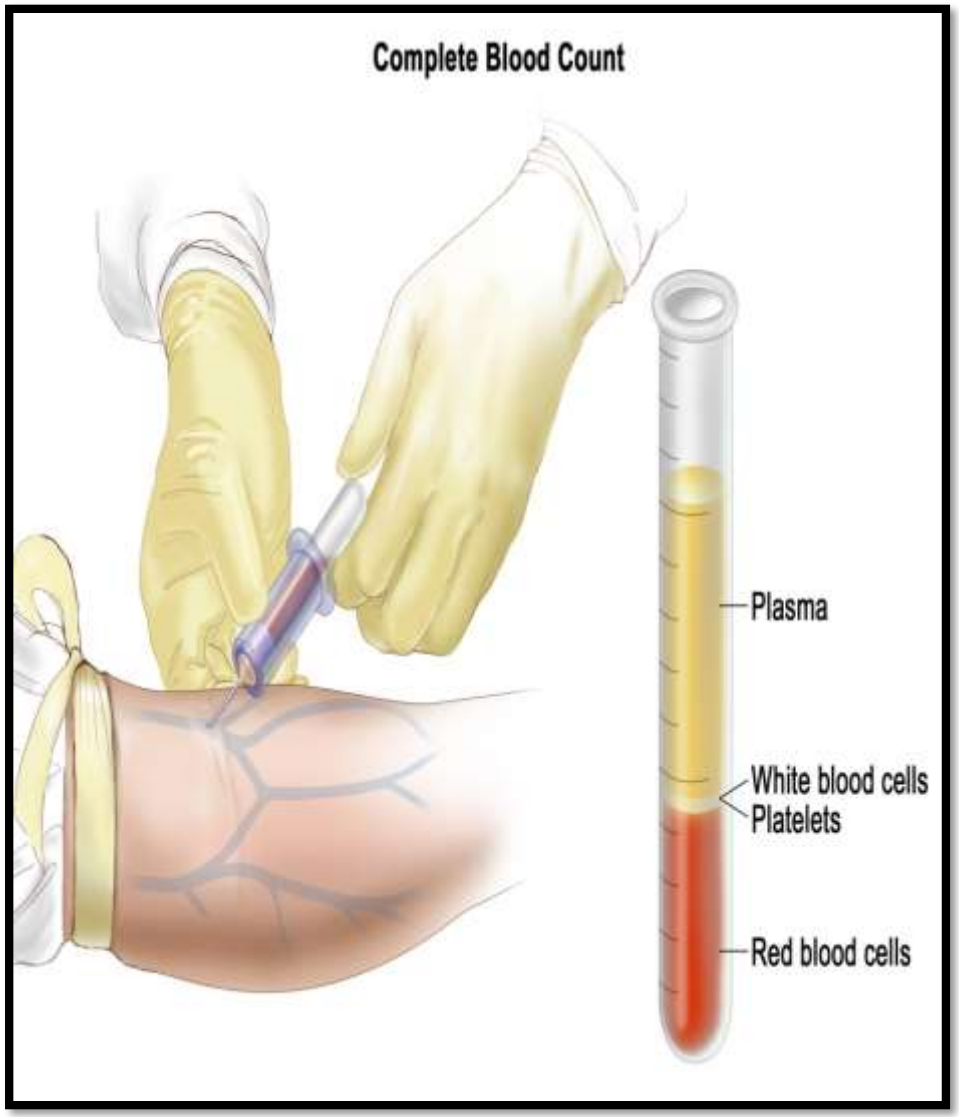
Blood Collection with focus on types of sample and its collection using different vacutainers

Learning agenda

- Introduction to blood collection
- Equipments and sites for blood collection
- Purposes of vacutainer
- Sites to be avoided
- Advantages & disadvantages
- Specimen collection through vacutainers
- Process
- Complications
- Conclusion

Introduction to blood Collection

Blood specimen **collection** is performed routinely to obtain **blood** for laboratory testing.



Equipment

A tray containing:

Syringe 5 ml /

10 ml

Vacutainer

Gloves

Tourniquet

Sterile

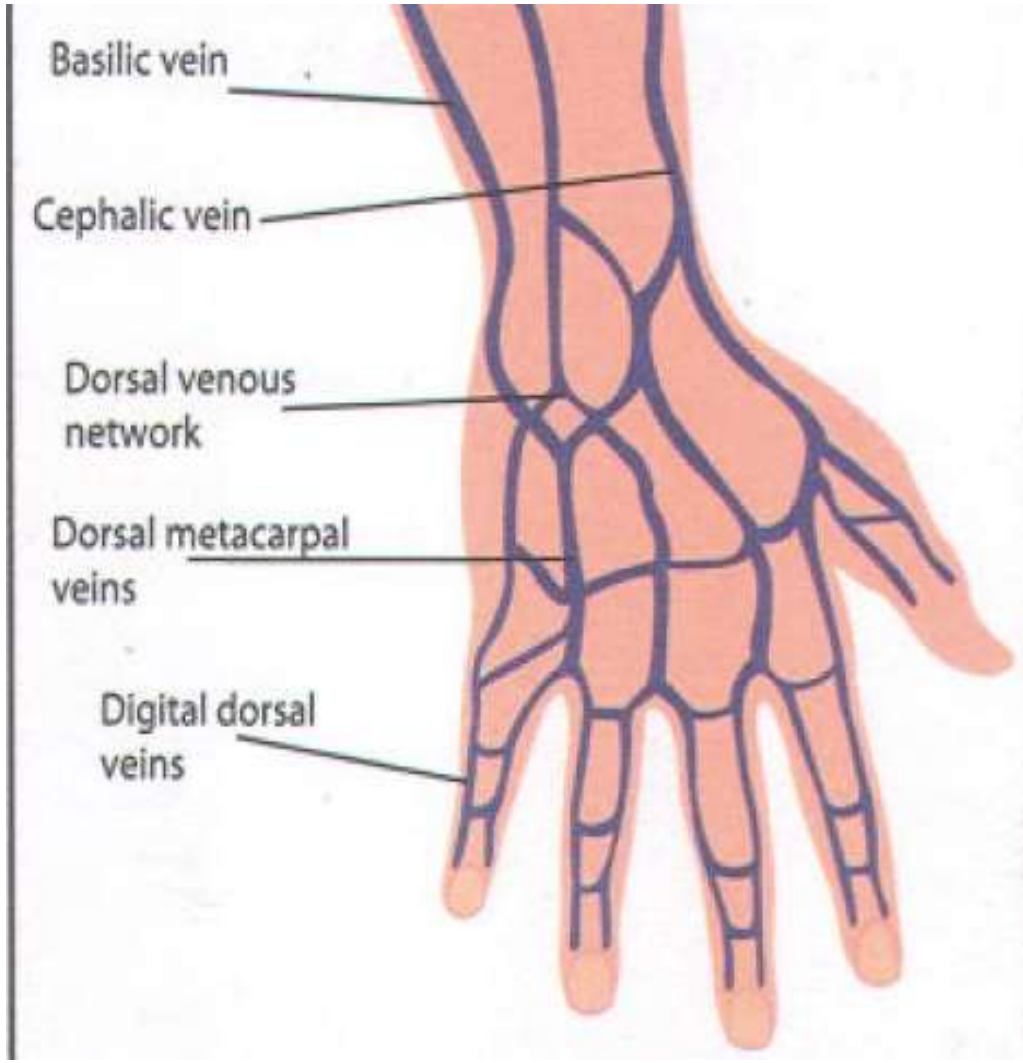
gauze/cotton

Transpore

Sites for collecting blood

Veins of the Hand

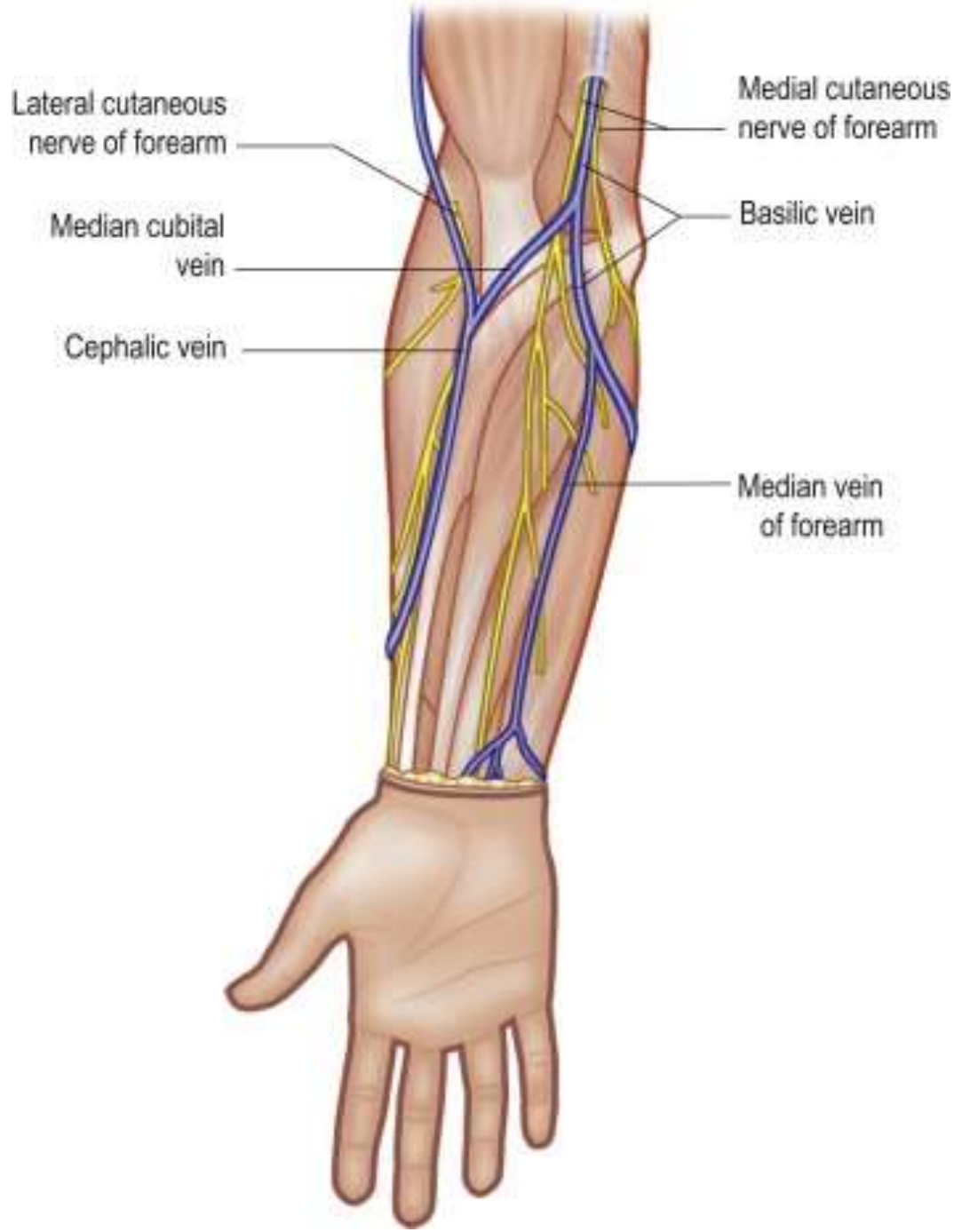
1. Digital Dorsal veins
2. Dorsal Metacarpal veins
3. Dorsal venous network
4. Cephalic vein
5. Basilic vein



Cont..

Veins of the Forearm

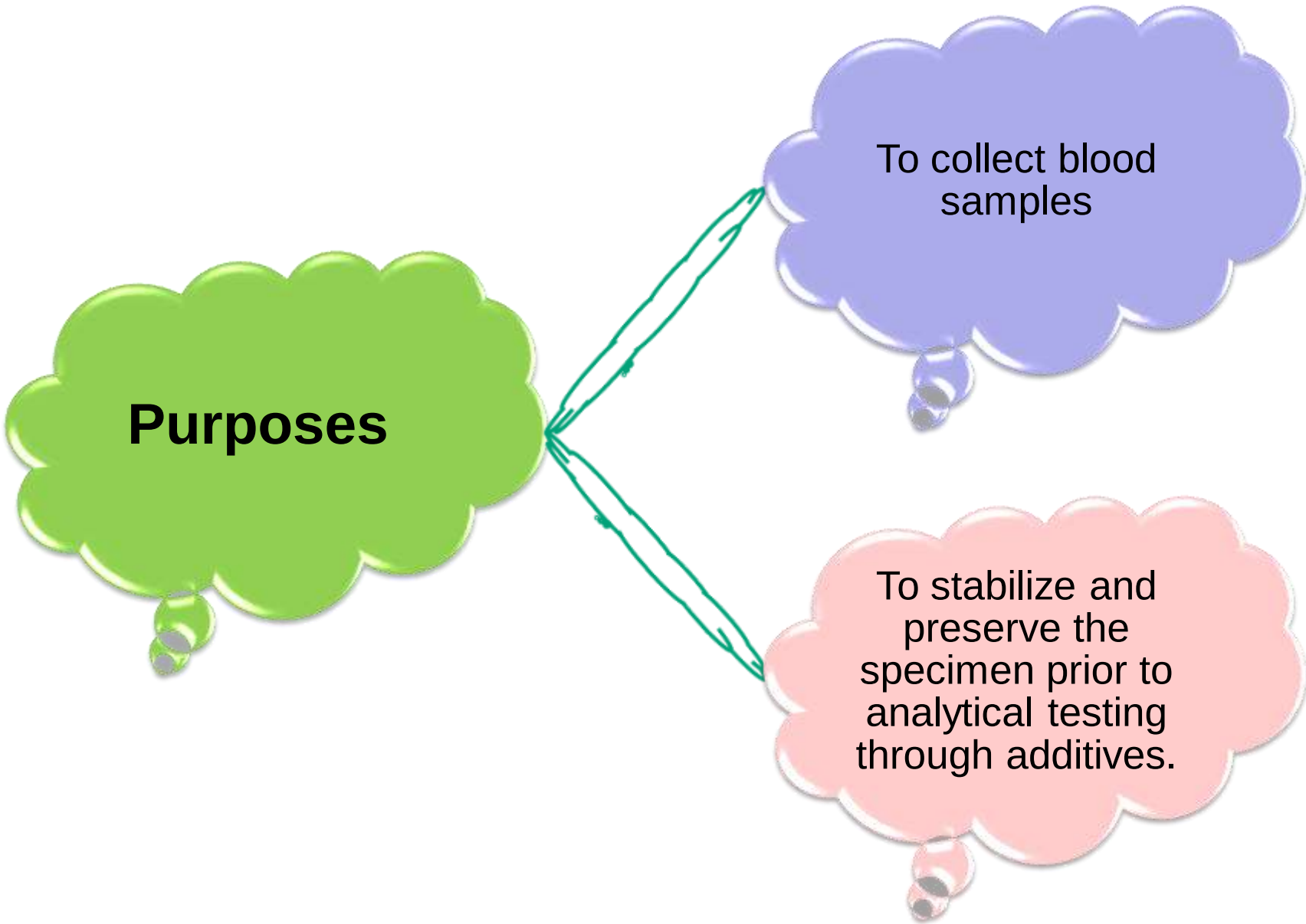
1. Cephalic vein
2. Basilic vein
3. Median Cubital
4. Medial Cutaneous nerve
5. Lateral Cutaneous nerve



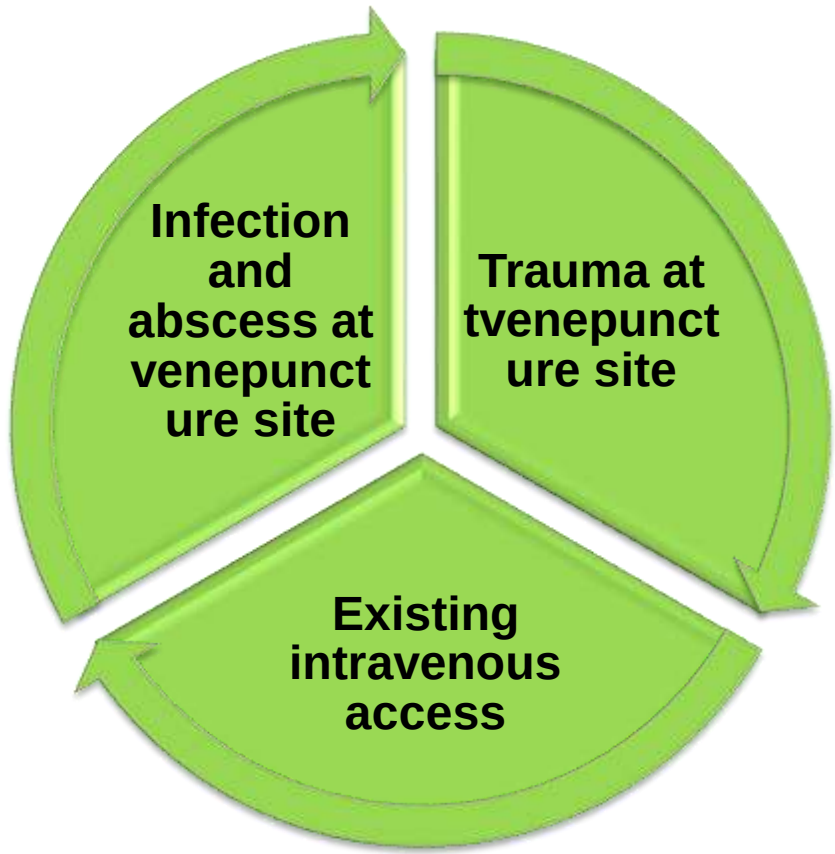
Vacutainer

A **Vacutainer** is a sterile glass or plastic tube to draw blood of a predetermined volume of liquid.

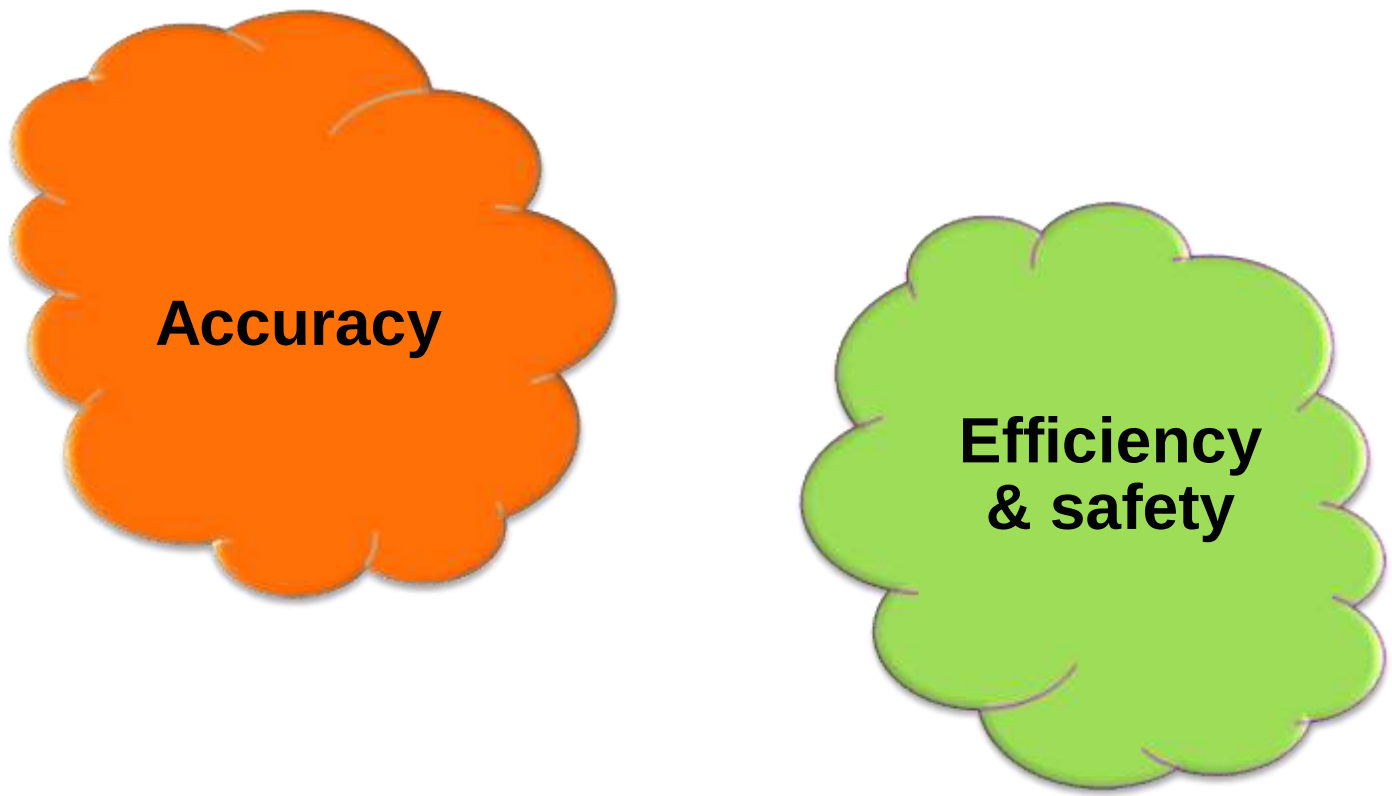
Purposes


Purposes
To collect blood samples
To stabilize and preserve the specimen prior to analytical testing through additives.

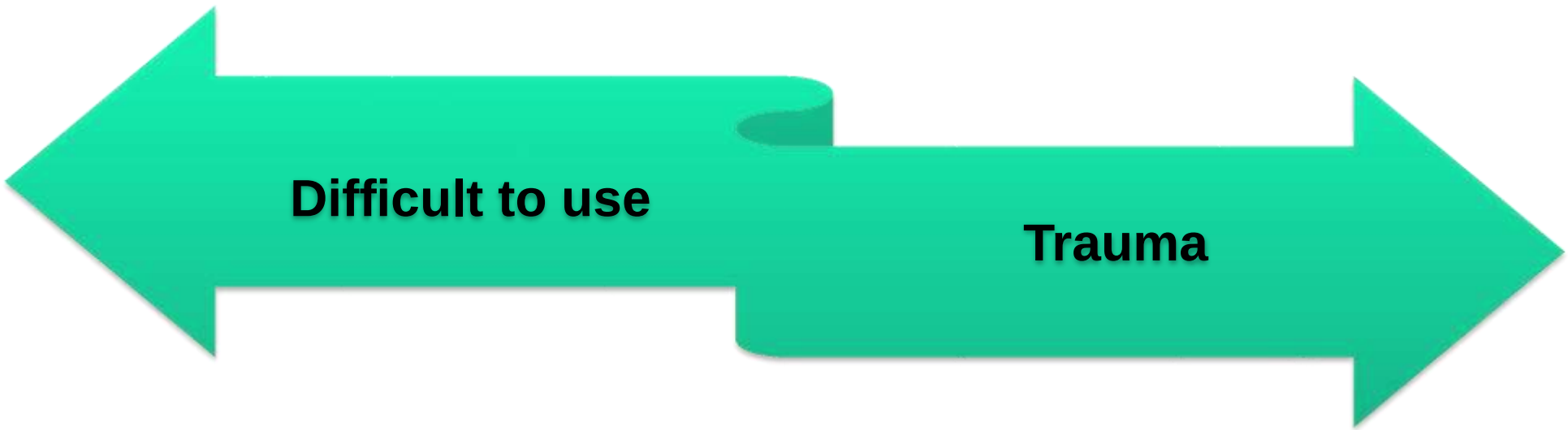
Sites to be avoided for venepuncture



Advantages of vacutainer



Disadvantages of vacutainer



Specimen collection through vacutainers

Cap Color	Additive	Mix by intervening	Suitable for	Common tests	Blood volume
Light Yellow	Sodium Polyanethol Sulfonate (SPS)	8-10 times	SPS for blood culture specimen collections in microbiology.	Blood bank studies, HLA phenotyping, and paternity testing.	5 mL

Cap Color	Additive	Mix by intervening	Suitable for	Common tests	Blood volume
Blue	Sodium citrate	3- 4 times	Coagulation determinations. CTAD for selected platelet function assays and routine coagulation determination	BT, PT, APTT, TT or fibrinogen assay, D-dimer, APTR	2.7mL
Yellow : SST (Serum Separating Tube)	Silica and a polymer gel	5 times	They are used for serum determinations in Bio chemistry.	Urea, creatinine, sodium and potassium, LFTs, amylase assay, Bone profile, TFTs, Lipid profile	

Cap Color	Additive	Mix by intervening	Suitable for	Common tests	Blood volume
Red: Serum tube	Silica -Clot activator	5 times (plastic) None (glass)	Serum determinations in bio chemistry, serology, and immuno hematology.	Hormones test, toxicology, dr ug levels, bacterial & viral serology	6mL
Orange: RST (Rapid Serum Tubes)	Thrombin-Based Clot Activator and Polymer Gel	5-6 times	Blood chemistry	STAT serum testing	

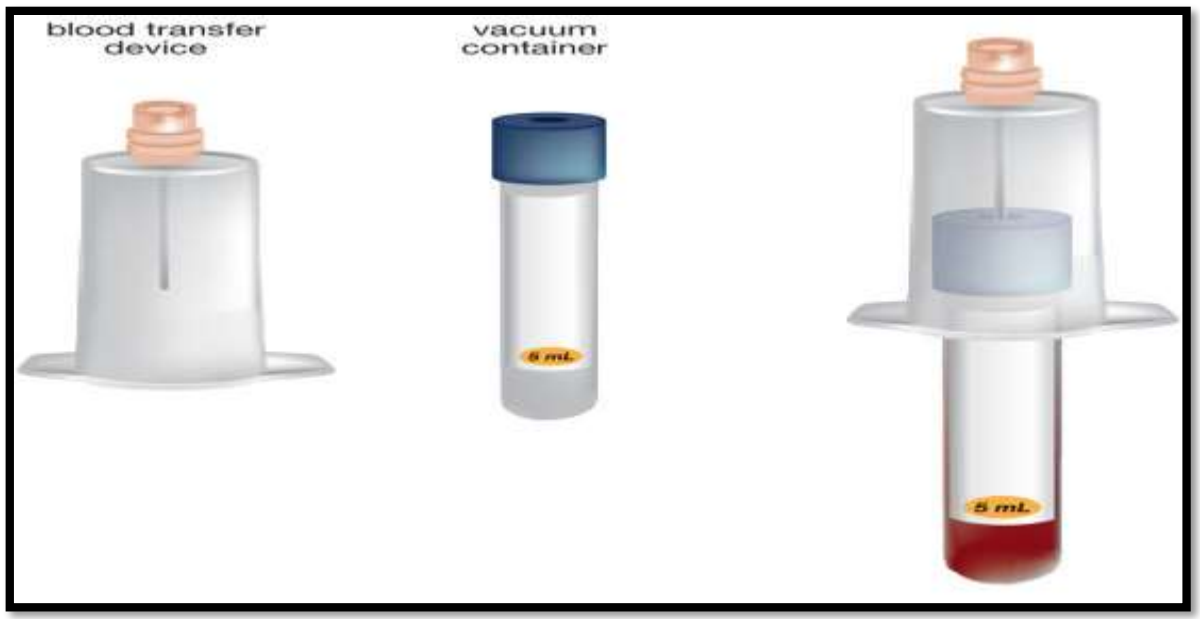
Cap Color	Additive	Mix by intervening	Suitable for	Common tests	Blood volume
Light green: PST (Plasma Separation Tube)	Lithium heparin and a gel for plasma separation	8-10 times times	Plasma determinations in bio chemistry	Electrolytes (sodium, potassium, chloride), Renal (Kidney) Function Tests, Liver Function Tests	
Green: Heparin tube	sodium heparin or lithium heparin	8-10 times	Bio chemistry (less common)	Ammonia, insulin renin and aldosterone	4 mL

Cap Color	Additive	Mix by intervening	Suitable for	Common tests	Blood volume
Purple/ Lavender	Spray-coated K2EDTA	8-10 times	Whole blood hematology determinations and immunohematology testing	Full blood count (FBC), ESR Blood film Reticulocytes, Red cell folate Monospot, HbA1C, Parathyroid hormone (PTH)*	3mL
Pink: PPT (Plasma Preparation Tube)	Spray-coated K2EDTA (plastic)	8-10 times times	The pink bottles work in the same way as the purple ones, but are specifically used only for whole blood samples being sent to the transfusion lab	Group and save (G&S), Crossmatch (XM), Direct Coomb's test	6mL

Cap Color	Additive	Mix by intervening	Suitable for	Common tests	Blood volume
Grey	Potassium oxalate/ sodium fluoride	8-10 times	Glucose determinations on plasma.	Glucose and lactate	6 mL

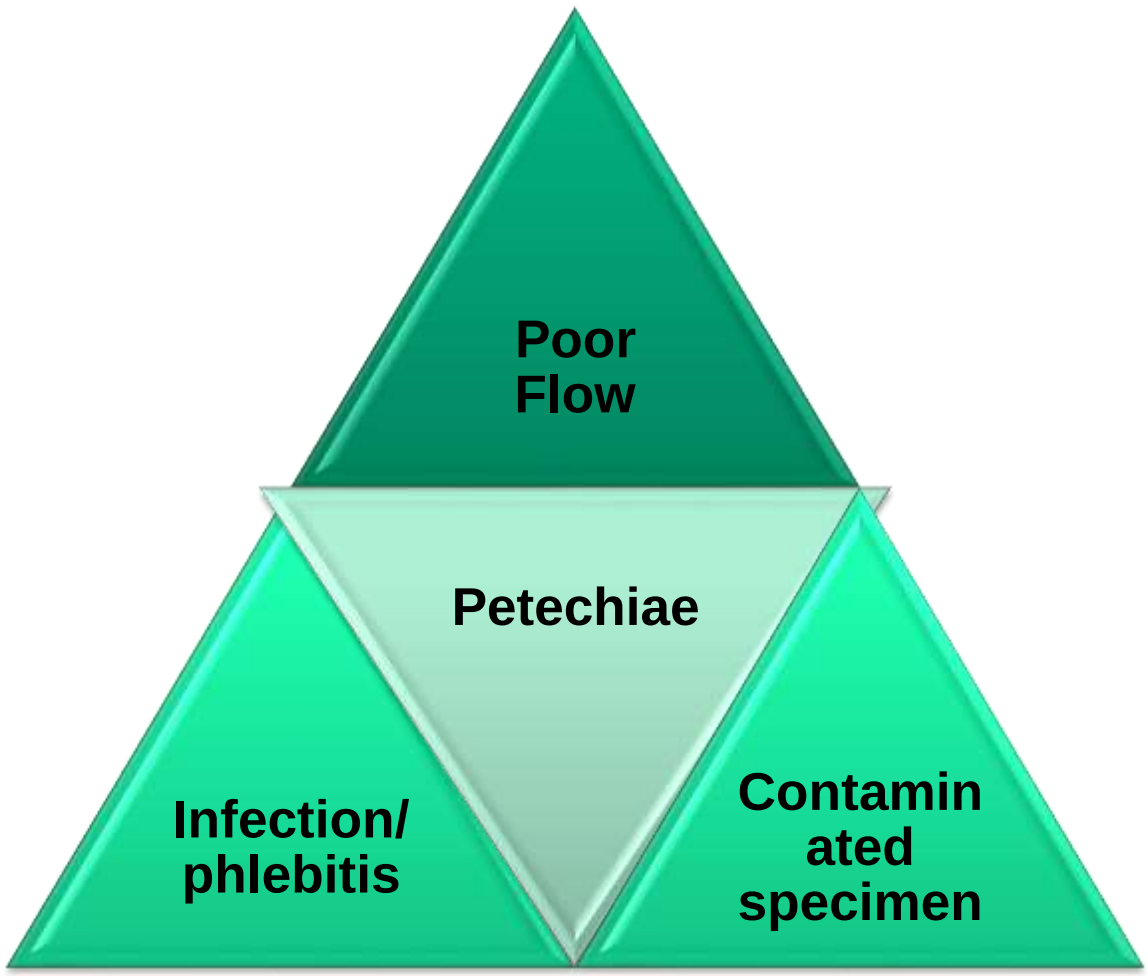
Blood collection Process through vacutainer

Vacutainer tubes have a hypodermic double ended needle in a translucent plastic holder that is used to puncture the vein.



Process

Complications



Video 1

Video 2

Conclusion

Vacutainer tubes have a color-coded plastic cap. The color code of the caps indicates the blood additives the tube contains. Additives are chemical substances that preserve the blood for processing in the laboratory.

References

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- https://en.wikipedia.org/wiki/Vacutainer
- https://geekymedics.com/blood-bottles-guide/

Objective type questions (identify the color of vacutainer)

1. Additive: Heparin

   Specimen type: whole blood/plasma

   Minimum volume: not affected

Answer: Green

2. Additive: sodium citrate

   specimen type: whole blood/plasma

   minimum volume: full tube

The answer

- Blue

3. Additive: EDTA

specimen type: whole blood plasma

minimum volume: full tube

The answer

- Lavender