

# Blood Pressure

**Blood pressure:** means the force applied by blood against any unit area of blood vessels as it passes through it

- Unit of measurement ~> mmHg

BP category	Systolic BP	Diastolic BP
Average Values	120 mmHg	80 mmHg
Normal Range	100-140 mmHg	60-90 mmHg
Hypertension	> 140 mmHg	> 90 mmHg

**Pulse pressure:** it is the difference between systolic and diastolic blood pressure

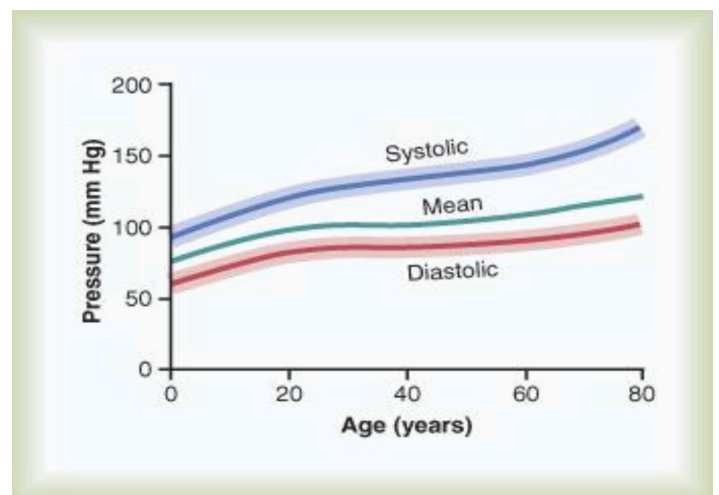
- Normal range 30 to 60 mmHg

**Mean Arterial Blood Pressure:** it is the average pressure which drives the blood forward in the tissues (through blood vessels) throughout the cardiac cycle

Mean ABP = Diastolic B.P + 1/3 Pulse pressure

$$= 80 + 1/3 \times 40$$

$$= 93 \text{ mmHg}$$



## Factors affecting BP

- Age , Sex
- Posture
- Exercise
- Anxiety or Sress
- Gravity
- Sleep
- Pregnancy

## Equipment

- Stethoscope
- Sphygmomanometer

## Methods of measurements

- Palpitory
- Auscultatory



## Procedure

### I. Palpatory method for ABP measurement

**This method only gives an estimate of the systolic blood pressure**

1. Ask the patient to sit comfortably on a chair with his/her arm resting on the bench.
2. Apply the cuff around the arm and over the brachial artery about 2.5cm above the cubital fossa. Make sure the arm is at heart level.
3. Inflate the cuff until the radial pulse disappears. By compressing the brachial artery, the pulse or pressure wave is prevented from being transmitted to the radial artery.
4. Deflate the cuff slowly (3-4 mmHg/second) and note the pressure at which the radial pulse returns. This will be the systolic blood pressure.

### II. Auscultatory method for ABP measurement

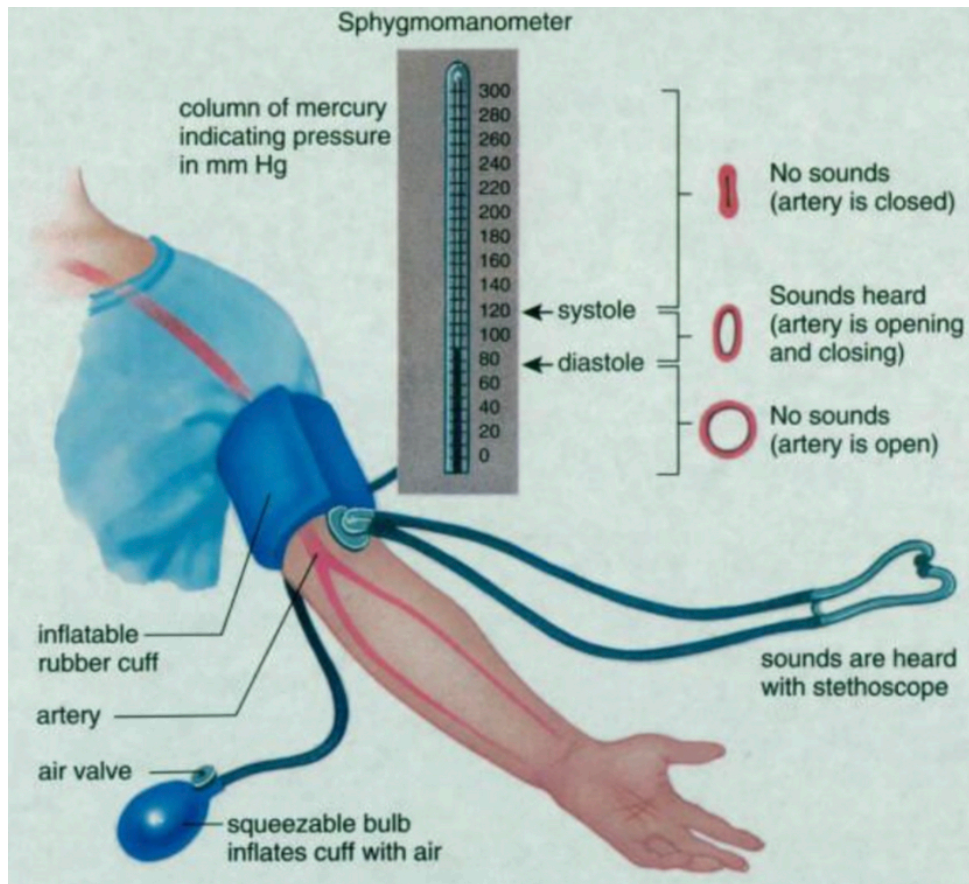
**This method measures both systolic and diastolic blood pressures**

1. Inflate the sphygmomanometer cuff until there is no radial pulsation
2. Place the diaphragm of the stethoscope over the brachial artery. The brachial artery is found in the cubital fossa 1/3 the way from the medial epicondyle.
3. Deflate the cuff (3-4 mmHg/second). As you deflate the cuff, five different sounds are heard, known as the **Korotkoff** sounds.

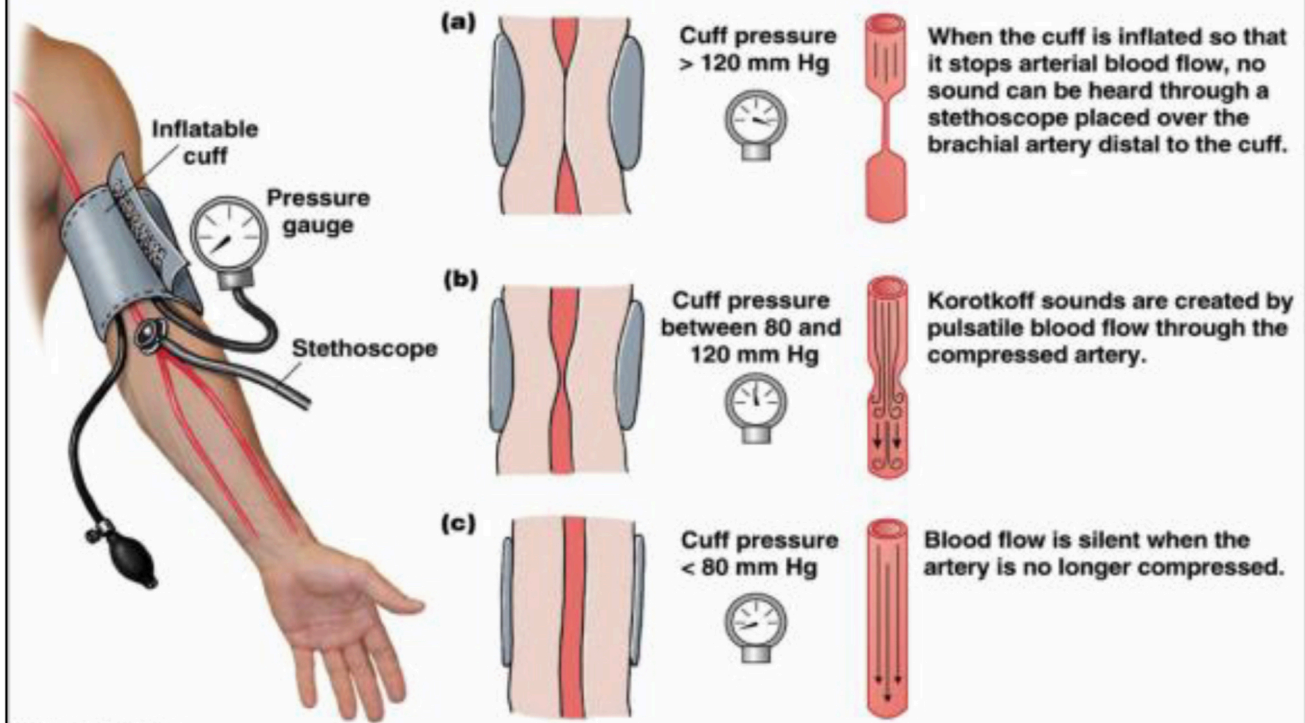
**Korotkoff Sounds:** The first sound heard is Korotkoff I (KI) and is heard as a tapping sound and represents “systolic pressure” As the cuff continues to deflate, the sounds increase in intensity (KII), then decrease (KIII), become muffled (KIV) and finally disappears (KV) The pressure at which the sounds disappear represents “diastolic pressure”

### **Precautions**

- The cuff should fit the patient’s arm appropriately. Cuffs come in different sizes. Ideally, the width of the inflatable bladder should cover 40% of the upper arm while its length should cover 80% of upper arm circumference.
- The cuff must be applied snugly (not too tight and not too loose) about 2.5 cm above the cubital fossa.
- Take care that the free margin of the cuff is not on the course of brachial artery i.e. make sure that the rubber bag within the cuff is on the medial side so that it can occlude the brachial artery when the cuff is inflated.
- It is important that the manometer is at the same level as the heart to exclude the effect of gravity while measuring the blood pressure.
- Mercury manometer should be in the vertical position.
- Check that there is adequate amount of mercury in the bulb of the instrument.
- This is done by checking the mercury level is at the zero position of the manometer.
- The patient must be physically and mentally relaxed and in a comfortable environment.



Arterial blood pressure is measured with a sphygmomanometer (an inflatable cuff plus a pressure gauge) and a stethoscope. The inflation pressure shown is for a person whose blood pressure is 120/80.



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