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## High blood pressure (Hypertension)

High blood pressure (hypertension) happens when the force on the walls of blood vessels (caused by the blood within them) is more than normal. This means the heart has to work harder and the blood vessels are under more strain, making it a major risk factor for [heart disease](#), [stroke](#) and other serious conditions.

### What is high blood pressure?

High blood pressure (hypertension) is a blood pressure that is 140/90 mm Hg or above each time it is taken at the GP surgery, or home or ambulatory readings where the average is more than 135/85 mm Hg. That is, it is sustained at this level.

The higher number is called the systolic blood pressure and the lower number is the diastolic blood pressure. The ideal blood pressure is between 90/60mmHg and 120/80mmHg.

High blood pressure is only diagnosed if there are several blood pressure readings that are high, taken on different occasions, and when a person is relaxed.

### What is blood pressure?

Blood pressure reading will have two figures, one 'over' the other - for example, 140/80. The higher figure (called the systolic level) is a measure of the pressure inside the arteries when the heart is pumping blood out.

The lower figure (called the diastolic level) is a measure of the pressure inside the arteries when the heart is resting between heartbeats. Blood pressure is measured in millimetres of mercury (mm Hg).

A one-off blood pressure reading that is high does not mean high blood pressure. Blood pressure varies throughout the day. It may be high for a short time, such as when anxious, stressed, or after exercise.

## High blood pressure symptoms

The vast majority of people with high blood pressure do not know they have it, until it causes a complication such as a stroke or heart attack. Usually high blood pressure is only picked up if blood pressure is checked routinely, or as part of checks for another medical problem.

Occasionally, symptoms of high blood pressure may include:

- Headaches.
- Dizziness.
- Affected vision.
- Changes in the blood vessels at the back of the eye.

Other than the blood pressure reading being high, there isn't usually anything for the doctor to find on examination either. If blood pressure has been high for some time, or very high, there can be changes in the blood vessels at the back of the eye.

## How is high blood pressure diagnosed?

Unless a single level is extremely high, high blood pressure will not be diagnosed without an average of several readings, usually from home or ambulatory measurements. Blood pressure recording outside of the doctor's surgery is recommended in most people who are suspected of having high blood pressure.

One reason for this is because some people become anxious in medical clinics. This can cause the blood pressure to rise. (This is often called white coat hypertension.) Home or ambulatory monitoring of blood pressure may show that the blood pressure is normal when a person is relaxed.

However, if a person has diabetes, or has recently had a heart attack or stroke, blood pressure checks may be advised more often over the following week or so. Treatment with medication is usually considered at an earlier stage if the high blood pressure readings remain high.

## Why is high blood pressure a problem?

High blood pressure (hypertension) is a risk factor for developing serious health problems sometime in the future. High blood pressure over a long period of time may do some damage to the blood vessels (arteries) and put a strain on the heart. In general, the higher the blood pressure, the greater the health risk.

[Cardiovascular disease](#) is the biggest risk from having high blood pressure. Cardiovascular diseases are diseases of the heart (cardiac muscle) or blood vessels (vasculature). This usually means diseases of the heart or blood vessels that are caused by atheroma.

Patches of atheroma are like small fatty lumps that develop within the inside lining of blood vessels (arteries). Atheroma is also known as atherosclerosis and hardening of the arteries.

Cardiovascular diseases that can be caused by atheroma include:

- [Angina](#).
- [Heart attack](#).
- [Stroke](#).
- [Transient ischaemic attack \(TIA\)](#).
- [Peripheral arterial disease](#).

## What causes high blood pressure?

It isn't always clear what might be causing high blood pressure. However, the risk of developing high blood pressure is increased if a person:

- Has diabetes. This is the case for [type 1 diabetes](#) but it is even more common in those with [type 2 diabetes](#).
- Is of African-Caribbean origin.

- Is from the Indian subcontinent.
- Has a family history of high blood pressure.
- Has certain lifestyle factors. That is, those who:
  - Are overweight.
  - Eat a lot of salt.
  - Aren't physically active.
  - Drink a lot of alcohol.
  - Have a lot of stress.

## How is blood pressure measured?

The first blood pressure reading will usually be in a clinic or GP's surgery. If one reading is found to be high, it is usual for the doctor or nurse to advise a time of observation. This means several blood pressure checks at intervals over time.

These checks will often include [home or ambulatory readings](#). The length of the observation period varies depending on the initial reading and whether there are any other risk factors for cardiovascular disease.

### Clinic/GP surgery blood pressure readings

These are readings taken by a doctor or nurse in a clinic or a GP surgery, using a standard blood pressure machine.

### Home blood pressure readings

This involves a machine to take blood pressure readings at home. Blood pressure readings are taken by a person whilst seated and at rest at home, using a standard blood pressure machine. The blood pressure readings are taken twice a day for a week. This can then provide an average reading. It's normal for blood pressure to fluctuate, so a single raised reading isn't a cause for concern unless it's extremely high.

### Ambulatory blood pressure readings

These are readings taken at regular intervals during normal activities. A small machine that is attached to the arm takes and records the readings, usually over a 24-hour period.

As a rule, an average of the ambulatory blood pressure readings gives the truest account of blood pressure. Home blood pressure readings are a good substitute if an ambulatory machine is not available.

Ambulatory and home readings are often a bit lower than clinic or GP surgery readings. Sometimes they are a lot lower. This is because people are often much more relaxed and less stressed at home than in a formal clinic or surgery situation.

[See the separate leaflet called Home and Ambulatory Blood Pressure Recording.](#)

## What tests are done for high blood pressure?

Anyone who is diagnosed as having high blood pressure (hypertension) will need to be examined by a doctor and have some routine tests which include:

- A [urine test](#) to check for protein or blood in the urine.
- A blood test to check that the [kidneys are working normally](#) and to check [cholesterol level](#) and [sugar \(glucose\) level](#).
- A heart tracing, called an [electrocardiogram \(ECG\)](#).

The purpose of the examination and tests is to:

- Rule out (or diagnose) a secondary cause of high blood pressure, such as kidney disease.
- Check to see if the high blood pressure has affected the heart.
- Check for other risk factors such as a high cholesterol level or diabetes.

# How to reduce high blood pressure

Lifestyle changes can be very important to help reduce blood pressure and reduce the risk of [cardiovascular disease](#). In some people diagnosed with high blood pressure, this may help them to avoid medication. In particular, the following may help:

- [Losing weight if overweight.](#)
- [Maintaining alcohol intake to within recommended limits.](#)
- Reducing the salt in the diet.
- [Taking regular exercise.](#)

[Stopping smoking](#) doesn't reduce blood pressure, but smoking and high blood pressure increase the risk of the same conditions. So quitting smoking will reduce the risk of conditions such as strokes, heart attacks, [peripheral arterial disease](#) and [chronic kidney disease](#).

[See the separate leaflet called Living with High Blood Pressure.](#)

## Treatments for high blood pressure

### High blood pressure medication

The main treatment for high blood pressure is medication. [There are many different medicines for high blood pressure](#). There are six main classes of medicines that are used to lower blood pressure:

- [Angiotensin-converting enzyme \(ACE\) inhibitors.](#)
- Angiotensin receptor blockers (ARBs).
- [Calcium-channel blockers.](#)
- [Thiazide diuretics.](#)
- [Beta-blockers.](#)
- [Alpha blockers.](#)

They work in various different ways. A doctor will advise on the best one to use for any individual as the most effective medicine will depend on age and ethnic group. If the first medicine doesn't work well enough or causes side effects, there are plenty of other options. More than one medicine is often needed to control high blood pressure.

The idea is to find one or more pills which suit an individual, and which control blood pressure. Once blood pressure is controlled, medication needs to be continued long-term. Blood pressure will be checked regularly and medication adjusted if need be.

It is recommended by the National Institute for Health and Care Excellence (NICE) that medication to help control high blood pressure should be used in addition to lifestyle advice for persistent stage 2 hypertension (clinic blood pressure measured as 160/100 mm Hg or higher but less than 180/120 mm Hg and home or ambulatory blood pressure average of 150/95 mm Hg or higher).

Medication may also be advised for anyone aged under 80 with persistent stage 1 hypertension (clinic blood pressure between 140/90 mm Hg and 159/99 mm Hg and home or ambulatory blood pressure average of 135/85 mm Hg to 149/94 mm Hg) if it is found that the high blood pressure has caused any damage, such as to the eyes, heart or kidneys, or if there is known cardiovascular disease, kidney disease, diabetes.

Medication may be considered in addition to lifestyle advice for those aged under 60 with stage 1 hypertension. Medication may also be considered in addition to lifestyle advice for those aged over 80 with stage 1 hypertension if the clinic blood pressure is over 150/90 mm Hg.

If a person has 'grade 1 hypertension' (clinic blood pressure 140/90 mm Hg to 159/99 mm Hg and subsequent ABPM daytime average or HBPM average blood pressure 135/85 mm Hg to 149/94 mm Hg), the [10-year risk of heart attack or stroke](#) will be calculated. This takes into account several factors including age, gender, cholesterol levels and other medical conditions, as well as blood pressure.

NICE recommends starting treatment if the 10-year risk is over 10%. That means many more people may be offered tablets to protect them against heart attack and stroke.

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## Further reading

- [Description of the DASH \(Dietary Approaches to Stop Hypertension\) Eating Plan](#); National Institutes of Health
- [Guidelines for the management of arterial hypertension](#); ESH/ESC Clinical Practice Guidelines, European Society of Cardiology (2013)
- [He FJ, Li J, Macgregor GA](#); Effect of longer term modest salt reduction on blood pressure: Cochrane systematic review and meta-analysis of randomised trials. *BMJ*. 2013 Apr 3;346:f1325. doi: 10.1136/bmj.f1325.
- [Ettehad D, Emdin CA, Kiran A, et al](#); Blood pressure lowering for prevention of cardiovascular disease and death: a systematic review and meta-analysis. *Lancet*. 2016 Mar 5;387(10022):957-67. doi: 10.1016/S0140-6736(15)01225-8. Epub 2015 Dec 24.
- [Hypertension in adults: diagnosis and management](#); NICE (August 2019 - last updated November 2023)
- [2021 European Guidelines on cardiovascular disease prevention in clinical practice](#); European Society of Cardiology (2021)
- [CKS Hypertension](#); NICE CKS, December 2023 (UK access only)
- [Cardiovascular disease: risk assessment and reduction, including lipid modification](#); NICE Clinical Guideline (July 2014 -last updated May 2023)  
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