

PROCEDURE NO.: SC.003

SUBJECT: Order of Draw for Blood Specimen Tubes
(Evacuated Tube, Syringe, and Microtainer Collection Method)

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Annual Review: _____

Purpose:

Quality control and accurate test results begin with patient preparation and sample collection. Following the recommended order of draw for blood specimens is important for specimen integrity.

When collecting several tubes of blood, one must follow an “order of draw” to diminish the possibility of cross contamination between tubes due to the different additives present. Errors in the “order of draw” can affect chemistry and hematology results.

The National Committee of Clinical Laboratory Standards (NCCLS) has set guidelines concerning the correct procedures for collecting and handling blood specimens.

Procedure:

A. Evacuated Tube Method - When drawing multiple vacutainer tubes during a single venipuncture the following order of draw should be followed:

<u>Tube Type</u>	<u>Additive</u>
1. Blood Culture - Aerobic	Sterile Specimen
2. Blood Culture - Anaerobic	Sterile Specimen
3. Red	None
4. Light Blue*	Sodium Citrate
5. Serum Separator (SST)	Clot Activator
6. Green or Green/Gray	Heparin
7. Lavender	EDTA
8. Gray	Sodium Fluoride/Potassium Oxalate
9. Yellow	ACD

*If drawing a blue top tube for coagulation tests, (other than PT and PTT), a red tube (2-3 cc) must be drawn first to avoid contamination from tissue thromboplastin, which can yield false coagulation results. Blue tubes must also be completely filled to avoid erroneous test results.

Note: When using a winged blood collection set for venipuncture and a coagulation tube is the first tube to be drawn, a discard tube should be drawn first. The discard tube must be used to fill the blood collection tubing dead space and to assure maintenance of the proper anticoagulant/blood ratio and need not be completely filled. The discard tube should be a plain red (no additive) or coagulation tube.

B. Syringe Method

1. Blood Cultures
2. Other sterile tubes
3. Light blue
4. SST
5. Green
6. Lavender
7. Gray
8. Yellow
9. Red

C. Microtainer Collection Method

If multiple specimens are to be collected by skin puncture (heel or fingerstick), anticoagulant tubes must be collected first to avoid microclots from forming because of a prolonged collection.

1. Blood gases
2. Slides/smears
3. EDTA tubes
4. Other additive tubes
5. Serum tubes

D. Errors

1. Anticoagulant cross contamination
 - a. Citrate Tissue thromboplastin can yield false coagulation results if drawn first. (Except when drawing PT & PTT)
 - b. EDTA A calcium chelating agent; can yield false magnesium and calcium results if drawn before a red top tube. Can falsely elevate potassium results if drawn before a green top tube.

- c. Oxalate Interferes with cell membranes

 - d. Fluoride Alters cell morphology, if drawn before a lavender top tube.
2. Tube inversion
- a. Blood collected in tubes with anticoagulants must be thoroughly mixed with the anticoagulant to prevent clotting.

DO NOT SHAKE THE TUBE.

Mix by inverting the tube 5-10 times so the anticoagulant is thoroughly mixed with the blood. If mixing is not thorough, a partial clot may form and could render the specimen unacceptable for use.

- b. Serum Separator tubes should also be inverted. There is a clot activator present and inversion expedites the clotting process.

References:

1. NCCLS Guidelines, "Procedures for the Collection of Diagnostic Blood Specimens by Venipuncture"; Approved Standard-Fourth Edition. H3-A4, June 1998.
2. Kasper, M.E., The Jewish Hospital of Cincinnati, Inc. "Draw Order for Blood Specimen Tubes" procedure. 8/1/95
3. Beyersdoerfer, B., The Christ Hospital "Venipuncture Procedure" procedure. 11/6/95
4. "Procedures for the Collection of Diagnostic Blood Specimens by Venipuncture" Approved Standard-Fourth Edition. NCCLS H3-A4, Vol. 18 No. 7, p. 11. 6/98.
5. "Procedures for the Collection of Diagnostic Blood Specimens by Venipuncture" Approved Standard-Fifth Edition. NCCLS H3-A5, Vol. 23 No. 32, p. 17. 2003.