Outline:

- Blood physical characteristics
- Components of the blood
- Blood Collection Tools.
- Blood Collection Tubes.
- Venous Blood collection.

Blood: Physical characteristics

Average amount: 8% body weight

(70 kg man- 5.6L)

Specific gravity: 1055-1065 (viscosity is 5 times that of water)

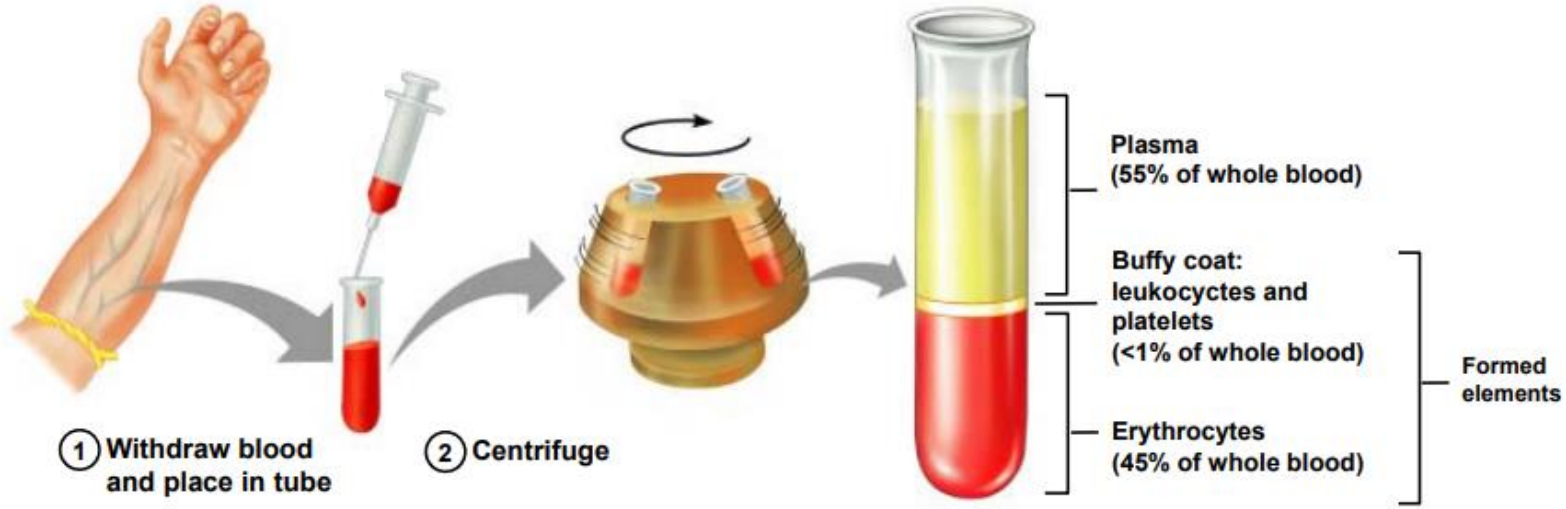
pH: 7.35-7.45

Osmolarity: 300 mOsm

Salanity: 0.9%

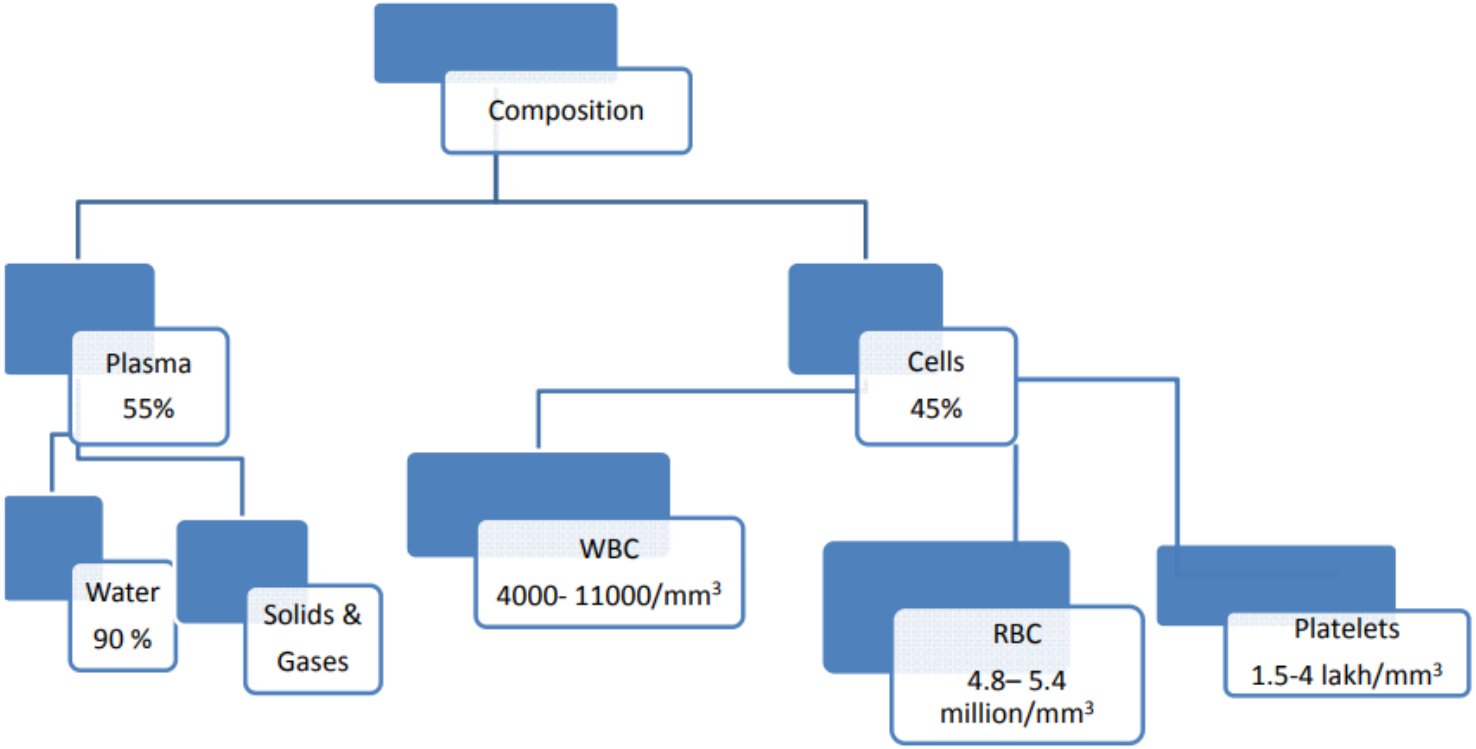
Colour: Bright red to deep red

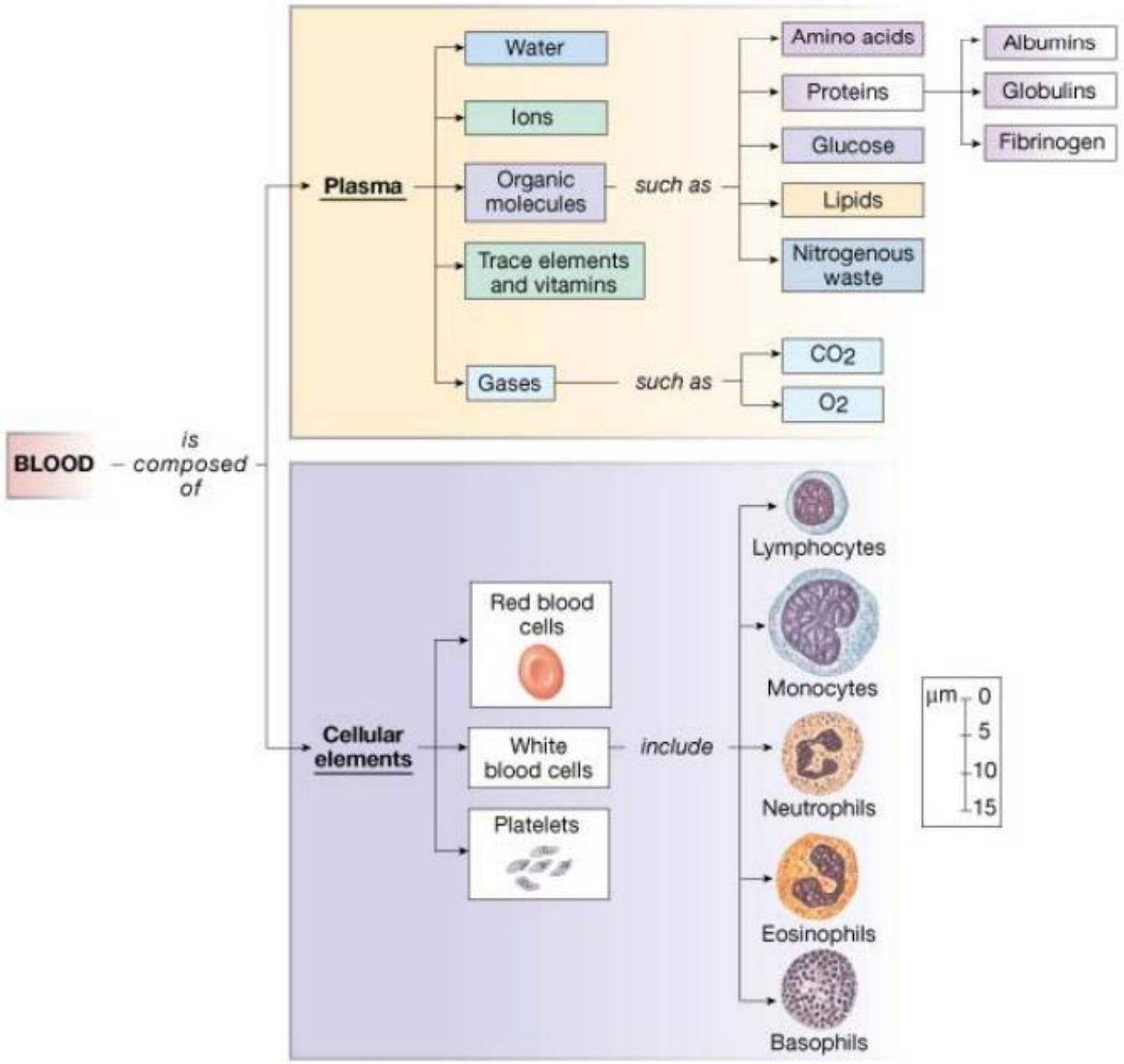
Components of Whole Blood



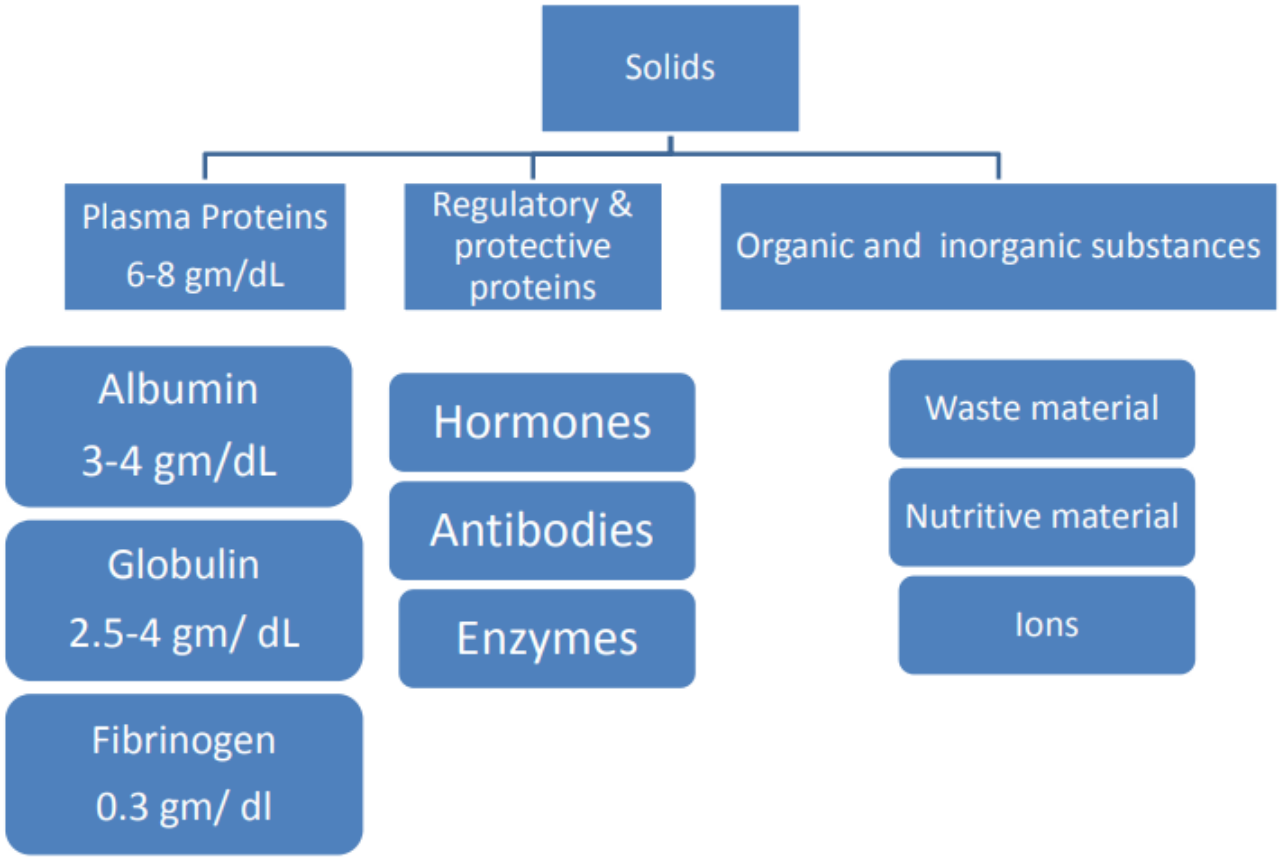
- Hematocrit
  - Males: 47% ± 5%
  - Females: 42% ± 5%

Components of blood




BLOOD
is composed of
Plasma
Water
Ions
Organic molecules
such as
Amino acids
Albumins
Proteins
Globulins
Glucose
Fibrinogen
Lipids
Nitrogenous waste
Trace elements and vitamins
Gases
such as
CO_2
O_2
Cellular elements
Red blood cells
White blood cells
include
Platelets
Lymphocytes
Monocytes
Neutrophils
Eosinophils
Basophils
µm
0
5
10
15

Components of plasma (90% water rest solids)



Blood collection tools

- **Material:**
  - Tourniquet.
  - Vacutainer or syringe.
  - Alcohol swab.
  - Bandage/ medi-plast.

Blood Collection tubes

ANTICOAGULANT TUBE

- **EDTA** (Ethylene Diamine Tetra-Acetate) liquid:
  - Types: Na and K2 EDTA (1.5-0.25mg /ml)
  - Functions by forming Ca salts to remove Ca.
  - Uses: most hematology studies. such as: CBC, PCR and HbA1c.

Light Blue :

- Sodium citrate (1:9 ratio).
- Anticoagulant: 32g/l.
- Action: Remove Calcium.
- Uses: Coagulation studies and platelet function (PT and PTT), and WBC count.
- But in accurate for RBC count

Royal blue top tube with No Preservative

used for trace metal serum determinations. (arsenic, calcium, iron, zinc, copper)

- **Dark GREEN, Plasma Separating Tube (PST) with Lithium heparin**
  - Sodium Heparin or Lithium Heparin anticoagulant.
  - Action: inactivate thrombin and thromboplastin.
  - Uses:

for Ammonia, lactate level

PST /Light Green

- Plasma Separating Tube with Lithium Heparin
- Uses: Chemistry

Red (Plain tube):

- No preservative/anticoagulant.

- Uses: usually for blood bank tests, toxicology and serology, immunology and biochemical analysis

SST/ Gold top tube:

- SST (Serum Separator Tube)
- No additives.
- Clotting accelerator and separation gel.
- Uses: Chemistry, Immunology, and Serology.

- **BLACK:**

- Na citrate 1:4.

- Action: Remove calcium.

- Uses: Westergren sedimentation rate (ESR).

- **ESR tube**

- Additive: 3.8% sodium citrate

Grey-Top Tube - Potassium Oxalate + NaF.
This tube is used primarily for glucose tolerance testing.

Yellow top tube with ACD (acid citrate dextrose) Solution A or B:

used for whole blood determinations including flow cytometry and tissue typing assays.

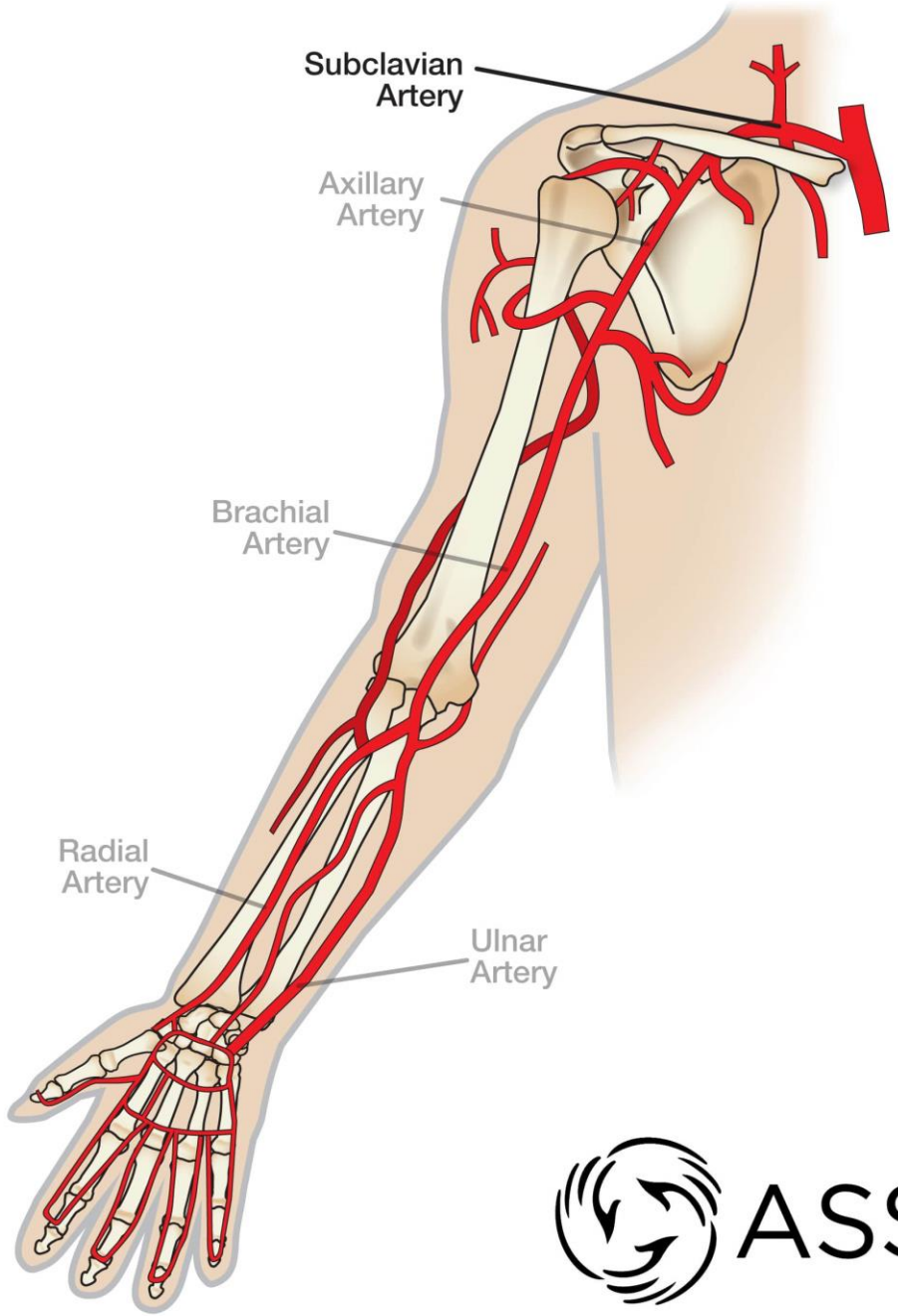
I. Venous blood

- **Most commonly required ….WHY??**

- ✓ Because most majority of routine tests are performed on venous blood.

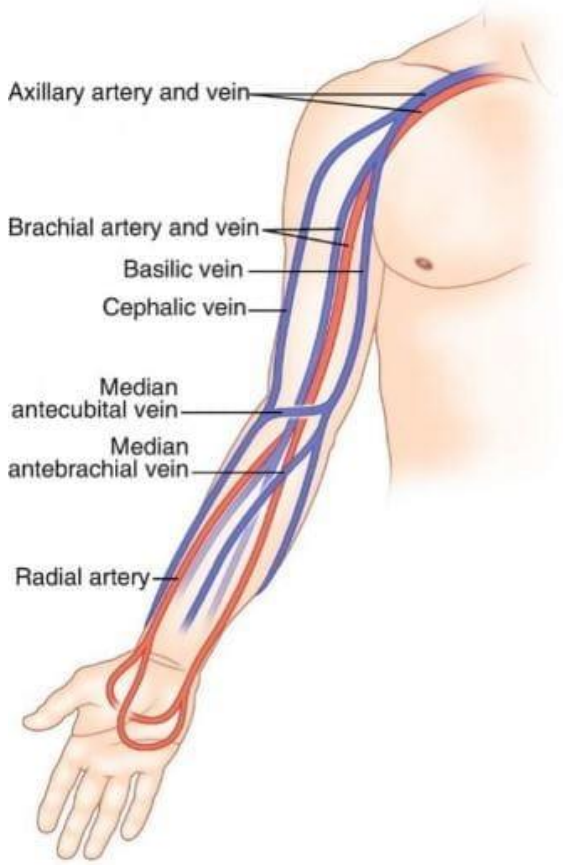
- ✓ Blood can be taken directly from the vein.

- ✓ The best site for venous collection is the deep veins of the ante-cubital fossa.


Subclavian Artery
Axillary Artery
Brachial Artery
Radial Artery
Ulnar Artery

ASSH

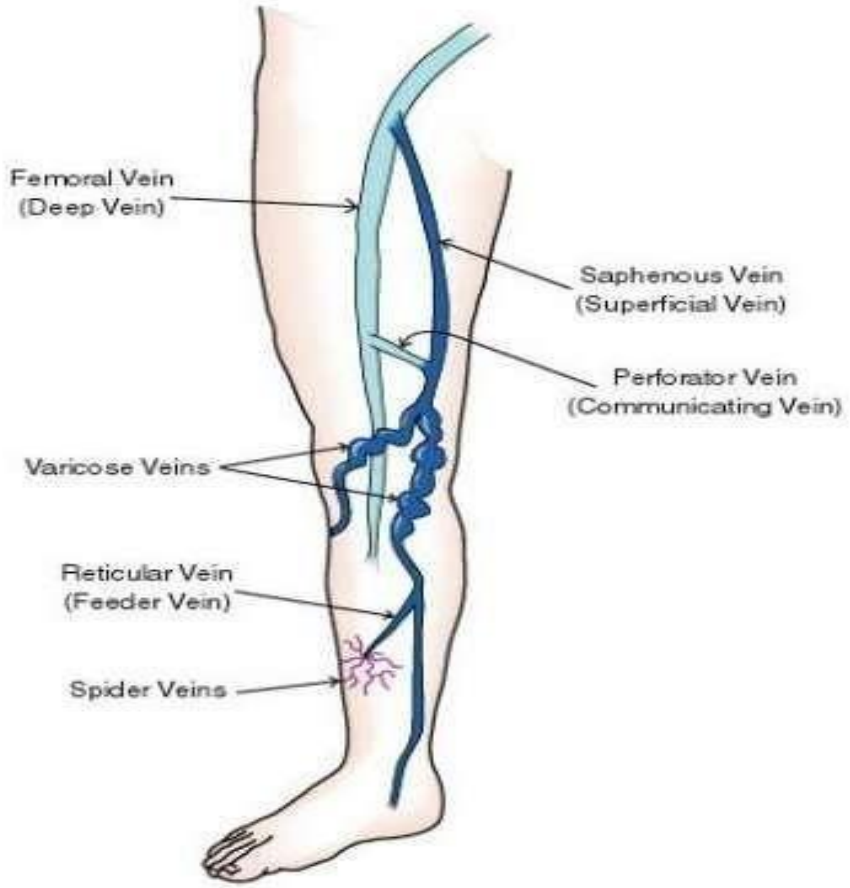
1. Forearm vein



- If difficult to obtain from the ante-cubital fossa we can draw blood from following various site:

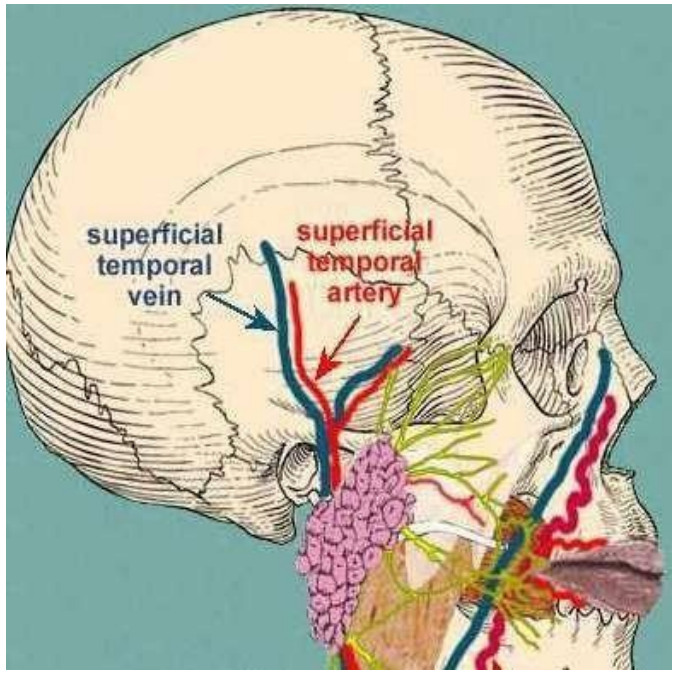
2. Dorsum of hand vein

3. Femoral vein

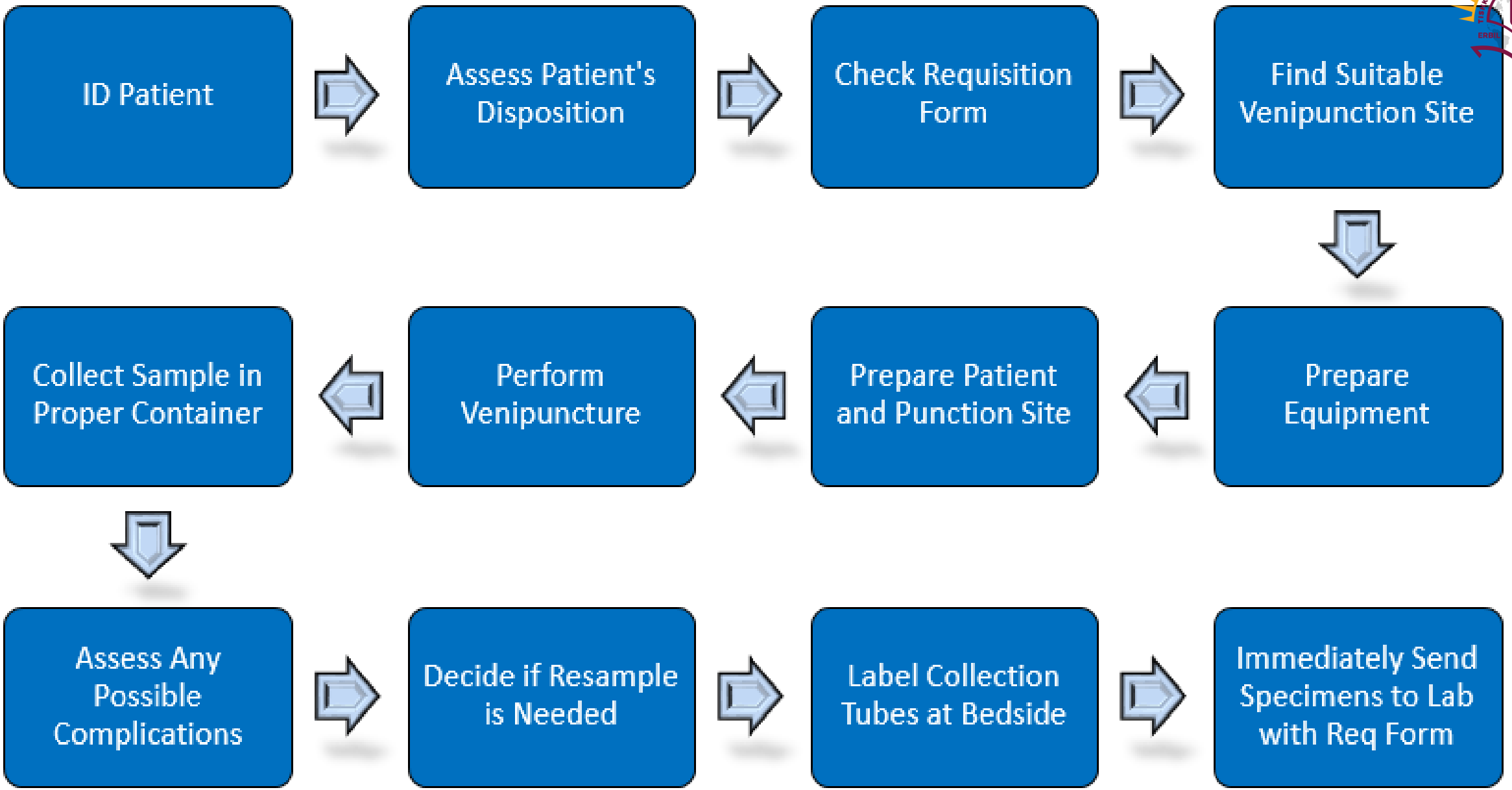


4. Jugular vein

5. Scalpvein



- These sites -other than the forearm- require extra caution and expertise for collection of blood.


ID Patient
Assess Patient's Disposition
Check Requisition Form
Find Suitable Venipunction Site
Prepare Equipment
Prepare Patient and Punction Site
Perform Venipuncture
Collect Sample in Proper Container
Assess Any Possible Complications
Decide if Resample is Needed
Label Collection Tubes at Bedside
Immediately Send Specimens to Lab with Req Form

Procedure for Vein Selection:

1. Position the patient so he or she is comfortable and safe in case the patient becomes faint and falls.

2. Ask to put one of his/her arm on the table and hold straight.

3. Select site for venipuncture. The median cubital vein of the arm is used most frequently. See diagram below:

4. Clean vein-puncture site with 70% alcohol prep. Clean in a circular fashion, beginning at the site and working outward.

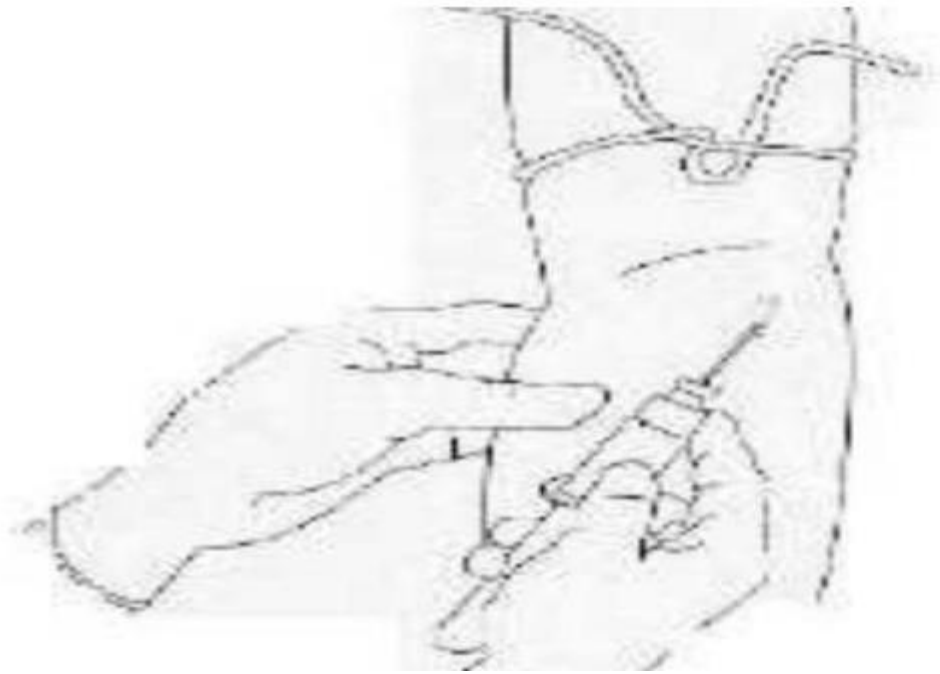
5. Applying the tourniquet:

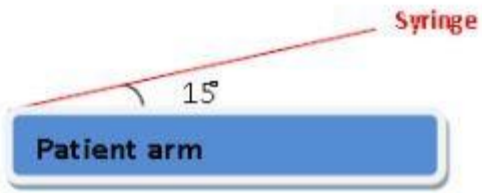
- Apply the tourniquet 3-4 inches above the selected puncture site.

- **Do not place too tightly nor too loose**. It should be just tight enough to stop the flow of blood.

- Rubber tourniquet is used to increase venous pressure and to make the veins move prominent and easier to enter.

6. The needle should be pointing exactly the **same direction** as the vein is running



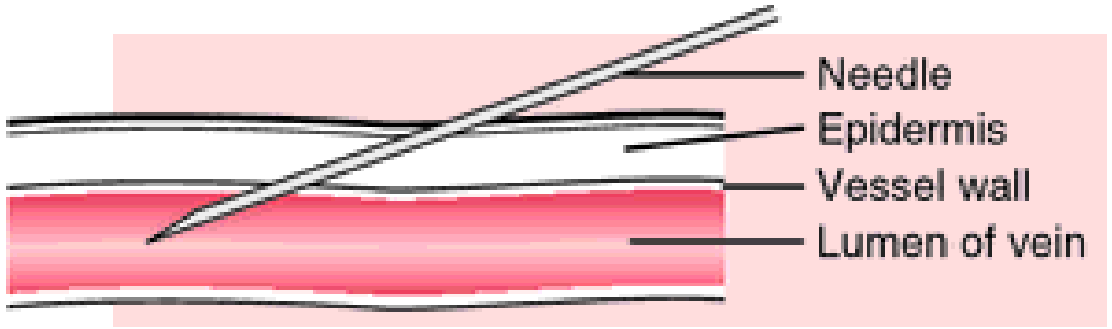


7. Hold the syringe at a 15-35 degree angle with the patient arm.

8. Insert the needle into your vein with the needle bevel opening facing up, and always in the direction of the heart.

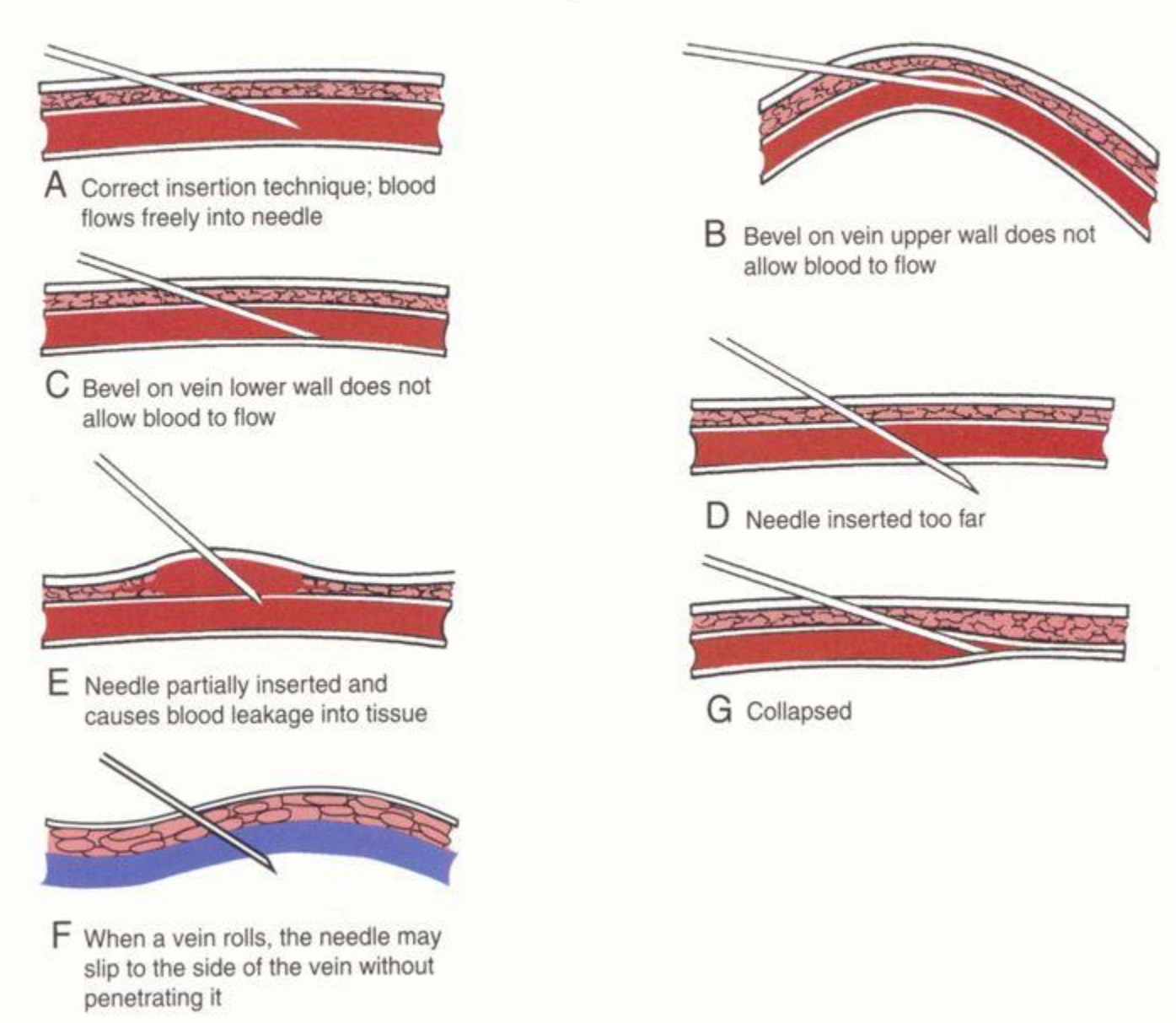
9. The more perpendicular the needle is to the injection site, the greater chance you have of sticking the needle through the vein instead of into it.

-Correct needle insertion- blood flows freely into needle:



-Incorrect needle insertion- bevel on vein lower wall does not allow blood to flow

Needle Position:



10. Before the needle is withdrawn, the pressure must be released. The pressure is released by having the patient open his drenched fist and release the tourniquet.

11. The needle must be withdrawn with slow gentle motion and anti-septic pad is applied to the puncture. The patient is then instructed to apply pressure to the wound.

- For more information about **Learn the procedures, steps, risks, and requirements for performing phlebotomy. You can visit:**
- https://www.unitekcollege.edu/blog/a-step-by-step-guide-to-phlebotomy/

thank you