

## Laboratory safety

Laboratory safety is a collection of measures taken to protect oneself and fellow worker from any potential hazards that could be possible in a laboratory. The preventative measures associated with these hazards encompass laboratory safety. The collection of acknowledgements which is used either to prevent or reduce laboratory hazard is called safety manual.



## Samples collection and preservation

### Types of biological samples

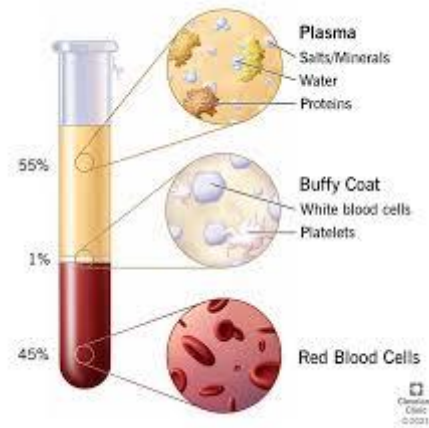
- ✓ Blood - Whole blood - Serum – Plasma
- ✓ Urine
- ✓ Feces
- ✓ Other body fluids: Saliva, Spinal fluid, Synovial fluid, Pleural.

**Blood:** is the red fluid in the body that delivers necessary substances such as nutrients and oxygen to the cells and transport metabolic waste products away from those cells. It consists of 55% fluid and 45% blood cells.

**Blood plasma:** is a light amber-colored liquid component of blood in which blood cells are absent, but which contains proteins and other constituents of whole blood in suspension. It makes up about 55% of the body's total blood volume.

**Serum:** is the fluid and solvent component of blood which does not play a role in clotting. Serum contains all proteins except clotting factors (involved in blood

clotting), including all electrolytes, antibodies, antigens, hormones; and any exogenous substances (e.g., drugs, microorganisms).



## Specimen Labeling

1. Patient's full name.
2. Date of birth.
3. Medical record number.
4. Sex.
5. Collection date and time.
6. Exact nature and source of the Specimen.
7. Expected diagnosis.

## Transportation of Specimens

1. Specimens should be collected into sterile, leak-proof containers.
2. The specimen should be sealed in a specimen bag and the attached request form completed with full patient information, clinical history and specimen details as appropriate.
3. The specimen should be transported to the laboratory as soon as possible after collection to allow the most accurate interpretation of results.

## Laboratory Specimen Storage Temperature Requirements

Storage Method	Centigrade (Celsius) Temperature Range
1. Refrigerated	2 - 8 ° C
2. Frozen less than or equal to	-20 ° C
3. Room/ Ambient	20 – 25 ° C
4. Deep- freeze less than	-70 ° C
5. Body Temperature	37 ° C

## Obtaining reliable and accurate laboratory test results

Physicians and others responsible for obtaining specimens and transporting them to the laboratory have a vital role in ensuring that laboratory test results are valid. The following are essential safeguards for your patients.

### 1. Avoid patient identification errors

### 2. Draw the tubes in the proper sequence

When multiple tubes are to be drawn from a single venipuncture using an evacuated tube system, there is a correct sequence for blood collection. This prevents cross-contamination of tube additives that could cause erroneous test results. The following should be used for both plastic and glass blood collection tubes.

### The order of draw:

1. Anti-Coagulation tube (blue top)
2. Serum tube with or without clot activator, with or without gel (red top)
3. Heparin tube with or without gel plasma separator (green top)
4. EDTA (purple top, pink top)
5. Oxalate and fluoride (gray top)
6. Other special tubes. ( figure.1)



**(figure.1)** Draw the tubes in the proper sequence.

- 3. Use proper containers for collection**
- 4. Mix all tubes ten times by gentle inversion immediately after collection**
- 5. Do not decant specimens from one type of container into another**
- 6. Deliver specimens to the laboratory promptly**
- 7. Avoid hemolysis**

## **Blood Smear Preparation**

Aim of blood smear:-

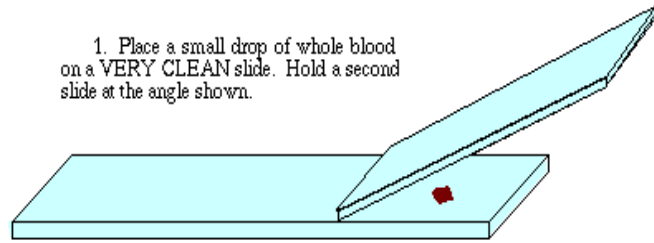
- Examination of thin blood films is important in the investigation and management of anemia, infections, and other conditions which produce changes in the appearance of blood cells and differential white cell count.
- A blood film report can provide rapidly and at low cost, useful information about a patient's condition.

Peripheral blood smear made from EDTA-anti coagulated blood. Smears should be made within 1 hour of blood collection from EDTA specimens stored at room temperature to avoid distortion of cell morphology. Blood smears can also be made from finger stick blood directly onto slide.

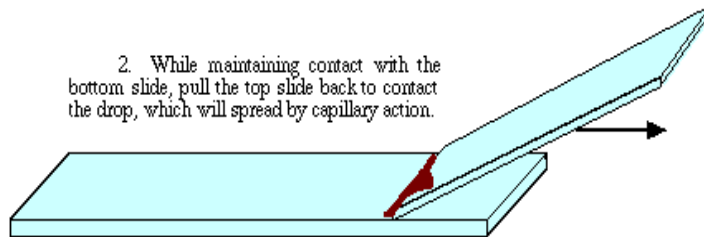
**Procedure:**

1. Fill a capillary tube three-quarter full with the anti-coagulated specimen.
2. Place a drop of blood, about 2 mm in diameter approximately an inch from the frosted area of the slide.
3. Place the slide on a flat surface, and hold the narrow side of the non-frosted edge between your left thumb and forefinger.
4. With your right hand, place the smooth clean edge of a second (spreader) slide on the specimen slide, just in front of the blood drop.
5. Allow the blood to spread almost to the edges of the slide.
6. Push the spread forward with one light, smooth, and fluid motion. A thin film of blood in the shape of a bullet with a feathered edge will remain on the slide.
7. Label the frosted edge with patient name, ID# and date.
8. Allow the blood film to air-dry completely before staining. (Do not blow to dry. The moisture from your breath will cause RBC artifact).
9. Hold the spreader slide at a 30° angle, and draw it back against the drop of blood.

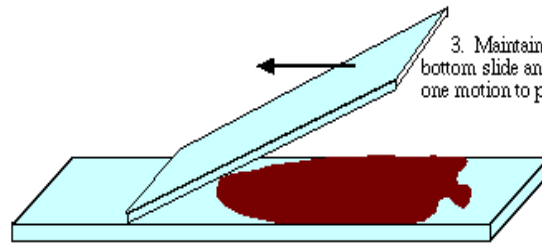
1. Place a small drop of whole blood on a VERY CLEAN slide. Hold a second slide at the angle shown.



2. While maintaining contact with the bottom slide, pull the top slide back to contact the drop, which will spread by capillary action.



3. Maintain firm contact with the bottom slide and push the top slide in one motion to produce the smear.



Platelet

