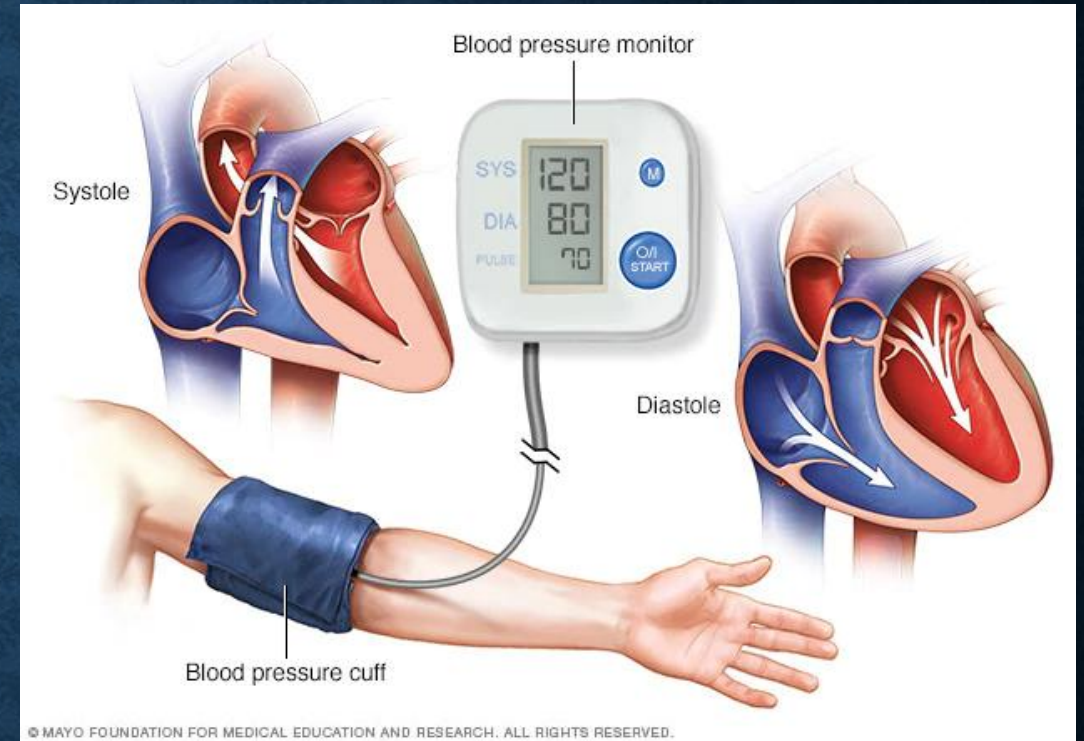


# OFFICE BLOOD PRESSURE MEASUREMENT



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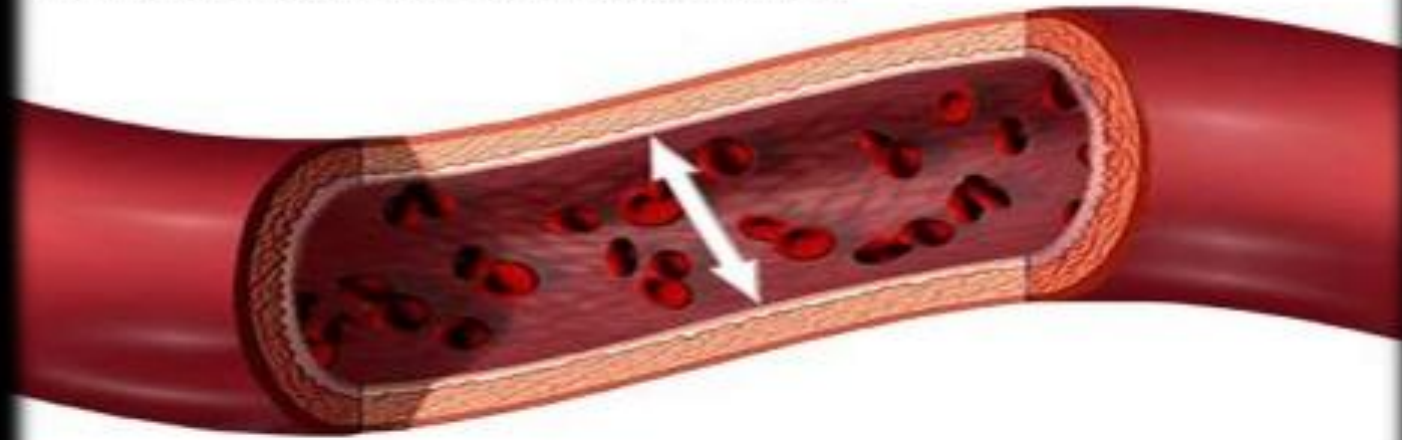
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# ARTERIAL BLOOD PRESSURE

Definition : Arterial blood pressure can be defined as the lateral pressure exerted by the moving column of blood on the walls of the arteries.

Blood pressure is the measurement of force applied to artery walls





# SYSTOLIC PRESSURE

- Systolic pressure is the maximum pressure exerted by the blood against the arterial walls.
- It results when the ventricles contract (systole)

# DIASTOLIC PRESSURE

- Diastolic pressure is the lowest pressure in the artery.
- It result when the ventricles are relaxed (diastole)



# RECORDING OF B.P

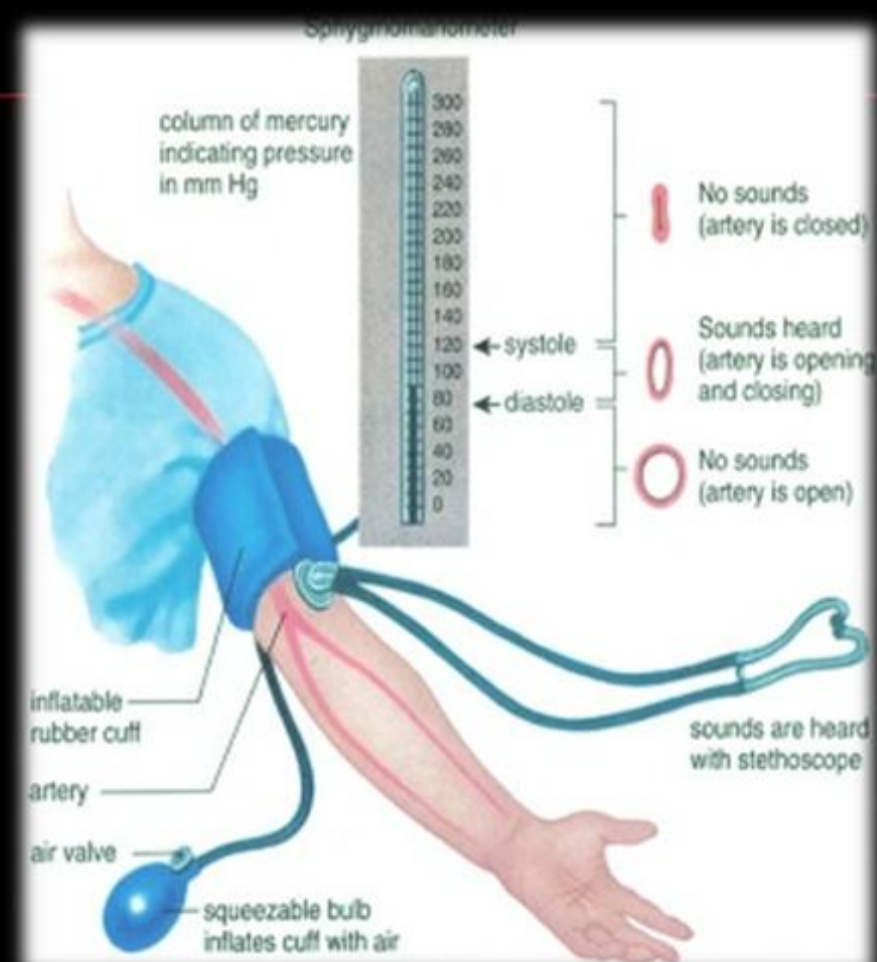
Direct method

Indirect method

## METHODS

### Indirect Methods

1. Palpatory method
2. Auscultatory method



# OFFICE BLOOD PRESSURE MEASUREMENT

## Before your reading

- No food or drink for 30 minutes
- Empty your bladder

## During the reading

- No talking
- Arm resting at chest height
- Cuff against bare skin
- Back is supported
- Sit with feet flat on floor





# Measurement Device

Aneroid  
sphygmomanometer



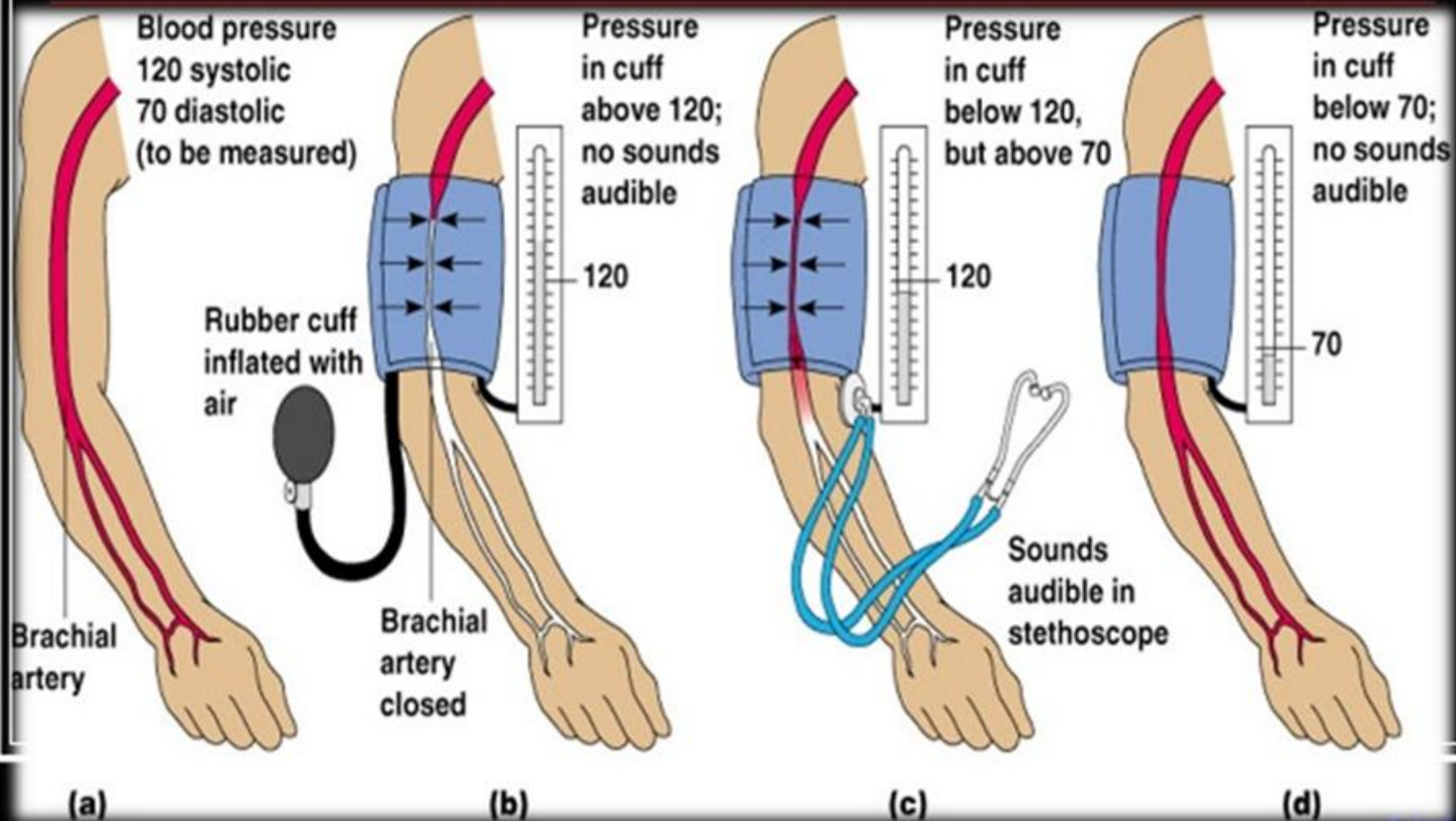
Automated bp device



Simple mercury  
sphygmomanometer



# PRINCIPLE INVOLVED IN RECORDING BLOOD PRESSURE





## AUSCULTATORY METHOD

This method was introduced by a Russian physician  
**Korotkov**

Recording of arterial BP by auscultatory method <b>Korotkov sounds</b>	<b>SBP</b>	<b>120 mm Hg</b>	<b>Tapping sound 1</b>
		<b>110 mm Hg</b>	<b>Murmurish 2</b>
		<b>95 mm Hg</b>	<b>Banging sound 3</b>
		<b>85 mm Hg</b>	<b>Muffling sound 4</b>
	<b>DBP-</b>	<b>80 mm Hg</b>	<b>No sound 5</b>

# OFFICE BLOOD PRESSURE MEASUREMENT

- Patients should be seated comfortably in a quiet environment for 5 min before beginning BP measurements.



# OFFICE BLOOD PRESSURE MEASUREMENT

- ❖ Use a standard bladder cuff (12–13 cm wide and 35 cm long) for most patients, but have larger and smaller cuffs available for larger (arm circumference >32 cm) and thinner arms, respectively.
- ❖ The cuff should be positioned at the level of the heart, with the back and arm supported to avoid muscle contraction and isometric exercise-dependent increases in BP.

# OFFICE BLOOD PRESSURE MEASUREMENT

- Three BP measurements should be recorded, 1–2 min apart, and additional measurements only if the first two readings differ by  $>10\text{mmHg}$ . BP is recorded as the average of the last two BP readings.
- Additional measurements may have to be performed in patients with unstable BP values due to arrhythmias, such as in patients with AF, in whom manual auscultatory methods should be used.



# OFFICE BLOOD PRESSURE MEASUREMENT

- ❖ When using auscultatory methods, use phase I and V (sudden reduction/disappearance) Korotkoff sounds to identify SBP and DBP, respectively.

# OFFICE BLOOD PRESSURE MEASUREMENT

- ✓ Measure BP in both arms at the first visit to detect possible between-arm differences.
- ✓ Use the arm with the higher value as the reference.

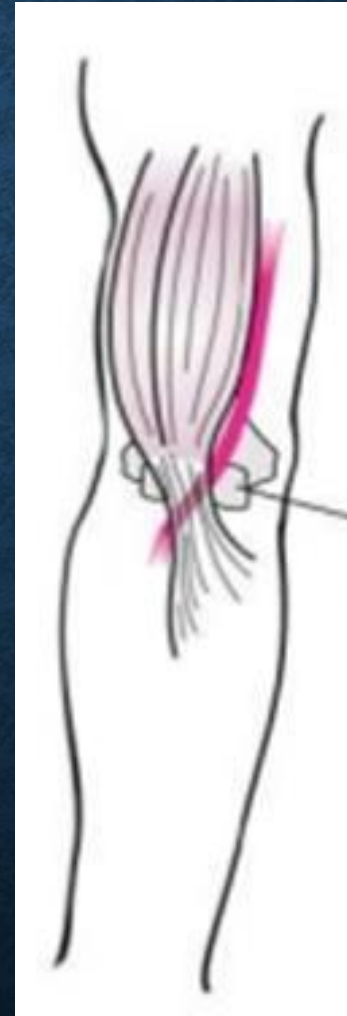


# OFFICE BLOOD PRESSURE MEASUREMENT

- ✓ Measure BP 1 min and 3 min after standing from a seated position in all patients at the first measurement to exclude orthostatic hypotension.
- ✓ Lying and standing BP measurements should also be considered in subsequent visits in *older people, people with diabetes, and people with other conditions in which orthostatic hypotension* may frequently occur.
- ✓ *Record heart rate and use pulse palpation to exclude arrhythmia.*

# WHERE TO LISTEN FOR BLOOD PRESSURE SOUNDS

1. Locate the antecubital fossa of the patient's arm and palpate the brachial artery. This location is the point over which the stethoscope is placed to listen for Korotkoff sounds later.
2. Wrap the cuff approximately 2.5 inch above the antecubital fossa.



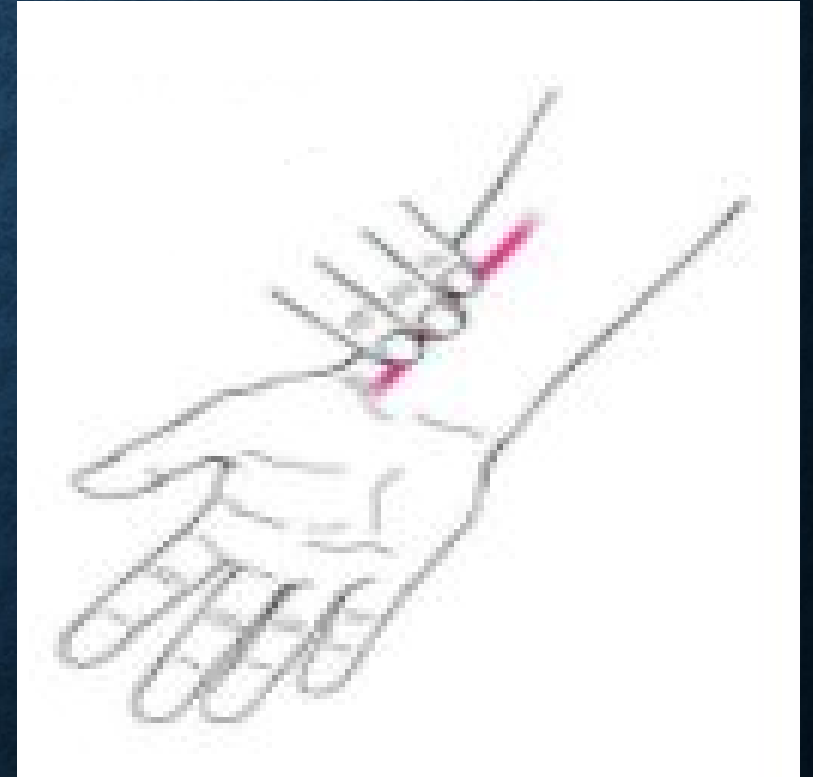
**Palpate the brachial artery just medial to and usually under the biceps tendon in the antecubital fossa. Place the diaphragm of the stethoscope directly over this pulse to get best Korotkoff sounds**



# DETERMINING THE PALPATED SYSTOLIC PRESSURE AND THE MAXIMUM INFLATION LEVEL

3. While palpating the radial pulse, inflate the cuff until you feel the radial pulse disappear.

Note the pressure on the manometer at this point and rapidly deflate the cuff.



## MEASUREMENT OF THE BP

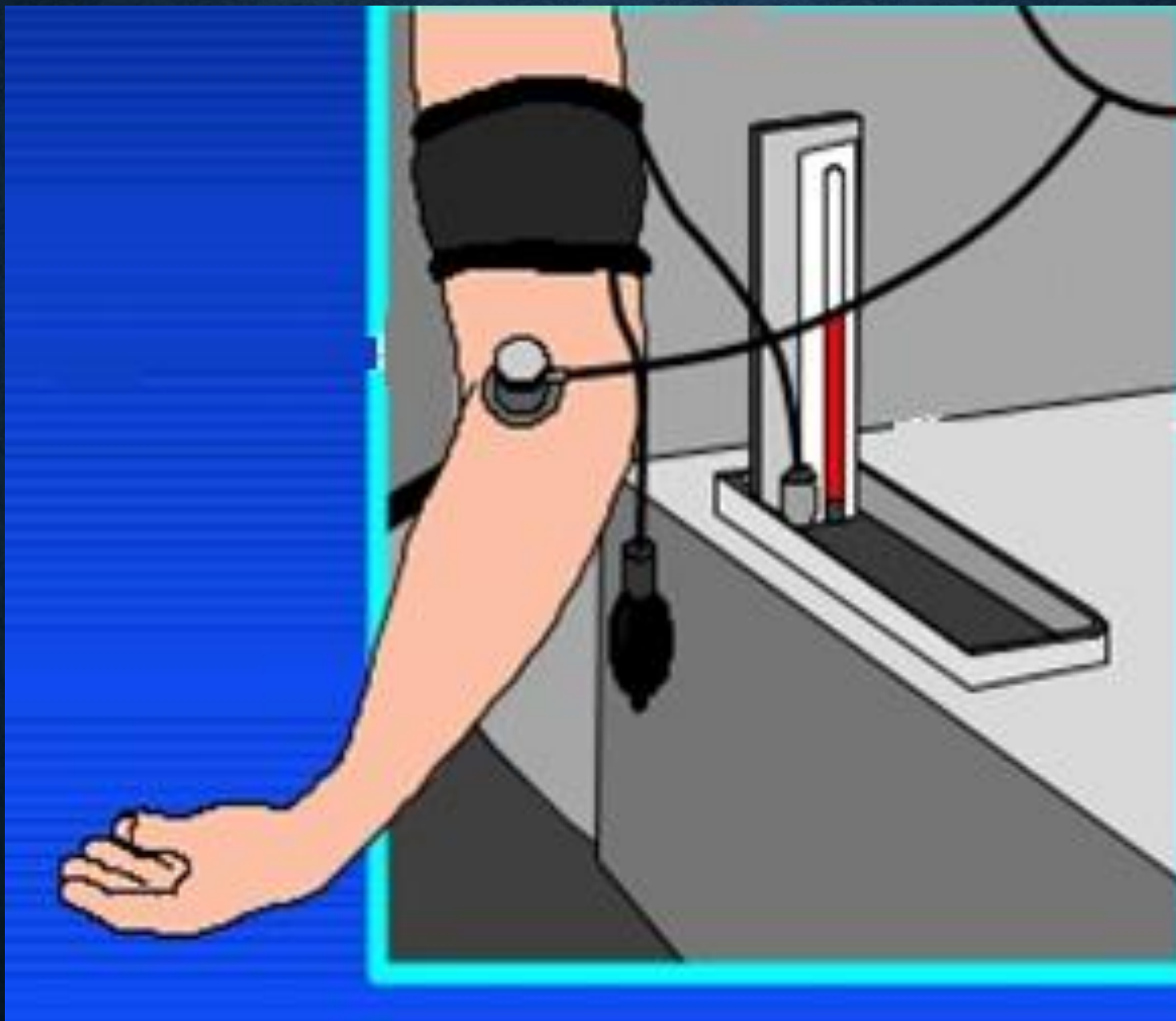
4. Place the stethoscope lightly over the brachial artery and inflate the cuff to a pressure 30 mmHg greater than estimated systolic pressure.
5. Deflate the cuff slowly at a rate of 2 mmHg per heartbeat.
6. Systolic pressure equal the pulse first heard by auscultation.



7. Deflate the cuff until the sounds became muffled and then disappear.

The disappearance of sound estimate the diastolic pressure

8. Record the blood pressure reading in even numbers. Note patient's position, cuff size, and arm used for measurement.





# COMMON PROBLEMS IN BP MEASUREMENT

**BP different in each arm:** A difference of  $>10$  mmHg suggest peripheral vascular disease and raises the possibility of renal artery stenosis as the cause of hypertension. Record the highest pressure and treat this.

**Wrong cuff size:** A cuff of 12.5x23 is suitable for only 60% of Europeans. The bladder should encircle between 80% and 100% of the arm.

In obese patients with large arm a normal-sized cuff will over estimate BP and the error is greater when the center of the cuff is not over the brachial artery. Using too large a cuff produces only a small under-estimation of BP (2-3 mm in systolic BP)

**Auscultatory gap:** Up to 20% of elderly hypertensive patients have phase 1 Korotkoff sounds which begin at systolic pressure but then disappear for varying lengths of time, reappearing before diastolic pressure. If the first appearance of the sound is missed, the systolic pressure will be recorded at a falsely low level. Avoid this palpating the systolic pressure first.

**Excess pressure of stethoscope:** Excess pressure can artificially lower the diastolic reading by 10 mmHg. The systolic pressure is not usually affected.

**Patient's arm at the wrong level:** The patient's elbow should be level with his heart. Hydrostatic pressure effects mean that if the arm is 7 cm higher, both systolic and diastolic pressure will be 5 mmHg lower. If the arm is 7 cm lower than the heart, they will be about 6 mmHg higher.



**Postural change:** When a healthy person stands, the pulse increases by 11 bpm and stabilizes after 1 min. The BP stabilizes after 1-2 min. Check the BP after a patient has been standing for 2 min; a drop of  $\geq 20$  mmHg on standing is postural hypotension.

**Abnormal pulse pressure:** The pulse pressure is the difference between the systolic and diastolic pressures. A pulse pressure of  $\geq 80$  mmHg suggests aortic regurgitation, while a low pulse pressure may occur in aortic stenosis.

Thank you