

EXPERIMENT TWO

The Blood pressure



The Blood pressure

Blood pressure (BP) is the pressure exerted by circulating blood upon the walls of blood vessels, and is one of the principal vital signs. During each heartbeat, BP varies between a maximum (systolic) and a minimum (diastolic) pressure.

The mean BP, due to pumping by the heart and resistance to flow in blood vessels, decreases as the circulating blood moves away from the heart through arteries.

Blood pressure drops most rapidly along the small arteries and arterioles, and continues to decrease as the blood moves through the capillaries and back to the heart through veins.

Gravity, valves in veins, and pumping from contraction of skeletal muscles, are some other influences on BP at various places in the body.

The force exerted by the blood on the wall of a blood vessel is called the blood pressure.

Or

The pressure exerted by the flow of blood on the wall of a blood vessel is called blood pressure

Blood pressure is measured by an instrument called as Sphygmomanometer.

This pressure is greater in the arteries than the veins.

The pressure in the artery during ventricular contraction is called the systolic pressure.

The pressure in the artery during ventricular relaxation is called diastolic pressure.

The term *blood pressure* usually refers to the pressure measured at a person's upper arm. It is measured on the inside of an elbow at the brachial artery, which is the upper arm's major blood vessel that carries blood away from the heart. A person's BP is usually expressed in terms of the systolic pressure over diastolic pressure (mmHg), for example 140/90.

Various factors influence a person's average BP and variations. Factors such as age and gender influence average values. In children, the normal ranges are lower than for adults and depend on height. As adults age, systolic pressure tends to rise and diastolic tends to fall. In the elderly, BP tends to be above the normal adult range,

largely because of reduced flexibility of the arteries. Also, an individual's BP varies with exercise, emotional reactions, sleep, digestion and time of day.

Differences between left and right arm BP measurements tend to be random and average to nearly zero if enough measurements are taken.

The risk of cardiovascular disease increases progressively above 115/75 mmHg. In the past, hypertension was only diagnosed if secondary signs of high arterial pressure were present, along with a prolonged high systolic pressure reading over several visits. Regarding hypotension, in practice blood pressure is considered too low only if noticeable symptoms are present.

The number of adults aged 30–79 years with hypertension has increased from 650 million to 1.28 billion in the last thirty years, according to the first comprehensive global analysis of trends in hypertension prevalence, detection, treatment and control, led by Imperial College London and WHO in 2020.

Blood Pressure Stages

Blood Pressure Category	Systolic mm Hg (upper #)		Diastolic mm Hg (lower #)
Normal	less than 120	and	less than 80
Elevated	120-129	and	less than 80
High Blood Pressure (Hypertension) Stage 1	130-139	or	80-89
High Blood Pressure (Hypertension) Stage 2	140 or higher	or	90 or higher
Hypertensive Crisis (Seek Emergency Care)	higher than 180	and/or	higher than 120

Source: American Heart Association

Complications of High Blood Pressure

1. Heart Attack
2. Stroke
3. Aneurysm
4. Heart Failure
5. Kidney Damage
6. Vision Loss

Symptoms of High Blood Pressure

- Severe headache صداع شديد
- Fatigue or confusion التعب أو الارتباك
- Vision problems مشاكل في الرؤية
- Chest pain ألم في الصدر
- Difficulty breathing صعوبة في التنفس
- Irregular heartbeat عدم انتظام ضربات القلب
- Blood in the urine دم في البول

Causes of High Blood Pressure

- Smoking التدخين
- Being overweight or obese زيادة الوزن أو السمنة
- Lack of physical activity نقص في النشاط الجسدي
- Too much salt in the diet الكثير من الملح في النظام الغذائي
- Too much alcohol الكثير من استهلاك الكحول
- Stress ضغط عصبي
- Older age كبار السن
- Family history of high blood pressure تاريخ الأسرة من ارتفاع ضغط الدم
- Chronic kidney disease فشل كلوي مزمن
- Thyroid disorders اضطرابات الغدة الدرقية

Symptoms Low blood pressure

Dizziness or lightheadedness الدوخة أو الدوار

Fainting إغماء

Blurred vision عدم وضوح الرؤية

Nausea غثيان

Lack of concentration قلة التركيز

Causes of Low blood pressure

Pregnancy حمل

Decreases in blood volume انخفاض في حجم الدم

Certain medications بعض الأدوية

Heart problems مشاكل قلبية

Severe infection (septic shock) العدوى الشديدة (الصدمة الإنتانية)

Allergic reaction (anaphylaxis) رد الفعل التحسسي الحساسية المفرطة

Neurally mediated hypotension انخفاض ضغط الدم بواسطة العصبي

Nutritional deficiencies نقص غذائي



A sphygmomanometer is a device for measuring blood pressure.

Purpose

The sphygmomanometer is designed to monitor blood pressure by measuring the force of the blood in the heart where the pressure is greatest. This occurs during the contraction of the ventricles, when blood is pumped from the heart to the rest of the body (systolic pressure). The minimal force is also measured. This occurs during the period when the heart is relaxed between beats and pressure is lowest (diastolic pressure).

Description

A sphygmomanometer consists of a hand bulb pump, a unit that displays the blood pressure reading, and an inflatable cuff that is usually wrapped around a person's upper arm. Care should be taken to ensure that the cuff size is appropriate for the person whose blood pressure is being taken. This improves the accuracy of the reading. Children and adults with smaller or larger than average-sized arms require special-sized cuffs appropriate for their needs. A stethoscope is also used in conjunction with the sphygmomanometer to hear the blood pressure sounds. Some devices have the stethoscope already built in. Operation

The flow, resistance, quality, and quantity of blood circulating through the heart and the condition of the arterial walls are all factors that influence blood pressure. If blood flow in the arteries is restricted, the reading will be higher.

Blood pressure should be routinely checked every one to two years. It can be checked at any time, but is best measured when a person has been resting for at least five minutes, so that exertion prior to the test will not unduly influence the outcome of the reading.

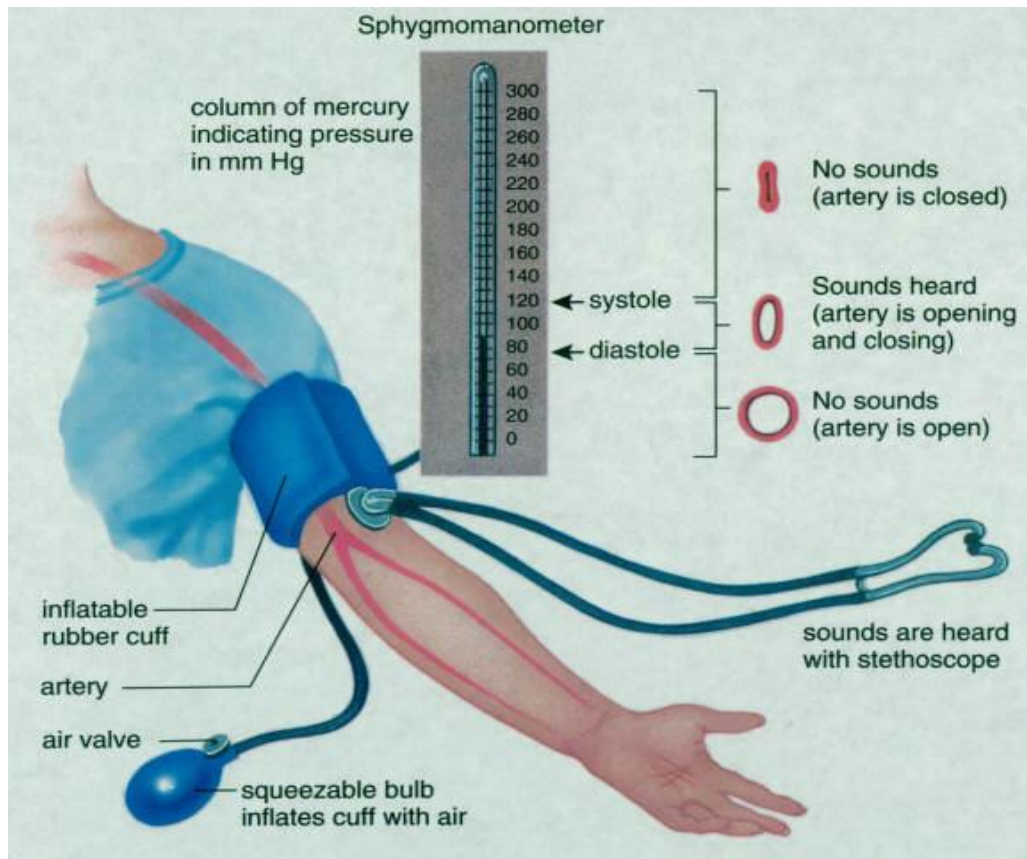
To record blood pressure, the person should be seated with one arm bent slightly, and the arm bare or with the sleeve loosely rolled up. With an aneroid or automatic unit, the cuff is placed level with the heart and wrapped around the upper arm, one inch above the elbow. Following the manufacturer's guidelines, the cuff is inflated and then deflated while an attendant records the reading.

If the blood pressure is monitored manually, a cuff is placed level with the heart and wrapped firmly but not tightly around the arm one inch (2-3 cm) above the elbow over the brachial artery. Wrinkles in the cuff should be smoothed out. Positioning a stethoscope over the brachial artery in front of the elbow with one hand and listening through the earpieces, the health professional inflates the cuff well above normal levels (to about 200 mm Hg), or until no sound is heard. Alternatively, the cuff should be inflated 10 mm Hg above the last sound heard. The valve in the pump is slowly opened. Air is allowed to escape no faster than 5 mm Hg per second to deflate the pressure in the cuff to the point where a clicking sound is heard over the brachial artery. The reading of the gauge at this point is recorded as the systolic pressure. The sounds continue as the pressure in the cuff is released and the flow of blood through the artery is no longer blocked. At this point, the noises are no longer heard. The reading of the gauge at this point is noted as the diastolic pressure. "Lub-dub" is the sound produced by the normal heart as it beats. Every time this sound is detected, it means that the heart is contracting once. The sounds are created when the heart valves click to close. When one hears "lub," the atrioventricular valves are closing. The "dub" sound is produced by the pulmonic and aortic valves.

With children, the clicking sound does not disappear but changes to a soft muffled sound. Because sounds continue to be heard as the cuff deflates to zero, the reading

of the gauge at the point where the sounds change is recorded as the diastolic pressure.

Blood pressure readings are recorded with the systolic pressure first, then the diastolic pressure (e.g. 120/70).



Heart beat



Figure 15.6. Measuring the pulse rate. Place the fingers over the radial artery at the wrist.

pulse rate?

Your pulse rate, also known as your heart rate, is the number of times your heart beats per minute. A normal resting heart rate should be **between 60 to 100 beats per minute**, but it can vary from minute to minute.

Your age and general health can also affect your pulse rate, so it's important to remember that a 'normal' pulse can vary from person to person.



Count the number of pulses for 60 seconds, and this will be the heart-rate in beats-per-minute.

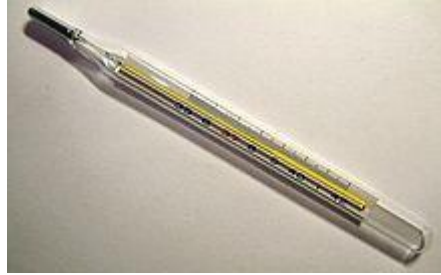
Or just count the number of pulses for 30 seconds, and multiply that number by 2 for H.R. in bpm. At rest, a normal heart beats around 60-100 bpm

Body Temperature

Normal human body temperature, also known as *normothermia* or *euthermia*, is a concept that depends upon the place in the body at which the measurement is made, and the time of day and level of activity of the person. There is no single number that represents a normal or healthy temperature for all people under all circumstances using any place of measurement.

Different parts of the body have different temperatures. Rectal and vaginal measurements, or measurements taken directly inside the body cavity, are typically slightly higher than oral measurements, and oral measurements are somewhat higher than skin temperature. The commonly accepted average core body temperature (taken internally) is 37.0 °C (98.6 °F)

Methods of measurement



A medical/clinical thermometer showing the temperature of 38.7 °C

Taking a patient's temperature is an initial part of a full clinical examination. Sites used for measurement include:

- In the rectal
- In the mouth
- Under the arm
- In the ear
- In the vagina
- On the skin of the forehead

The temperature reading depends on which part of the body is being measured. The typical daytime temperatures among healthy adults are as follows: