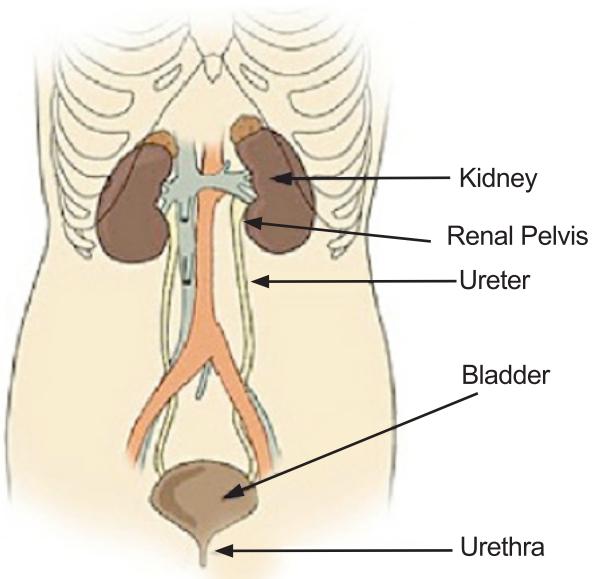


What are kidneys?

Your kidneys are one of the organs in your body that help to keep it working like your heart, lungs and liver. Most people have two kidneys, and they are inside your tummy, tucked away under your ribcage at the back. They lie on either side of the spine or back bone and are protected by the ribs and the back muscles. They are about the size of a matchbox in a baby, and grow as you do till you are fully grown when they will be about the size of a grown up's fist.

Parts of the Urinary System



What do your kidneys do?

Your kidneys act like your body's washing machine, getting rid of waste water and waste products in the form of urine (pee). All the food and drink that your body takes in goes through your stomach (or puku) and into your blood stream. It needs to be filtered or cleaned to make sure that you get the right amount of water and salts to keep your body happy. The kidneys help balance this. If you drink a lot they will get rid of the extra water and if your body needs to hold onto water when you are not well, or on a very hot day, the kidneys make sure that this happens. Without them waste products and water would build up in the blood and you would get very sick.

What else do my kidneys do for my body?

They do lots of other jobs too. They help to produce red blood cells which are needed for the body's health and energy. They produce hormones to keep bones healthy. They help you grow taller and they help to control blood pressure. You don't always need two kidneys to do all this work – many people have one and have a healthy life.

How do they work?

The kidneys work as part of a system called the [urinary tract](#) or system

It's easiest to think of the kidney system in two parts:

- The tissue part of the system that cleans the blood – the kidney
- The drainage part of the system that links up to your bladder

The kidney has 2 big blood vessels taking the blood in and out from the body to be cleaned. There are thousands and thousands of tiny filters and blood vessels inside the kidney that do the blood cleaning and make urine. Even though your kidneys might seem little compared to the rest of your body, this filtering system has enough space to clean your blood hundreds times a day. The filters produce urine that collects in the drainage system of the kidney.

There is an area in the middle of the kidney called the renal pelvis where urine collects before draining down tubes called [ureters](#) to the bladder. Urine collects in the bladder and when it is part full you get the urge to go to the toilet. Then urine gets out through a tube called the [urethra](#).

What tests are done if the doctors think there is a problem?

Your child may require blood and urine tests and to have their blood pressure checked. Many structural kidney problems do not cause symptoms but can be picked up on an [ultrasound scan](#). Ultrasound is also used to check the urinary tract after problems like having an infection. Having an ultrasound is painless and doesn't involve any needles. Sometimes more detailed scans are needed that do involve needles but your child can have a special numbing cream so they don't feel the needle. These scans are called [nuclear medicine scans](#) and they look for areas of damage or abnormality in the kidneys and what the overall function of the kidneys is. The blood tests look at levels of waste products in the blood called [urea](#) and [creatinine](#). If these numbers are higher than expected for the child's age, then this is a sign that the kidneys are not working properly. A more detailed way to look at how the kidneys are working is to measure something called the GFR or [glomerular filtration rate](#) which is more accurate in children. This can be done as a nuclear medicine test or from blood tests.

How are kidney problems found?

Some kidney problems are found on [antenatal](#) scanning. Sometimes your child may become unwell with signs of an infection such as fever and the infection is found to be in the urinary tract.

Kidneys that are not functioning well ([Chronic kidney disease](#)) have very few outward signs, but people notice that their child is smaller than expected, tired and might have a poor appetite. There are no specific signs or symptoms of chronic kidney disease.

The diagnosis of chronic kidney disease requires simple blood and urine tests.

Chronic kidney disease usually gets worse over time and may eventually need treatment with dialysis and/or a kidney transplant.

What problems do children get with their kidneys?

Some children are born with kidney problems and some develop them later on in life. These problems can be structural, due to infection or due to the kidneys failing to work properly. Some of the names you might hear or read include:

- **Urinary tract infection** – this is an infection in the urine in the bladder kidney or both. When the kidney is affected it may be called pyelonephritis (inflammation of the kidney). There is an information leaflet about urine infections in children on this website.
[Urinary tract infections in children leaflet](#)
- Hydronephrosis – this is when the collecting area in the kidney is bigger than normal. The different conditions that cause this are covered in the antenatal screening leaflet.
- **Reflux and dysplasia** – The [ureters](#) (see above) should be a one way system allowing urine to travel down from the kidneys to the bladder. Reflux is where the tubes that drain the kidneys are bigger than usual and can let urine travel back up. Many children grow out of this. Sometimes they need more treatment and sometimes reflux can be associated with an abnormal (dysplastic) kidney(s). Have a look at the [reflux and dysplasia leaflet](#) for more information.
- **Nephrotic syndrome** – this is when the kidney leaks protein leading to fluid accumulating in the body. There are different forms and treatment in children and there is more detail about this in the [Nephrotic syndrome leaflet](#).
- **Glomerulonephritis** – this is an inflammation of the kidneys that can follow some infections. The urine looks dark and your child may look puffy in the face. Post streptococcal infections (the bug that can cause skin and throat infections) are seen more frequently in New Zealand children than in many other countries. It affects both kidneys, and can lead to the kidneys not working fully for a short time and high blood pressure. Many children with glomerulonephritis need a few days in hospital but most recover fully from this illness.
- **Acute kidney failure** (or Acute Kidney Injury) – this is when the kidneys suddenly stop working and need to be supported with machines that temporarily take over the work of the kidneys. Acute kidney failure can occur in some children with [glomerulonephritis](#), or with a condition called HUS or [haemolytic uraemic syndrome](#) which can follow a particular form of gastroenteritis. If your child has acute renal failure their care would be discussed with the kidney specialists at Starship Hospital and your child may need to be transferred there for further care.
- **End stage kidney disease** – these are kidneys that have stopped working completely with no chance of recovery. There are about 50 children with this at any time in New Zealand. They need dialysis or transplant to keep them alive, and other medications to try to replace the other jobs that the kidneys do.
- **Chronic kidney disease** (CKD), also known as chronic renal disease is a term used to describe kidney damage or reduced kidney function, whatever the cause, that doesn't go away.

Remember that while urine infections are a very common problem in early childhood, most of these other conditions are rare

Can kidney problems run in families?

This depends on the type of kidney problem. Many kidney problems, such as the nephrotic syndrome, happen for the first time in a family. Some conditions, however, can be inherited, or happen more frequently in some families. This has been known about for many years with some forms of kidney disease such as [polycystic kidney disease](#), but we are learning more and more about the role that genetics or inheritance can play in structural abnormalities in the urinary tract too. Your doctor will be able to tell you more about this, and whether other people in the family need to be tested as well. Your doctor will also take into account whether knowing about the condition would be of benefit to your child. Many things do not show up or cause issues until adult life and so screening too early for them might cause unnecessary anxiety or problems.

What can I do for my kidneys?

We know in adults that having high blood pressure, being overweight and smoking can cause problems for your kidneys. So it makes sense to develop healthy habits in childhood around food and exercise. As you get older having a blood pressure check if you have to go to the doctors for any reason is a good idea too.

Where can I find out more information?

There are more information leaflets on the Kidney Health New Zealand website.
(KHNZ sheet – [“The kidneys and kidney disease”](#)) You could also look at the Kidshealth website (www.kidshealth.org.nz – which is run by the Paediatric Society of New Zealand to provide information for parents). If you are worried about your child's kidneys then a good person to talk to is your GP.

Glossary

- ◀ **Antenatal**
Before birth
- ◀ **Chronic kidney disease**
Chronic kidney disease (CKD), also known as chronic renal disease is a term used to describe kidney damage or reduced kidney function (irrespective of the cause) that persists for more than 3 months.
- ◀ **Creatinine**
Creatinine is a product of muscle metabolism and excreted by the kidneys. Elevated levels can indicate kidney disease.
- ◀ **Glomerular filtration rate**
The flow rate of filtered fluid through the kidney
- ◀ **Glomerulonephritis**
An inflammatory disease of the kidney filters (glomeruli).
- ◀ **Haemolytic uraemic syndrome**
Often referred to as HUS. A condition that results from the abnormal premature destruction of red blood cells. Once this process begins, the damaged red blood cells start to clog the filtering system in the kidneys, which may eventually cause the life-threatening kidney failure.
- ◀ **Nuclear medicine scans**
To perform a nuclear medicine scan, a radioactive pharmaceutical is first administered to the patient, usually intravenously. Depending on the type of scan, the pictures may be taken immediately and/or after a period of time during which the pharmaceutical localises in the target organ/system.
- ◀ **Polycystic kidney disease**
An inherited progressive form of kidney disease characterized by formation of multiple cysts of varying size scattered diffusely throughout both kidneys that may result in destruction of the kidney, hypertension, blood in the urine, and kidney failure.
- ◀ **Ultrasound scan**
An ultrasound scan is a painless test that uses sound waves to create images of organs and structures inside your body. It is a very commonly used test. As it uses sound waves and not radiation, it is thought to be harmless.
- ◀ **Urea**
Urea is a nitrogen-containing substance normally removed from the blood by the kidney into the urine. Kidney disease often leads to increased blood levels of urea.
- ◀ **Urinary tract infection**
A urinary tract infection (UTI) is a bacterial infection that affects any part of the urinary tract.
- ◀ **Ureters**
Muscular tubes that propel urine from the kidneys to the urinary bladder
- ◀ **Urinary tract**
The organs of the body that produce and discharge urine. These include the kidneys, ureters, bladder, and urethra.
- ◀ **Urethra**
The transport tube leading from the bladder to discharge urine outside the body.