Collecting Blood Specimens

Laboratory Education

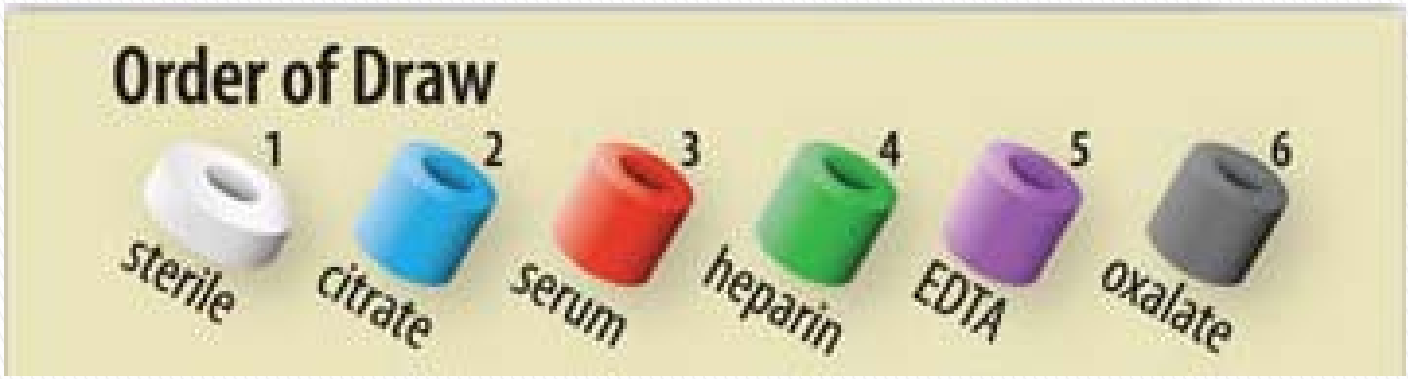
for

Physician Office Staff

April 2013

Correct Order of Draw

For accurate blood test results, the order of collection the phlebotomist uses is very important. This specific order is necessary to prevent additive carryover from altering test results.



Sterile – blood culture

Serum – both yellow and red

Adequate Amount of Serum

RULE OF THUMB:

At times, a test needs repeated if the result is abnormal. Adequate specimen is vital.

SST tubes contain 4 ml of blood – Serum is only half of blood volume

(4 ml of blood = only 2 ml of serum)

For MMC Panels: draw 1 panel / SST tube

Acute Hepatitis Panel = 2 SST tubes (These tubes are to be dedicated and NOT shared with any other test.

Draw 3-5 general chemistries /SST tube
(BUN, Creatinine, SGOT, SGPT)

List of Tests Collected by MMC Lab Only

Ammonia
Antiphospholipid Ab
Antithrombin III, Functional (Activity),
Chain of Custody Collection, DNA/Urine
Cortisol, Saliva
Cryoglobulin and Cryocrit
Glucose, Cola 1 Hour, Preg
Glucose Tolerance Tests
HIV1 RNA, QN, PCR
Homocysteine
Lactic Acid
Lupus Anticoagulant Evaluation
Platelet Aggregation Study (must be scheduled)
Protein C, Functional (Activity), Plasma

Protein C-Resistance, Activated
Protein S, Functional (Activity), Plasma
Semen Analysis, Fertility
TB Gold (Quantiferon)
Urovision (FISH)
Vitamin A
Vitamin B1
Vitamin B2
Vitamin B6
Vitamin C
Vitamin E (Tocopherol), Serum
Vitamin K1
Von Willebrand Factor Antigen, Plasma
Von Willebrand Panel

Due to time and temperature constraints, these tests these tests require special handling.

Sample Handling Pre-Testing Phase

Background

- The Laboratory provides a physician 70% of all objective information on the patient's health status
- Approx 75% of all lab diagnostic errors are associated with pre-testing specimen preparation
- 20% of errors occur in collection phase
- **TAKE CARE! Pre-testing is the most critical phase of the entire clinical testing work flow**

Minimize pre-testing errors for better patient diagnosis

Roche

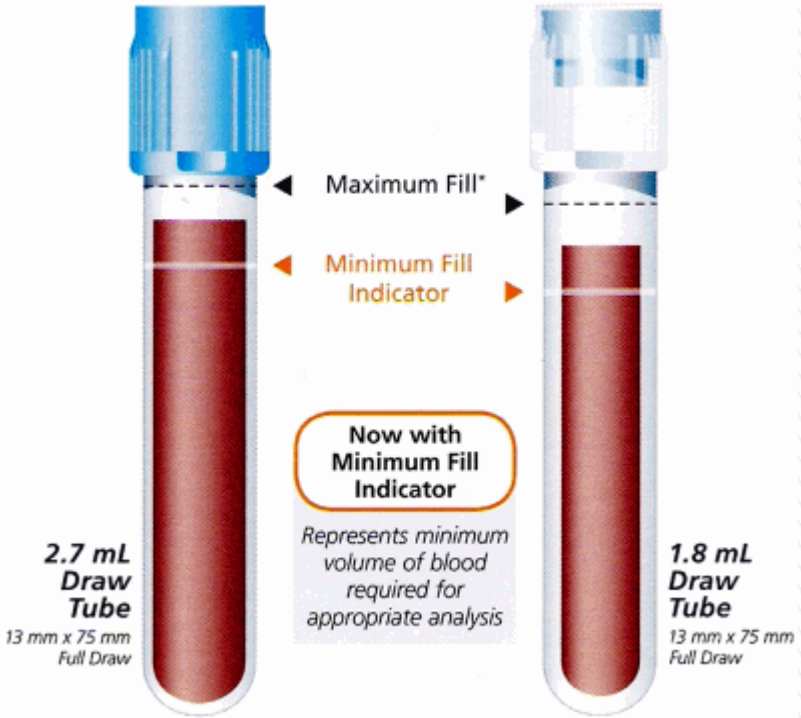
Anticoagulated Tubes

- Blue
- Gray
- Green
- Lavender

Blue-Top – It is important to completely fill the tube for correct blood to additive ratio (at least 90% of total fill volume).

If anticoagulant ratio is too high (not enough blood in the tube) – the tube will be rejected since the patient results would not be accurate.

Blue-Top



Butterfly collection:
To ensure the tube fills properly, draw ½ cc (½ ") of blood in another blue-top before attaching the patient's blue-top (The 1st blue-top may be discarded.)

Due to the high volume of citrate in the tube, it is critical that the blue-top be filled to or above the etched line.

The butterfly tubing must be completely full of blood before attaching the blue-top tube. This prevents a collection below the minimum fill line due to a decrease of vacuum.

Why is it Important to Centrifuge Blood?

Serum must be separated from the cells to become stable. This is accomplished in SST/yellow tubes by centrifugation. Red tubes must have the serum poured off after centrifugation.

Example of an unstable test: Glucose – Once blood is drawn, the cells begin to metabolize glucose, decreasing the glucose level 10% per hour.

Ref: www.aroconsulting.ca , January 2008

Glucose is a component in **BMP** and **CMP** panels

Situation:

Glucose collected at 4 pm and packaged unspun. The on-call courier picks up specimen and continues with his on-call route. Lab's 2nd shift techs are extremely busy due to a busy Emergency Department. By 8 pm the specimen is received and analyzed. At time of collection the glucose was 100 mg/dL, at time of analysis the result is 60 mg/dL.

Importance of Centrifuging

- **Potassium** – Cells contain 25% more potassium than serum. Due to this, cellular metabolism significantly increases false elevated levels of potassium.
  - Refrigerating an unspun blood specimen further elevates false potassium levels due to additional metabolic interactions.

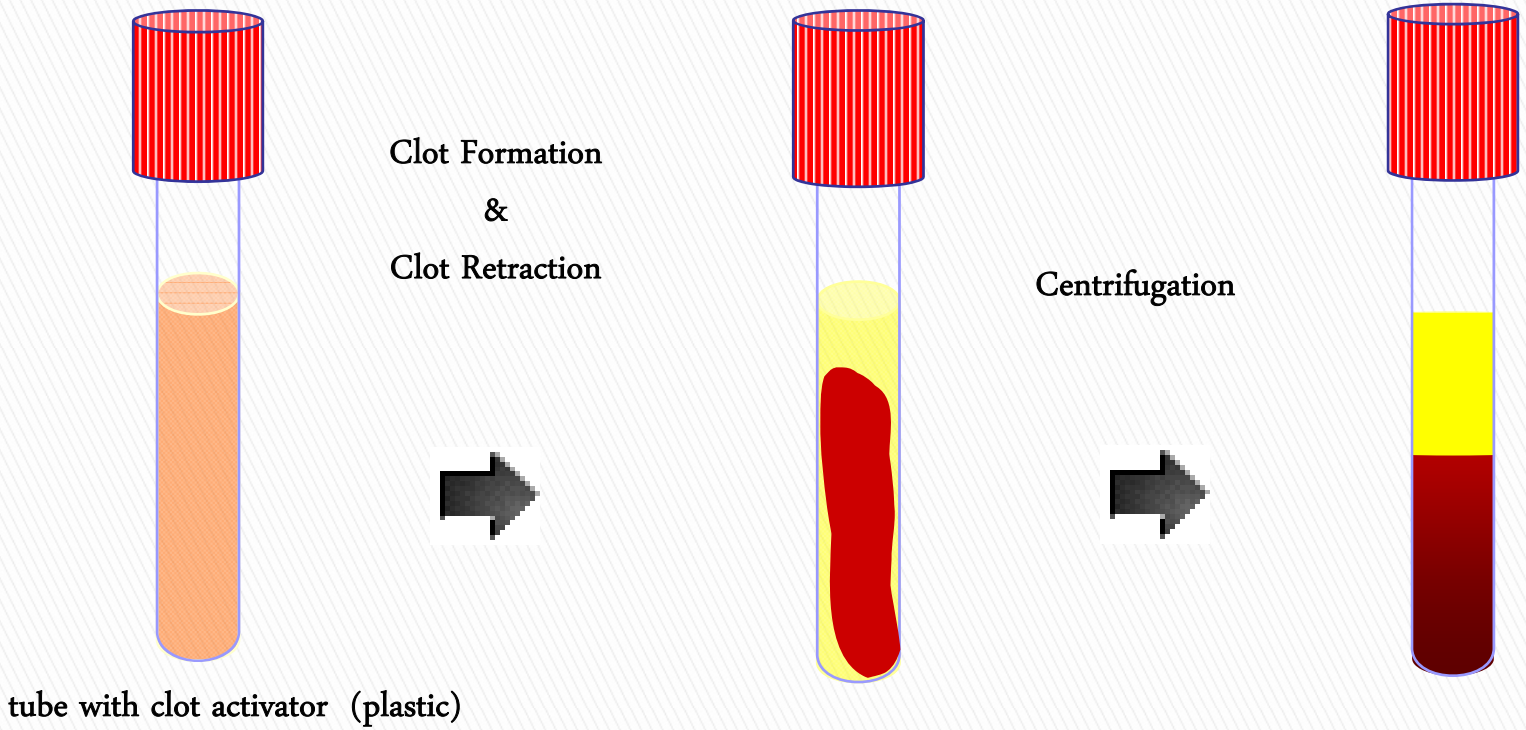
Potassium is a component of **Electrolytes, BMP, CMP, Renal Function** panels

- **Ionized Calcium** is also greatly affected.

Wait 30 minutes after collection to allow blood to completely clot before centrifuging specimens.

Ref: www.aroconsulting.ca , January 2008

Serum Tubes
(Red and SST/Yellow)



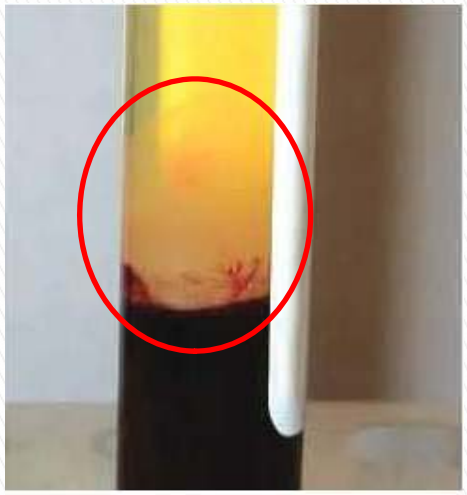
- Blood clots since no anticoagulant is present.
- Allow 30 minutes to clot before centrifuging.

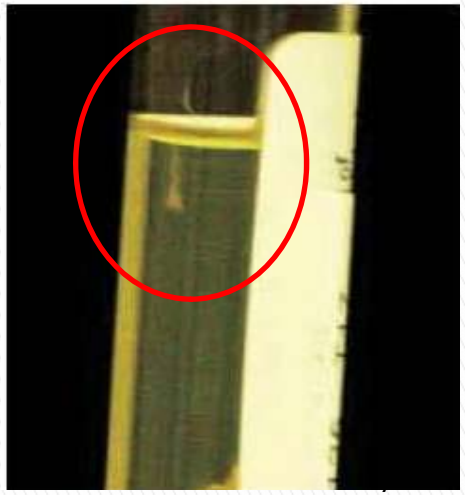
Fibrin

Fibrin: appears as a clot or strands (e.g., white "cloud") at the sample surface

Fibrin strands or mass:

- Can occur in any serum tube.
- Formation during or after centrifugation because:
  - Insufficient inverting of specimen *(clot activation)*
  - Insufficient clotting time **(at least 30 minutes)**
  - In patient specimens with coagulation abnormalities or on anti-coagulation therapy





Presence of fibrin can damage lab analyzer and lead to failure to provide test result or incorrect test result.

NOTE: If present, SEND TUBE and lab tech will attempt to remove the fibrin and preserve the specimen.

Hemolysis

Hemolysis is the breakage of the red blood cell's (RBC's) membrane, causing the release of the hemoglobin and other internal components into the surrounding fluid.

(http://www.bd.com/vacutainer/pdfs/techtalk/TechTalk_Jan2004_VS7167.pdf)

Possible causes:

- Traumatic venipuncture
- Too small needle

The tube on the <u>left</u> is NOT hemolyzed.

The others demonstrate levels of hemolysis. Hemolysis can <u>greatly</u> effect the test results of your patients.

Effect of Hemolysis on Some Biochemistry and Hematology Test Results

	Degree of change in **test**	Test result <u>increased</u> by hemolysis	Test result <u>decreased</u> by hemolysis	Test result <u>increased</u> or <u>decreased</u> by hemolysis
	Slight change	Phosphate, Total Protein, Albumin, Magnesium, Calcium, Alkaline Phosphatase (ALP)	Haptoglobin, Bilirubin	
	Noticeable change	ALT, CK, Iron, Coagulation tests	Thyroxine (T4)	
	Significant change	Potassium (K+), Lactate Dehydrogenase (LDH), AST	Troponin T	HGB, RBC, MCHC, Platelet Count

Note: If the specimen is grossly hemolyzed, a recollected specimen will be requested. If the recollected specimen is also grossly hemolyzed, it will be processed and a comment added.

http://www.calgarylabservices.com/lab-services-guide/specimen-collection/hemolysis.aspx

Call MMC Lab if You Have a Question

If you have a question regarding a difficult collection, please call 333-5514 for a technical consult. It may be possible to send in the tube and our technicians will make a judgment call regarding the viability of the specimen.

Much of the information has been provided in part from Roche Diagnostics.

Roche

Thank you for completing the

Collecting Blood Specimens

educational module.

Please press HERE to return to the main menu.