Blood pressure

infoKID
Information for parents and carers about children's kidney conditions

This infoKID topic is for parents and carers about children's kidney conditions. Visit www.infoKID.org.uk to find more topics about conditions, tests & diagnosis, treatments and supporting information.

Each topic starts with an overview followed by several sections with more information.

Links to sections in topic | **Other topics** available on website

Blood pressure is the force, or pressure that makes the blood flow round the body. Blood pressure is often shortened to BP.

- **When the heart beats, or contracts, it pushes blood through blood vessels called arteries.**
- **When the heart relaxes between beats, blood returns to the heart through blood vessels called veins.**

It is very important that your child's blood pressure is in a healthy range. If his or her blood pressure is too high or too low, your doctor will try to find out what is causing this.

Overview

High and low blood pressure

High blood pressure

Hypertension is blood pressure that is too high. In some children, hypertension can be a serious condition. It can increase the risk of getting cardiovascular disease, especially if it continues into adulthood. Some children with hypertension have no symptoms, but it may cause headaches that do not go away, vomiting (being sick) or blurred (fuzzy) vision.

Hypertension in children is rare. If your child has high blood pressure, your doctor will try to find out what is causing it and whether it is affecting other parts of his or her body, such as the kidneys. Your child may need to make changes to his or her diet and/or take medicines.

» More about hypertension

Low blood pressure

Hypotension is blood pressure that is too low. This can happen in **acute** disease (where the illness comes on suddenly) or as a side-effect of some medicines. Some children with hypotension may have no symptoms, but some may experience:

- dizziness or light-headedness
- fainting
- blurred vision
- rapid or irregular heartbeats
- nausea (feeling sick)
- general weakness.

Your doctor will try to find out what is causing the low blood pressure.

Why does my child need his or her blood pressure measured?

Children may have their blood pressure measured for many reasons, including:

- during a doctor's appointment – this is routine
- when they are admitted to hospital
- before an operation.

Regular measurements

Some children need regular measurements of their blood pressure, especially if:

- they already have **hypertension**, or high blood pressure
- they are at risk of high blood pressure – for example, because they have problems with their kidneys.

Blood pressure measurements

Blood pressure is measured using a special instrument. This can be either electronic or manual (worked by hand).

A blood pressure measurement has two numbers.

- The top number is called the **systolic pressure** – the pressure when the heart beats. This is easier to measure and is used more often in children.
- The bottom number is called the **diastolic pressure** – the pressure when the heart relaxes.

Changes in blood pressure

Blood pressure changes from day to day and at different times of the day. It can also change when we feel stress and during exercise.

» More about blood pressure measurements

How is blood pressure measured?

Although measuring blood pressure will not hurt your child, it can be challenging, especially in younger children. Your child's doctor or nurse will take a few measurements when your child is relaxed.

You do not usually need to make special preparations before your child's blood pressure measurements. A cuff will be placed around his or her arm and pumped up, so your child will feel the arm being squeezed.

You may need to measure your child's blood pressure at home, sometimes over a day. Your doctor or nurse will give you equipment to do this, and show you how to use it.

» More about how blood pressure is measured

Blood pressure and your child's health

Blood pressure in children

Babies, children and young people usually have lower blood pressure than adults. They have different ranges that are considered healthy. These depend on:

- how old they are
- whether they are a boy or a girl
- how tall they are.

Your child's doctor or nurse will know the normal ranges of blood pressure for children who are the same age, sex and height as your child. They will let you know what your child's blood pressure readings mean.

Keeping healthy

Your family can follow some tips to help keep your child's blood pressure healthy. These include:

- eating less salt
- eating a healthy diet
- staying active.

If your child has a kidney condition, your doctor or nurse will give you more information about how this affects blood pressure. Rarely, children need to take medicines to control their blood pressure.

» More about blood pressure and your child's health

Blood pressure and kidneys

Kidneys normally control blood pressure to help make sure it is at a healthy level. They do this by regulating how much salt and water is in the blood. If the kidneys are not working properly, they may not be able to control blood pressure well.

Overview: Read more about blood pressure and kidneys

The kidneys and other parts of the body are involved in the renin–angiotensin system, which helps control blood pressure. There are two types of chemicals.

- **Enzymes** speed up chemical reactions in the body.
- **Hormones** are carried in the blood to send messages to other parts of the body.

The renin–angiotensin system is very complicated, but it is important and works like this:

- The kidneys release an enzyme called **renin.** The liver releases a hormone called **angiotensin**.
- Renin changes angiotensin into **angiotensin I**. When angiotensin I gets to the lungs, some of it is changed into **angiotensin II** by an enzyme called **ACE (angiotensin-converting enzyme**).
- Angiotensin II causes the **adrenal gland**, which sits on top of the kidney, to release another hormone called **aldosterone**. Angiotensin II also causes the small blood vessels (arterioles) to constrict (squeeze), which raises blood pressure.
- When blood flows into the kidney, the filters (**glomeruli**) remove most of the water and salts from the blood into long tubes (**renal tubules**). Some of the water and salts leave the kidney as **urine**, and some are taken back into the blood. The hormone called aldosterone causes more water and salt to be taken back into the blood, which raises blood pressure.

About blood pressure measurements

A blood pressure measurement has two numbers.

- The top number is called the **systolic pressure** – the pressure when the heart **contracts** (tightens), or beats. This is easier to measure and is used more often.
- The bottom number is called the **diastolic pressure** – the pressure when the heart relaxes.

For example, a measurement of 110/75 or 110 over 75 means that the systolic pressure is 110 and the diastolic pressure is 75.

Blood pressure instruments

Blood pressure is measured with a special instrument. There are different types.

Electronic

Many blood pressure instruments are electronic, or digital, and are automated. Different versions are used in the hospital or clinic or at home. The parts include:

- a cuff that wraps around the arm
- a small machine with a screen that shows the blood pressure readings.

Manual

Some blood pressure instruments are manual (worked by hand). These are not automated. The parts include:

- a cuff that wraps around the arm
- a pump to inflate air into the cuff
- a pressure gauge with a dial that shows the blood pressure readings
- a device to listen to the heartbeat:
  - **stethoscope** – doctors often use this to listen to sounds in the body, including the blood flow
  - **Doppler** – a special instrument is used to record sound waves (pulse).

Which instrument is used?

Your doctor or nurse will use the best type and size of instrument for your child.

An electronic instrument may be used for the first blood pressure measurement. If the reading is high, a doctor or nurse may take more measurements with a manual instrument.

How blood pressure is measured

Measuring blood pressure

Measuring blood pressure in young children can be challenging. Your child's doctor or nurse will take a few measurements when your child is relaxed.

If your child's first blood pressure measurement is very high or low, your doctor or nurse will check it a few more times. This is because blood pressure can change depending on the time of day, feeling stressed or after exercising.

Preparing for the test

You do not need any special preparation before your child has his or her blood pressure measured. Here are some tips.

- Your child can wear a shirt with sleeves that are short or can be easily rolled up.
- Explain to your child what will happen during the test. You may say that it won't hurt him or her but that his or her arm will be squeezed for a few moments.
- Help him or her to feel relaxed before and during the test.

What happens?

- Your child will be asked to sit for a few minutes before the measurement is taken.
- The cuff is wrapped around your child's arm and it is pumped up. This holds back the blood flow to that area.
- The pressure on the cuff is slowly released.
- For electronic instruments, the readings appear on a screen.
- For manual instruments, a stethoscope or Doppler is used to listen to your child's pulse, and the readings are taken from the pressure gauge. The systolic number (or top number) is recorded when the pulse is first heard. The diastolic number is recorded when the pulse is no longer heard. The Doppler can only detect the systolic pressure.

Finding out the results

You can find out your child's blood pressure straight away after the test is over.

Measuring blood pressure at home

Blood pressure can vary throughout the day, when we exercise and when we feel stress. Some children feel stress when they visit the doctor. If they feel stress and have higher blood pressure, and no other symptoms of hypertension, this is called **white coat hypertension.**

Measuring at home

Because of this, your doctor or nurse may ask you to measure your child's blood pressure at home. They will explain what to do and how you can report the blood pressure readings. Your child will be able to do many of the activities they usually do.

Your doctor or nurse may ask a community nurse to measure your child's blood pressure at home. Or, you may be asked to use a home electronic monitor to measure your child's blood pressure at regular intervals during the day.

Ambulatory blood pressure monitoring

You may be given a special electronic monitor that automatically measures blood pressure over a period of time, usually 24 hours. This is called **ambulatory blood pressure monitoring (ABPM)**. ("ambulatory" means moving about.)

This monitor will automatically measure your child's blood pressure every half hour during the day, and every hour during the night while he or she is sleeping. Your child will need to keep his or her arm still during each measurement.

ABPM gives a true picture of your child's blood pressure when he or she is awake and asleep. It is normally only used for children aged 5 years or older.

Measuring blood pressure in hospital

For some babies and young children, it can be very difficult to take blood pressure measurements. They may become distressed in the clinic and you may not be able to take the electronic measurements at home.

These children may need to go into hospital for 24 hours to have their blood pressure measured regularly during the day and night.

Your child's health

What do the readings mean?

The normal range of blood pressure for your child depends on his or her age, sex and height. Your doctor or nurse will let you know whether your child's readings are normal and healthy.

If you would like to see the ranges of blood pressure for children from ages 1 to 17 years, download the report, **Diagnosis, evaluation and treatment of high blood pressure in children and adolescents (PDF)**. Tables for boys are on pages 10–11 and tables for girls are on pages 12–13.

Children with kidney disease and some other conditions may benefit from having a blood pressure that is at the lower part of the normal range for their age, sex and height. Your doctor or nurse will give you more information.

Controlling blood pressure

It is important for your child's health that his or her blood pressure is controlled so it is in a healthy range. Below are some tips you can follow as a family to keep your child's blood pressure healthy.

- Reducing the amount of salt you eat can help to control blood pressure. Avoid eating or drinking lots of salted nuts, crisps, crackers, soft drinks, fast food meals, takeaways and processed foods (meals that are pre-prepared, including soups) – these often have more salt than we think. Do not add extra salt to meals that you cook, or at the dining table.
- Eat lots of fresh fruits and vegetables. Swap white bread, rice and pasta for whole-wheat varieties. Avoid food and drinks with lots of added sugar (including sweets, sugary cereals, high-sugar squash and fizzy drinks or sodas). Limit caffeine (which is found in coke drinks, tea and coffee).
- Most children should be physically active for at least 30 minutes a day. Encourage your child to get involved with sports and other activities where they are moving around.
- It is important that your child has a healthy weight for his or her age. Children (and adults) who are overweight are more likely to develop high blood pressure.
- If your child has a kidney condition, he or she may need to make more changes to what he or she eats and how much he or she drinks. A **renal dietitian** – a professional who advises what your child should eat and drink during different stages of a kidney condition – will help you with this.

Your notes and contact information

www.infoKID.org.uk

For details on any sources of information used in this topic, please contact us through our website www.infoKID.org.uk.

We take great care to make sure that the information in this leaflet is correct and up-to-date. However, it is important that you ask the advice of your child's doctor or nurse if you are not sure about something. This information is intended for use in the United Kingdom, and may not apply to other countries.