with anticoagulants, inadequate mixing may result in platelet clumping, clotting and incorrect test results.

Additive	Number of Inversions	Notes
Serum Clot Activator 	5-10	For complete clotting, allow tube to stand 30 minutes minimum clotting time Incomplete or delayed mixing may result in delayed clotting.
Serum Clot Activator w/Gel 	5-10	For complete clotting, allow tube to stand 30 minutes minimum clotting time Incomplete or delayed mixing may result in delayed clotting. VACUETTE® Serum Clot Activator Gel Tubes may be used for therapeutic drug monitoring (TDM) testing. Drugs may be stable in the primary tube up to 48 hours under the recommended storage conditions.
Lithium Heparin Sodium Heparin 	5-10	Inadequate or delayed mixing may result in incorrect test results. Do not use VACUETTE® Plasma Tubes with Lithium Heparin for Lithium determinations. Do not use VACUETTE® Plasma Tubes with Sodium Heparin for sodium determinations.
Lithium Heparin w/Gel 	5-10	Inadequate or delayed mixing may result in incorrect test results. Do not use VACUETTE® Plasma Tubes with Lithium Heparin or with Lithium Heparin and Gel for Lithium determinations.
K_2EDTA K_3EDTA 	8-10	Spray-dried K_3EDTA and K_2EDTA are substantially equivalent.
K_2EDTA w/Gel 	8-10	Centrifugation for VACUETTE® K_2EDTA Gel Tubes should be done within 6 hours after blood collection. For mid-term storage (2 weeks at –20°C) or long-term storage (greater than 2 weeks at -70°C), transfer plasma to a secondary container, i.e., aliquot tube and freeze.
Sodium Fluoride/ Potassium Oxalate 	5-10	Inadequate or delayed mixing may result in incorrect test results.
Important: Store tubes at 4-25°C (40°-77°F) prior to blood collection. Do not store tubes in direct sunlight. Preferably, transport tubes in an upright position.		

VACUETTE® one step ahead ▶