

Fact sheet

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All About Chronic Kidney Disease (CKD)

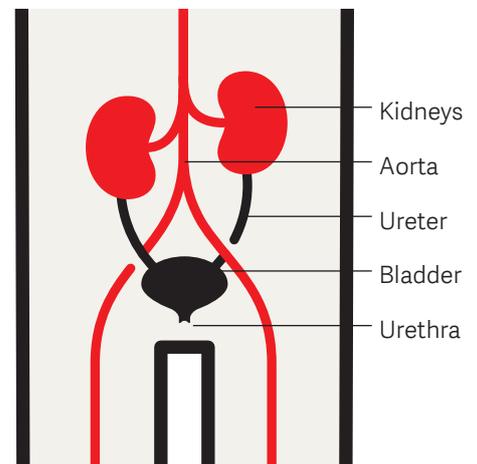
Inside each kidney there are about one million tiny units called nephrons. The nephrons are the part of the kidney, which filter the blood. Each nephron is made up of a very small filter called a glomerulus. As blood passes through the nephron, water and waste products are removed. Most of the water returns to the blood and the waste products collect in the bladder then leave the body as urine (wee). Most kidney diseases attack the nephrons.

Sometimes kidney failure can happen quickly. For example, kidney failure can be caused by a sudden loss of large

amounts of blood or by an accident. A sudden drop in kidney function is called Acute Kidney Failure and is often short lived but can occasionally lead to lasting kidney damage.

More often kidney function worsens over a number of years. If kidney disease is found early, medication, dietary and lifestyle changes can increase the life of your kidneys and keep you feeling your best for as long as possible.

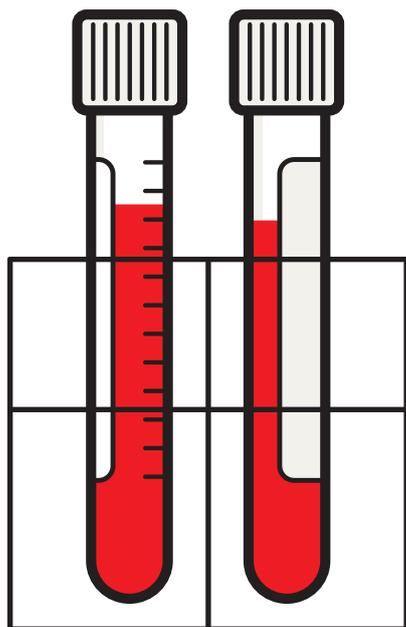
Sometimes kidney disease leads to kidney failure, which requires dialysis or a kidney transplant to keep you alive.



What are the signs of chronic kidney disease?

Kidney disease is called a 'silent disease' as there are often no warning signs. It is not uncommon for people to lose up to 90% of their kidney function before getting any symptoms. The first signs may be general and include:

- high blood pressure
- changes in the amount and number of times urine is passed, e.g. at night
- changes in the appearance of urine
- blood in the urine
- puffiness e.g. legs and ankles
- pain in the kidney area
- tiredness
- loss of appetite
- difficulty sleeping
- headaches
- lack of concentration
- itching
- shortness of breath
- nausea and vomiting
- bad breath and a metallic taste in the mouth



How is chronic kidney disease diagnosed?

If kidney disease is suspected, you will have some kidney function tests to measure how well your kidneys are working and help plan your treatment, including:

- Tests for albumin (a type of protein) and/or blood in your urine.
- A blood test to find out the level of waste products in the blood and calculate your glomerular filtration rate (GFR — see below).
- A blood pressure test as kidney disease causes high blood pressure, which can damage the small blood vessels in the kidneys. High blood pressure can also cause kidney disease.

- An ultrasound or Computed Tomography scan (CT scan) to take a picture of your kidneys and urinary tract. These tests show the size of your kidneys, locate kidney stones or tumours and find any problems in the structure of your kidneys and urinary tract.

You may also visit a kidney specialist (called a nephrologist) to help manage your care and decide if a kidney biopsy is needed. During a kidney biopsy a small piece of kidney tissue is removed and looked at under a microscope to find out the type of kidney disease and check if the kidneys are damaged.

What do kidney test results mean?

The following blood and urine tests are commonly performed to assess kidney function.

Glomerular filtration rate (GFR) is the best measure of your kidney function and helps decide the stage of kidney disease. It shows how well your kidneys are cleaning the blood. Your GFR is usually estimated (eGFR) from the results of the creatinine blood test. eGFR is reported in millilitres per minute per 1.73m^2 ($\text{mL}/\text{min}/1.73\text{m}^2$).

Your eGFR can also be used to work out your percent of kidney function. This is an estimate of the level that each kidney is working. A GFR of $100\text{ mL}/\text{min}/1.73\text{m}^2$ is in the normal range so it is useful to say that $100\text{ mL}/\text{min}/1.73\text{m}^2$ is about equal to '100% kidney function'. A GFR of $50\text{ mL}/\text{min}/1.73\text{m}^2$ could be called '50% kidney function' and a GFR of $30\text{ mL}/\text{min}/1.73\text{m}^2$ could be called '30% kidney function'.

See the eGFR fact sheet for more information.

Albuminuria can mean that your kidneys are damaged so albumin, a kind of protein, leaks into the urine. A small or 'micro' amount of albumin in the urine is called microalbuminuria, and a larger 'macro' amount is called macroalbuminuria. Albuminuria is often an early warning of kidney disease but can also be present for other reasons. Albuminuria can be detected by a special urine test called an albumin:creatinine ratio (ACR). An ACR is performed on a single sample of urine.

See the *Albuminuria* fact sheet for more information.

Haematuria or blood in the urine occurs when red blood cells leak into the urine. It can turn urine a red or dark cola colour. Sometimes the blood in the urine is not visible to the eye, but may be found on a urine test. This is called microscopic haematuria. Blood in the urine is a common sign of urinary tract infections but can also be the first sign of a problem with the kidneys or the bladder.

Creatinine is a waste product made by the muscles. It is usually removed from the blood by the kidneys and passes out in the urine. When the kidneys aren't working well, creatinine stays in the blood. A blood test helps to work out how quickly your kidneys remove or 'clear' creatinine from the blood. Creatinine is a good measure of kidney function as it does not change with diet. However it does vary with age, gender and body weight so is not an accurate way of measuring overall kidney function.

Urea is a waste product made by the body as it uses protein from the food you eat. If you have lost some kidney function, your kidneys may not be able to remove all the urea from your blood.

Potassium is a mineral found in many foods. If your kidneys are healthy, they remove extra potassium from the blood. If your kidneys are damaged, the potassium level can rise and affect your heart. A low or high potassium level can cause an irregular heartbeat.

What is the definition of chronic kidney disease?

To be diagnosed with chronic kidney disease you must have a GFR less than 60 mL/min/1.73m² for more than three months.

or

Evidence of kidney damage for more than three months, regardless of your GFR.

Kidney damage can be any of the following:

- albuminuria
- haematuria
- pathological abnormalities (such as an abnormal kidney biopsy result)
- structural abnormalities (such as an abnormal kidney ultrasound result)

Stages of chronic kidney disease

Kidney function can be classified into stages depending on your eGFR.

Stage 1	A normal eGFR greater than or equal to 90 mL/min/1.73m ²
Stage 2	Slightly decreased eGFR between 60–89 mL/min/1.73m ² <i>If your kidney function is at stage 1 or 2, you only have CKD if you have albuminuria, haematuria, a pathological abnormality or a structural abnormality.</i>
Stage 3a	Mild–moderate decrease in eGFR between 45–59 mL/min/1.73m ²
Stage 3b	Moderate–severe decrease in eGFR between 30–44 mL/min/1.73m ²
Stage 4	Severe decrease in eGFR between 15–29 mL/min/1.73m ²
Stage 5	Kidney failure as eGFR decreases to less than 15 mL/min/1.73m ² or dialysis is started

Description of kidney disease

Please note that the following descriptions are a general guide only, and may not apply to everyone. Some people reach end stage kidney disease (Stage 5) without experiencing any symptoms, while some people may start to feel unwell in the early stages of kidney disease. Many factors affect the progress of kidney disease and these are not completely understood.

Early stages (stages 1–2)

Some people have no symptoms of chronic kidney disease; however there is more risk of dehydration and a higher sensitivity to medications. It is very important to talk to your doctor before starting any new medications including over the counter and 'natural' or herbal medications. The risk of heart (cardiovascular) disease also starts to increase. Management includes maintaining a healthy blood pressure and making healthy lifestyle choices to delay or prevent progress to the next stage.

Middle stages (stages 3–4)

Discovering kidney disease during this stage is more common as the level of waste (urea and creatinine) in the blood rises. You may begin to feel unwell and notice changes in the number of times you pass urine. As kidney function slows down, blood

pressure rises. Early signs of bone disease and anaemia may appear. Management can slow the progress of kidney disease and reduce the likelihood of further complications.

Later stages / end stage kidney disease (stage 5)

Changes may occur in the amount of urine passed. High blood pressure is almost always present. The amount of protein in the urine increases, as do the levels of creatinine and potassium in the blood. You are more likely to feel unwell, and you may also experience other complications of kidney disease, such as low haemoglobin (anaemia).

Even with the best management, kidney disease sometimes leads to stage 5 (or end-stage kidney disease), which requires dialysis or a kidney transplant to maintain life.

Who is more at risk of chronic kidney disease?

You are at increased risk of chronic kidney disease if you:

- have high blood pressure
- have diabetes
- have established heart problems (heart failure or past heart attack) and/or had a stroke
- have a family history of kidney failure
- are obese (body mass index ≥ 30)
- are a smoker
- are 60 years or older
- are of Aboriginal or Torres Strait Islander origin
- have had an episode of acute kidney injury

For more information about kidney or urinary health, please contact our free call Kidney Health Information Service (KHIS) on 1800 454 363.

Or visit our website kidney.org.au to access free health literature.

This is intended as a general introduction to this topic and is not meant to substitute for your doctor's or Health Professional's advice. All care is taken to ensure that the information is relevant to the reader and applicable to each state in Australia. It should be noted that Kidney Health Australia recognises that each person's experience is individual and that variations do occur in treatment and management due to personal circumstances, the health professional and the state one lives in. Should you require further information always consult your doctor or health professional.



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