Erythrocyte sedimentation rate (ESR) and hematocrit (HCT)
Objectives

1) Determination of erythrocyte sedimentation rate (ESR).

2) Determination of hematocrit (HCT).

3) To assess the condition of a patient by such tests.
Erythrocyte Sedimentation Rate (ESR)

- ESR is the mm of plasma separated per hour.

- It is used clinically as a non-specific screening test to:
  - Detect the presence of infection in the body in general.
  - Monitor the status of chronic inflammatory disease such as rheumatoid arthritis.

- ESR is not diagnostic of any particular disease, but rather is an indication that a disease process is ongoing and must be investigated.
- It does not tell the health practitioner exactly where the inflammation is in the body or what is causing
Erythrocyte Sedimentation Rate

The distance, in mm, the RBC fall in 1 hr is the Sed Rate.
Principle

• In this technique, anticoagulated whole blood are allowed to sediment under the effect of gravity, using a narrow vertical tube called Westergren’s tube.

• This test is based on the fact that inflammatory and necrotic processes cause an alteration in blood proteins, resulting in an aggregation of red cells, which make them heavier and more likely to fall rapidly when placed in a special vertical tube.

• The length of the column of clear plasma at the top is noted at the end of 1 hour.
Results

Normal range

Men → 0 - 5 mm/hr
Women → 0 - 10 mm/hr [They tend to have a higher ESR, and menstruation and pregnancy can cause temporary elevations]

Conditions that inhibit the normal sedimentation of red blood cells

- Thrombocytosis
- Leukocytosis
- Sickle cell
- Abnormal proteins

LOW ESR
- Polycythemia
- Infections
- Rheumatica

HIGH ESR
- Inflammation
- Infants
- Cancer
- Autoimmune
- *Temporal arteritis
- Polymyalgia
Hematocrit (HCT)

- **HCT or packed cell volume (PCV)** is the volume percentage (%) of RBCs in blood.
- It is used as a **simple screening test for anemia.**
- Blood is collected in heparinized *capillary tube*, which is then sealed, centrifuged and the red cell volume expressed as a percentage of the whole blood.
Calculation:

\[
HCT = \frac{\text{Length of column of RBC}}{\text{Total length of blood component}} \times 100
\]

Normal ranges:

Male: 40.7 - 50.3%  
Female: 36.1 - 44.3%
Animation

https://www.youtube.com/watch?v=ow_SENCieAw