



**Department of Anesthesia Technique**

**Title of the lecture: -**



# **Estimation of Packed cell Volume ( PCV )**

**By**

**Msc. Amaal Sahib  
Msc. Faten Kareem  
Msc. Ola Abdulla**

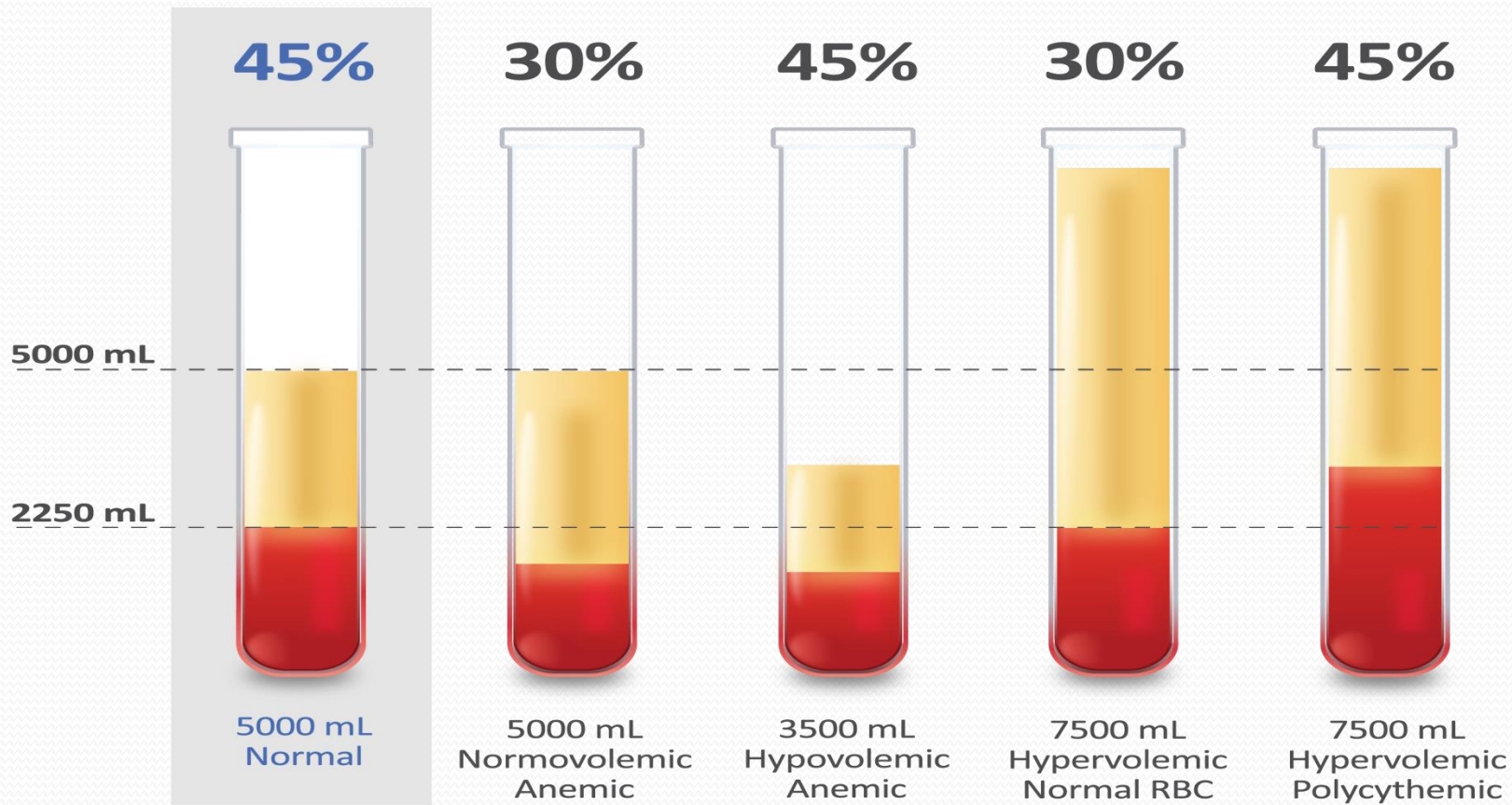
**Dr. Zahraa Tariq  
Dr. Duaa Hamza**

## **Hematocrit (Ht or HCT) or Packed cell Volume (PCV)**

- packed cell volume (PCV) is the proportion of blood volume that is occupied by red blood cells.

Or The PCV is the measurement of relative mass of red cells present in sample of whole blood

- The increase in PCV value means increase the number of red blood cells per unit volume of the suspension



Hematocrit: % of RBC to TBV

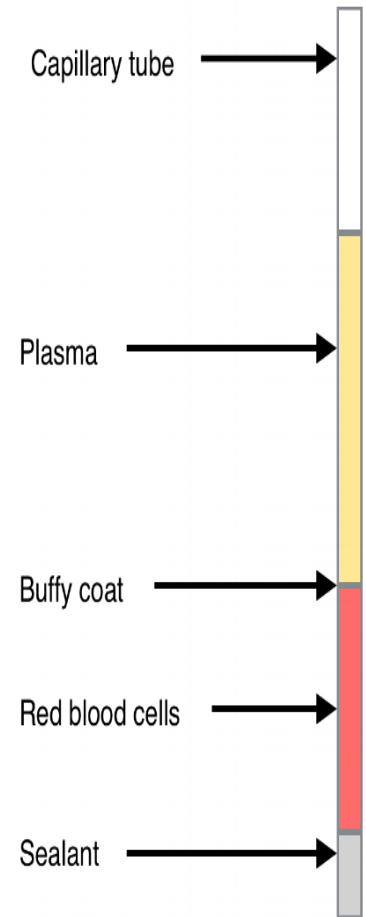
Hemoglobin: 1/3 of Hematocrit

Plasma

Red Blood Cells

**In a centrifuge blood is separated into three layer including :**

1. The mass of the erythrocytes at the bottom which is referred to as packed corpuscles volume (P.C.V).
2. White or gray layer of leukocytes and thrombocytes immediately above the red corpuscles mass that referred to as the buffy coat.
3. The blood plasma



# Decreased PCV

**A decreased PCV reflects a low number of circulating red blood cells and is an indicator of a decrease in the oxygen-carrying capacity or of over hydration.**

**Examples of conditions causing a low hematocrit (anemia) include**

**1-bleeding**

**2-kidney disease**

**3- vitamin-B12 deficiency**

**4-Hemolysis**

**5- Bone marrow disorders such as leukaemia ,  
lymphoma**

**6-Some medicines– including chemotherapy**

**7- pregnancy.**

# PCV Test Normal Range

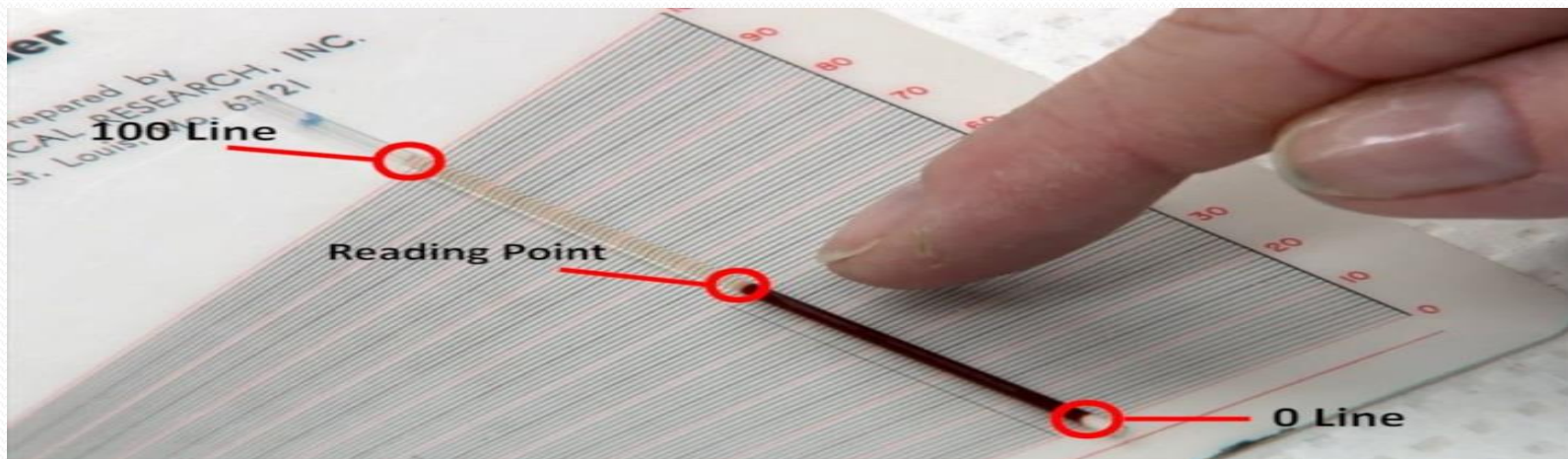
The values of the PCV test normal range are:

- **Between 35% - 48%**
- **The range of new born is 53%-65% while children is 30%- 43%**
- **The range for females is 35.5 %- 44.9%, and for males it is 38.3%- 48.6%**
- **Low PCV in blood test results is less than 30%, and High PCV is more than 50%.**

## Increased PCV

A increased PCV may reflect an absolute increase in the number of erythrocytes, or a decrease in plasma volume, in conditions such as

- 1- Severe dehydration – e.g. in case of burns, diarrhea or excessive use of diuretics
- 2- Erythrocytosis – excessive red blood cell production
- 3- Polycythemia vera – abnormal increase of blood cells
- 4- Hemachromatosis – an inherited iron metabolism disorder



# Apparatus and reagent

- Microhematocrit centrifuge.
- Whole blood in heparin or EDTA tube
- Microhaematocrit (capillary) tubes
- Plasticine clay
- Microhaematocrit reader





# Procedures

**1-Fill hematocrit tube to about three-fourth of its length**

**By sample EDTA**



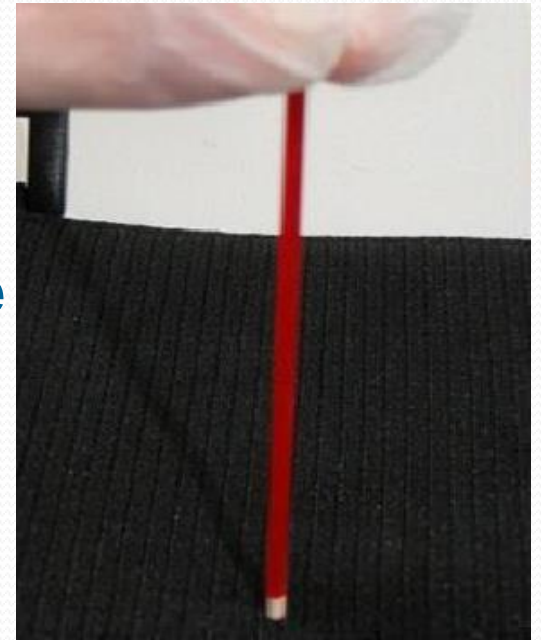
**Or by lancet**



**2- Place hematocrit tube the "non-blood" end of the tube and push the opposite end into a clay sealant 3-4 times (clay length about 1 cm)**



**3- Check there is a sufficient plasticine plug.**

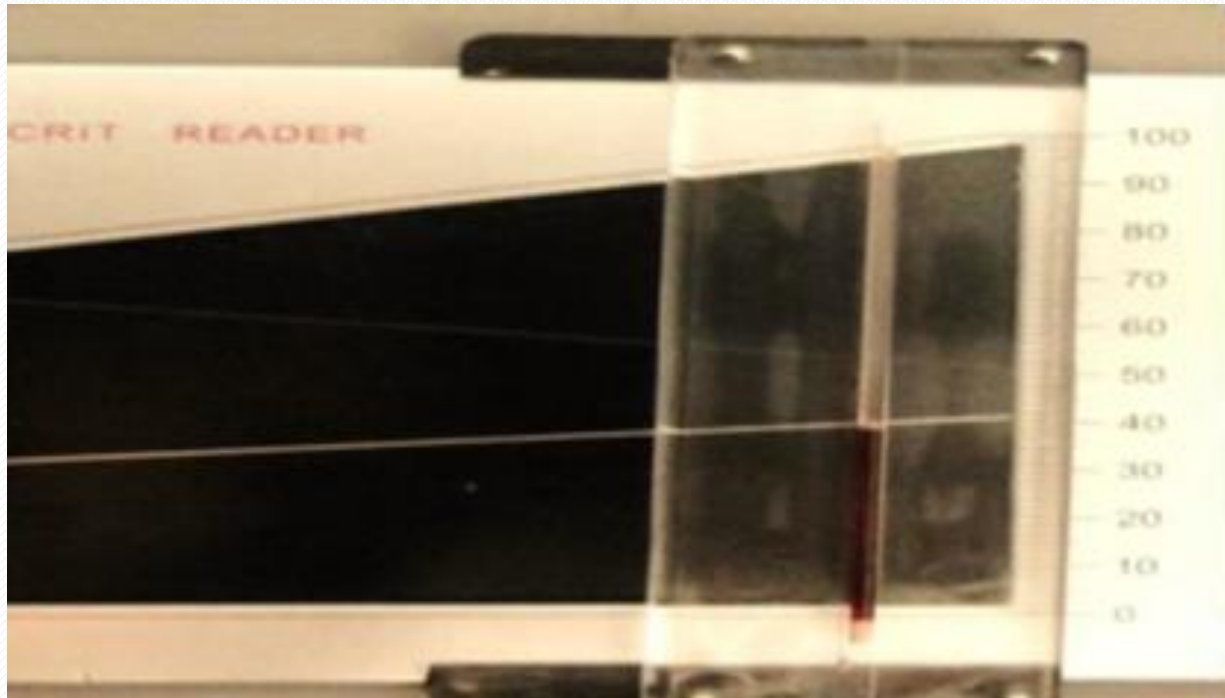


4- Fill 2 tubes and place them opposite each other in the centrifuge. This is to balance the centrifuge; every tube must have another tube opposite it. Place the plasticine plug end of the tube against the rubber (outer) edge to stop the contents spilling out when spun(3 minutes at 15,000; 5 minutes at 10,000).



5-Place the capillary tube onto the haematocrit reader.

- Adjust the tube on the slide so that the top of the pleistocene is level with the bottom line (0%).
- Move the slider to the top of the plasma fraction is level with the topline (100%).
- Use the adjuster on the left to align the middle line with the top of the red cells. Read the PCV from the right hand side scale.



# • Whole blood form after centrifugation

