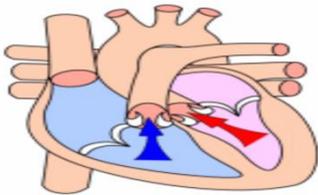


Blood Pressure Measurement

What is blood pressure?

- Blood pressure refers to the force exerted by circulating blood on the walls of blood vessels.
- The pressure of the circulating blood decreases as blood moves through arteries, arterioles, capillaries, and veins.
- Blood pressure values are reported in millimeters of mercury (mmHg).
- Blood pressure is recorded as systolic over diastolic e.g. 120/80.
- The **systolic** arterial pressure is defined as the peak pressure in the arteries, which occurs near the beginning of the cardiac cycle.
- The **diastolic** arterial pressure is the lowest pressure (at the resting phase of the cardiac cycle).
- Measures of arterial pressure are not static, but undergo natural variations from one heartbeat to another and throughout the day.
- Blood pressure also changes in response to stress, nutritional factors, drugs, or disease.

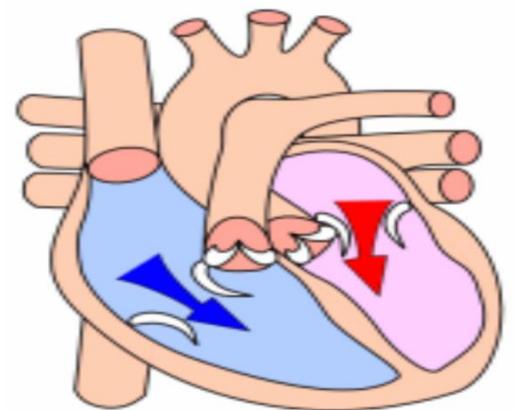


Systole is the contraction of heart chambers, pushing blood out of the chambers.

The chamber valves are closed.

Diastole is the period of time when the heart fills with blood after systole (contraction).

The chamber valves are open. The heart is at rest.



High blood pressure

- High blood pressure (or hypertension) is defined in an adult as a blood pressure greater than or equal to 140 mm Hg systolic pressure or greater than or equal to 90 mm Hg diastolic pressure.

- High blood pressure directly increases the risk of coronary heart disease (which leads to heart attack) and stroke, especially when there are other risk factors.
- High blood pressure is the major preventable cause of premature ill-health.

Risc factors fpr developing hypertension

- Obesity;
- Physical inactivity;
- High consumption of alcohol;
- High intake of dietary sodium;
- Low intake of dietary potassium;
- Stress;
- Increasing age;
- Cigarette smoking;
- Increased blood cholesterol;
- Patients with systemic diseases including diabetes mellitus; renal disease; peripheral vascular disease;
- Family history of hypertension, CHD or stroke.

Preparation for measurement

⊙ The patient should abstain from eating, drinking, smoking and taking drugs that affect the blood pressure one hour before measurement.



- ⊙ Instruct your patients to avoid coffee, smoking or any other unprescribed drug with sympathomimetic activity on the day of the measurement.
- ⊙ Because a full bladder affects the blood pressure, it should be emptied.
- ⊙ Painful procedures and exercise should have been avoided one hour prior to the measurement.
- ⊙ The patient should have been sitting quietly for about 5 minutes.



- ⊙ BP is taken in a quiet room and at comfortable temperature, the room temperature and time of the day must be recorded.

Measuring blood pressure

Main Steps

- ⊙ Wash your hands - Handwashing prevents the spread of infection;
- ⊙ Prepare all the required equipment: a qualitative stethoscope, an appropriately sized blood pressure cuff, a blood pressure measurement instrument with a manual inflate mode, gloves (if necessary), a cotton pad.
- ⊙ Cleanse the ear pieces and the diaphragm of the stethoscope with a spirit cotton pad.
- ⊙ Explain the purpose and procedure to the patient.

Now I would like to take your blood pressure. The blood pressure is an important vital sign. Depending on it, I will prescribe you investigations and treatment. Do you agree?

Acum eu Vă voi masura tensiunea arterială. Tensiunea arterială este un parametru important al stării de sanatate, în dependența de nivelul temperaturii eu voi prescri investigațiile necesare și tratament. Sunteți de acord?

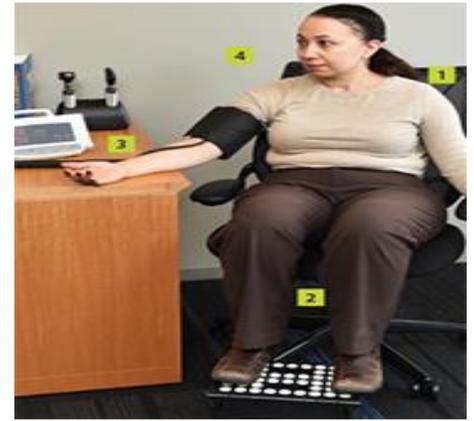
- ⊙ After that, you should explain what you want to do:

Please, relax, don't worry, this procedure is safe and not complicated. I will put the BP cuff around your upper arm, the cuff will be inflated, then deflated; after that I will say your BP level, please, don't move and speak during the procedure, it will take about a few minutes. Please, open your shoulder region.

Vă rog, nu retrăiți, relaxați-vă, procedura dată este inofensivă, eu Vă voi plasa manșeta tonometrului în regiunea brațului, o voi umfla, apoi dezumfla și voi anunța cifrele TA, Va rog, nu Va mișcați și nu vorbiți în timpul procedurii. Durata este de câteva minute. Eliberați, Va rog, regiunea brațului.

The position of the patient

- ⦿ The patient must sit.
- ⦿ The arm and back are supported.
- ⦿ The feet should be resting firmly on the floor.
- ⦿ The feet should not dangle.



The position of the arm



- ⦿ The measurements should be made on the right arm whenever possible.
- ⦿ The patient's arm should be resting on the desk and raised (by using a pillow).
- ⦿ The palm is facing up.
- ⦿ The arm should remain bent and completely relaxed.

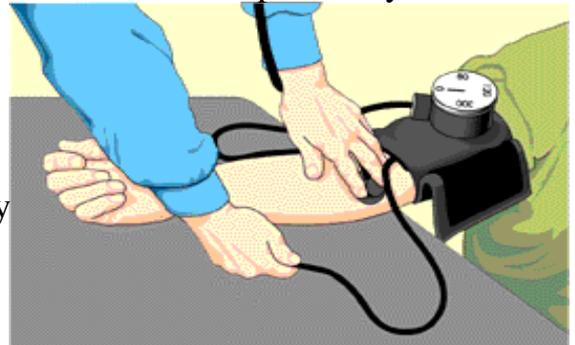
- ⦿ The patient's arm should be slightly flexed at elbow.
- ⦿ Push the sleeve up, wrap the cuff around the bare arm.
- ⦿ The cuff is applied directly over the skin (the clothes artificially raise the blood pressure).
- ⦿ The cuff lower border should be 2.5 cm above **antecubital**
- ⦿ The center of the inflatable bladder should be over the brachial artery.
- ⦿ Feel for a pulse from the artery coursing through the inside of the elbow (antecubital fossa).
- ⦿ Turn the thumb-screw.



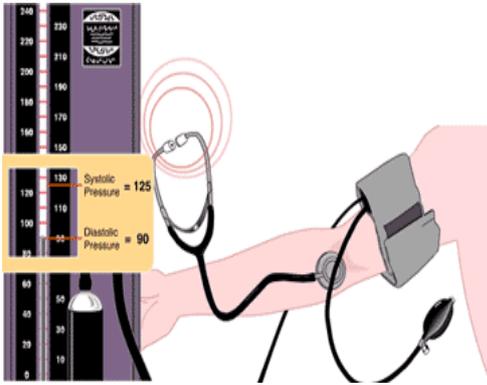


- ⦿ Turn the thumb-screw.
- ⦿ With your left hand place the stethoscope head directly over the artery you have found. Press firmly but not too hard so that not to block the artery.
- ⦿ Use your right hand to pump the squeeze bulb several times as you listen to the pulse sounds. When the BP cuff has inflated enough to stop the blood flow, you should hear no sounds through the stethoscope and pump up an additional 20-30 mmHg to the level of suspected Systolic BP.

- ⦿ Deflate the cuff slowly at a rate of 2-3 mmHg per second until you can again detect a radial pulse.
- ⦿ Listen for auditory vibrations from artery "bump, bump, bump" (Korotkoff)
- ⦿ Systolic blood pressure is the pressure at which you can first hear the pulse.
- ⦿ Diastolic blood pressure is the last pressure at which you can still hear the pulse.
- ⦿ Avoid moving your hands or the head of the stethoscope while you are taking readings as this may produce noise that can obscure the Sounds of Korotkoff.



- ⦿ The difference between two arm readings should be within 10-15 mm Hg. Differences greater than 10-15 imply differential blood flow.



- ⦿ If you wish to repeat the BP measurement, you should allow the cuff to completely deflate, permit any venous congestion in the arm to resolve and then repeat a minute or so later.

- ⦿ Explain the result to the patient
Your Blood pressure level is, thank you.
Nivelul tensiunii arteriale Dvoastră este, Va mulțumesc
- ⦿ Dispose of the equipment properly.
- ⦿ Wash your hands.



Questions to control your knowledge

1. What is blood pressure and what characteristics do you know?
 - Blood pressure refers to the force exerted by the blood circulating on the walls of blood vessels.
 - Circulating blood pressure decreases as blood passes through arteries, arterioles, capillaries and veins.
 - Blood pressure values are reported in mmHg (millimeters per Mercury column).
 - Blood pressure is recorded as systolic blood pressure on diastolic blood pressure, for example, 120 / 80mmHg.
 - Systolic blood pressure is defined as the highest pressure in the arteries, which occurs near the beginning of the heart cycle.
 - Diastolic blood pressure is the lowest pressure (in the resting phase of the cardiac cycle).
 - Blood pressure measurements are not static, but suffer from natural variations from one heartbeat to another throughout the day.
 - Blood pressure also changes in response to stress, nutritional factors, medications or diseases.
2. What is systole?

Systole is the contraction of the chambers of the heart, forcing blood from the chambers.

The valves are closed.

3. What is diastole?

Diastole is the time when the heart is filled with blood after systole (contraction).

The valves are open. The heart is in rest.

4. What is high blood pressure?

Increased blood pressure (or hypertension) is defined in an adult as a blood pressure higher or equal to 140 mm Hg of systolic blood pressure or higher or equal to 90 mm Hg of diastolic blood pressure.

5. What are the health risks of high blood pressure?

High blood pressure directly increases the risk of coronary heart disease (leading to heart attack) and stroke, especially when there are other risk factors.

High blood pressure is the most important cause of early health problems.

6. List the risk factors that lead to high blood pressure:

- Obesity ;
- Lack of physical activity;
- High alcohol consumption;
- Increased dietary sodium intake;
- Low dietary potassium intake;
- stress;
- Aging;
- Smoking ;
- Increased blood cholesterol;
- Patients with systemic diseases including diabetes, kidney disease, peripheral vascular disease;
- Family history of hypertension, coronary heart disease or stroke.

7. How to prepare to measure the blood pressure?

- The patient should avoid eating, drinking, smoking and receiving medications that affect blood pressure one hour before the measurement.
- Instruct your patients to avoid coffee, smoking or any non-prescription drugs with sympathomimetic activity on the day of measurement.
- Because a full bladder affects blood pressure, it should be emptied.
- Painful procedures and exercises should be avoided one hour before the measurement.
- The patient should sit quietly for about 5 minutes.
- Blood pressure is measured in a quiet room and at a comfortable room temperature, the temperature and time of day must be recorded.

8. Name the main steps when measuring blood pressure.

- Wash your hands - washing your hands prevents the spread of the infection;
- Prepare all the necessary equipment: a quality stethoscope, a cuff of appropriate size, a blood pressure measuring instrument with manual inflation mode, gloves (if necessary), a cotton swab.
- Clean the ear and diaphragm parts of the stethoscope with a cotton swab.
- Explain the purpose and procedure of the patient.
- After that, you should explain what you want to do.

9. Describe the patient's position during blood pressure measurement.

- The patient must be seated.
- The arm and back are supported.
- The feet must rest firmly on the floor.
- The legs should not sway.

10. Describe the position of the arm when measuring blood pressure.

- Measurements should be made on the right arm whenever possible.

- The patient's arm should be on the table and raised (using a pillow).
 - The palm is facing up.
 - The arm should remain bent and completely relaxed.
 - The patient's arm should be slightly bent at the elbow.
 - Push the sleeve up, wrap the cuff around the hollow arm.
 - The cuff is applied directly to the skin (clothes artificially raise blood pressure).
 - The lower edge of the cuff should be 2.5 cm above
 - The center of the inflatable balloon should be above the brachial artery.
 - Feel the pulse on the artery passing through the inside of the elbow (antecubital fossa).
 - Turn the screw with the striped head.
 - With your left hand, place the head of the stethoscope directly over the artery you found. Press firmly, but not too hard, so as not to block the artery.
 - Use your right hand to pump the balloon as if squeezing it several times while listening to the sounds of the pulse. When the cuff is swollen enough to stop the flow of blood, you should not hear any sound through the stethoscope and pump another 20-30 mmHg to the suspected systolic blood pressure level.
 - Release the cuff slowly at a rate of 2-3 mmHg per second until you can detect the radial pulse again.
 - Listen to the auditory vibrations on the "bump, bump, bump" artery (Korotkoff)
 - Systolic blood pressure is the voltage at which the pulse can first be heard.
 - Diastolic blood pressure is the last voltage at which the pulse can still be heard.
 - Avoid moving the hands or head of the stethoscope while reading the values as this can produce noise that can cover Korotkoff sounds.
 - The difference between the values of the two arms should be within 10-15 mm Hg. Differences greater than 10-15 involve differential blood flow.
 - If you want to repeat the blood pressure measurement, you should let the cuff release completely, allow any venous congestion in your arm to resolve, and then repeat about a minute later.
11. How do you explain the result of the patient's blood pressure measurement?
Your blood pressure level is, Thank you.

Test

1. Which of the following are characteristics of blood pressure?

- a. * Blood pressure refers to the force exerted by the blood circulating on the walls of blood vessels.
 - b. * Circulating blood pressure decreases as blood passes through arteries, arterioles, capillaries, and veins.
 - c. * Blood pressure values are reported in mmHg (millimeters per Mercury column).
 - d. * Blood pressure is recorded as systolic pressure on diastolic blood pressure, for example, 120 / 80mmHg.
 - e. Diastolic blood pressure is the highest pressure.
2. Which of the following are characteristic of high blood pressure?
- a. * Systolic blood pressure is defined as the highest pressure in the arteries, which occurs near the beginning of the cardiac cycle.
 - b. * Diastolic blood pressure is the lowest pressure (in the resting phase of the cardiac cycle).
 - c. * Blood pressure measurements are not static, but suffer from natural variations from one heartbeat to another throughout the day.
 - d. * Blood pressure also changes in response to stress, nutritional factors, medications or diseases.
 - e. Systolic blood pressure is the lowest pressure.
3. What is systole?
- a. * Systole is the contraction of the chambers of the heart, forcing blood from the chambers.
 - b. * valves are closed.
 - c. Systole is the contraction of the chambers of the heart, forcing blood into the chambers.
 - d. The valves of the room are open.
 - e. The chamber valves are half open.
4. What is diastole?
- a. * Diastole is the period of time when the heart fills with blood after systole (contraction).
 - b. * The valves are open. The heart is in rest.
 - c. The valves of the chamber are closed.
 - d. The systole is the contraction of the chambers of the heart, forcing the blood from the chambers.
 - e. The valves of the chamber are semi-closed.
5. What is high blood pressure?
- a. * Elevated blood pressure (or hypertension) is defined in an adult as a blood pressure higher or equal to 140 mm Hg of systolic blood pressure or higher or equal to 90 mm Hg of diastolic blood pressure.

b. Elevated blood pressure (or hypertension) is defined in an adult as a blood pressure higher or equal to 80 mm Hg of systolic blood pressure or higher or equal to 30 mm Hg of diastolic blood pressure.

c. Increased blood pressure (or hypertension) is defined in an adult as a blood pressure higher or equal to 90 mm Hg of systolic blood pressure or higher or equal to 90 mm Hg of diastolic blood pressure.

d. Elevated blood pressure (or hypertension) is defined in an adult as a blood pressure higher or equal to 140 mm Hg of systolic blood pressure or higher or equal to 50 mm Hg of diastolic blood pressure.

e. Elevated blood pressure (or hypertension) is defined in an adult as a blood pressure higher or equal to 140 mm Hg of systolic blood pressure or higher or equal to 65 mm Hg of diastolic blood pressure.

6. What health risks are high blood pressure?

a. * High blood pressure directly increases the risk of coronary heart disease (leading to heart attack) and stroke, especially when there are other risk factors.

b. * High blood pressure is the most important preventable cause of early health problems.

c. High blood pressure does not directly increase the risk of coronary heart disease and stroke.

d. High blood pressure is not the most important preventable cause of early health problems.

e. High blood pressure is not as important as diabetes.

7. List the risk factors that lead to high blood pressure:

a. * Obesity.

b. Physical activity.

c. * High alcohol consumption.

d. * Increased dietary sodium intake.

e. * Low dietary potassium intake.

8. List the risk factors that lead to high blood pressure:

a. * Stress.

b. * Aging.

c. * Smoking.

d. High blood cholesterol is not related to high blood pressure.

e. * Patients with systemic diseases including diabetes, kidney disease, peripheral vascular disease.

9. What is the preparation for measuring blood pressure?

a. * The patient should avoid eating, drinking, smoking and receiving medications that affect blood pressure one hour before measurement.

- b. * Instruct your patients to avoid coffee, smoking or any non-prescription drugs with sympathomimetic activity on the day of measurement.
- c. * Since the full bladder affects blood pressure, it should be emptied.
- d. * Painful procedures and exercises should be avoided one hour before the measurement.
- e. The patient must be seated and blood pressure measured immediately.

10. Name the main steps during blood pressure measurement.

- a. * Wash hands - hand washing prevents the spread of infection;
- b. * Prepare all the necessary equipment: a qualitative stethoscope, a cuff of appropriate size, a blood pressure measuring instrument with manual swelling, gloves (if necessary), a cotton swab.
- c. * Clean the ear and diaphragm parts of the stethoscope with a cotton swab.
- d. * Explain the purpose and procedure of the patient.
- e. Blood pressure must be measured promptly so that it fails to change due to emotions

11. Describe the patient's position when measuring blood pressure.

- a. * The patient must be seated.
- b. * The arm and back are supported.
- c. * The feet should rest firmly on the floor.
- d. * Legs should not sway.
- e. The patient's position is not important

12. Describe the position of the arm during blood pressure measurement.

- a. Measurements should be made on the right arm whenever possible.
- b. The patient's arm should be on the table and raised (by using a pillow).
- c. The palm is facing up.
- d. The arm should remain bent and completely relaxed.
- e. The patient's arm should be slightly flexed at the elbow.

13. Describe the position of the arm during blood pressure measurement.

- a. Push the sleeve down, wrap the cuff around the empty arm.
- b. * The cuff is applied directly to the skin (clothes artificially raise blood pressure).
- c. * The lower edge of the cuff should be 2.5 cm above the elbow
- d. * The center of the inflatable balloon should be over the brachial artery.
- e. * Feel the pulse on the artery passing through the inside of the elbow (antecubital fossa).

14. Describe the position of the arm during blood pressure measurement.

- a. Be careful not to turn the knurled screw.

- b. * With your left hand, place the head of the stethoscope directly over the artery you found. Press firmly, but not too tightly so that you do not block the artery.
- c. * Use your right hand to pump the balloon as if squeezing it several times while listening to the sounds of the pulse. When the cuff is swollen enough to stop the flow of blood, you should not hear any sound through the stethoscope and pump another 20-30 mmHg to the suspected systolic blood pressure level.
- d. * Deflate the cuff slowly at a rate of 2-3 mmHg per second until you can detect the radial pulse again.
- e. * Listen to the auditory vibrations on the "bump, bump, bump" artery (Korotkoff).

15. Describe the position of the arm during blood pressure measurement.

- a. * Systolic blood pressure is the voltage at which the pulse can first be heard.
- b. Diastolic blood pressure is the first voltage at which the pulse can still be heard.
- c. * Avoid moving the hands or head of the stethoscope while reading the values as this may produce noise that may cover Korotkoff sounds.
- d. * The difference between the values of the two arms should be within 10-15 mm Hg. Differences greater than 10-15 involve differential blood flow.
- e. * If you want to repeat the blood pressure measurement, you should let the cuff to relieve completely, allow any venous congestion in your arm to resolve and then repeat about a minute later.

16. How do you explain the result of measuring the patient's blood pressure?

- a. Your blood pressure level is, Thank you.
- b. Blood pressure is not told to the patient.
- c. The patient alone follows the cursor, observes the result and must not be informed.
- d. You have a good voltage.
- e. No answer is correct.